

Communications Review

New opportunities in familiar places



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Collaborating in the indirect sales channel

Reshaping retail through mobile wallets

Facing realities in mHealth

Ensuring an ROI from 4G

Creating value from network decommissioning

Often in the telecoms sector, we look for opportunities and inspiration in new places: a technology, a geography, a demographic. As a result, we miss opportunities that still exist in places we have already been. Some places are worth a second look.

Cover image: View of the Eiffel Tower from the Trocadero.

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Any operator with ambitions to lead in enterprise telecommunications shouldn't overlook small to medium-sized businesses – a segment that represents up to 45% of the market value for enterprise telecommunications services. In the past, innovation has been focused at the product level but success lies in selling and creating customer relationships around a compelling proposition. By innovating within the channel model, operators can use partnerships to acquire the technical and commercial expertise necessary to unlock greater value from information and communications technology services.

by Cledwyn Jones and Tom Birtwhistle

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Mobile wallets in retail

Mobile commerce is about more than simply contactless payment. Its services range from personalised, location-specific advertising to transport tickets, and from loyalty schemes to secure building access. To deliver all these services in a consistent, integrated way on mobile handsets, operators are starting to work with partners but, in our view, a large opportunity is still waiting to be exploited. Operators can collaborate together – and with retailers – to use mobile wallets and m-commerce to reshape and redefine the entire retail experience and relationship.

by Colin Light and Peter Stubbs

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Emerging mHealth: paths for growth

As part of our continued focus on mobile health, PwC recently commissioned the Economist Intelligence Unit (EIU) to examine the current state and potential of mobile health (mHealth), barriers to adoption and opportunities for companies seeking growth in the mHealth space. Here we present an excerpt from the full report, *Emerging mHealth: Paths for growth*, based on surveys and interviews with key subject matter experts conducted by the EIU.

by Economist Intelligence Unit

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Smarter investing: ensuring an ROI from 4G

To meet the demand for 4G/LTE spectrum and networks, the communications industry will need to make a major new wave of capital investment over the next three to four years. As this requirement grows nearer, competition for capital remains fierce. To get a reasonable return on their investments—and avoid the history of what happened with 3G—operators need to take a selective approach to acquiring spectrum and a collaborative approach to infrastructure, while using more sophisticated techniques for managing capital expenditures.

by Rolf Meakin and Brian Potterill

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Clearing the way

As telecom operators around the world continue to upgrade their network technologies to improve performance and increase capacity, many of them are confronted with the challenge of maintaining multiple generations of technologies and networks. Dealing with the complexity and cost of maintaining these networks, and needing to make assets that are valuable but occupied by older and less efficient technology available for reuse, operators have begun preparing to decommission their older networks. Here we present highlights and analysis of a recent PwC survey of operators' plans and efforts to decommission networks

by Dan Hays and Greg Chiasson

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Petite entreprise, grosse opportunité

Les opérateurs qui veulent être leaders dans les télécommunications d'entreprise ne devraient pas négliger les petites et moyennes entreprises – un segment qui représente jusqu'à 45 % de la valeur de marché des services de télécommunications d'entreprise. Alors que l'innovation se concentrait auparavant sur les produits, réussir aujourd'hui demande de vendre et de créer des relations client autour d'une proposition convaincante. En innovant au sein du modèle de distribution, les opérateurs peuvent nouer des partenariats afin d'acquérir l'expertise technique et commerciale nécessaire pour mieux valoriser les services de technologies de l'information et de la communication.

par Cledwyn Jones et Tom Birtwhistle

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Portefeuilles mobiles dans la distribution

Le commerce mobile ne s'arrête pas au paiement sans contact. Il englobe aussi bien la publicité personnalisée et localisée, et les titres de transport, que les systèmes de fidélisation et la sécurisation de l'accès aux locaux. Pour proposer tous ces services dans une offre cohérente et intégrée sur les téléphones portables, les opérateurs commencent à travailler avec des partenaires mais, selon nous, ils ne se sont pas encore saisis de l'opportunité considérable qui leur est offerte. Ils peuvent en effet travailler ensemble – et avec les distributeurs – pour redéfinir et profondément transformer l'expérience d'achat et la relation client en s'appuyant sur les portefeuilles mobiles et le m-commerce.

par Colin Light et Peter Stubbs

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« Emerging mHealth: paths for growth »

Dans le cadre de son travail de veille sur le sujet de la santé mobile, PwC a récemment chargé l'Economist Intelligence Unit (EIU) de faire le point sur la situation et le potentiel de la santé mobile (m-Santé), les obstacles à l'adoption et les opportunités pour les entreprises qui cherchent à se développer dans ce secteur. Nous présentons ici un extrait du rapport intitulé « Emerging mHealth: Paths for growth », rédigé par l'EIU à partir d'enquêtes et d'entretiens avec des spécialistes en la matière.

par Economist Intelligence Unit

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Mieux investir pour rentabiliser les investissements dans la 4G

Pour répondre à la demande de fréquences et de réseaux 4G/LTE, le secteur des communications va devoir réaliser une nouvelle série d'investissements de grande ampleur dans les trois à quatre prochaines années. Alors que l'échéance se rapproche, la concurrence pour le capital reste féroce. Pour dégager un retour sur investissement raisonnable – et éviter ce qui s'est produit avec la 3G – les opérateurs doivent se montrer sélectifs dans l'acquisition de fréquences et adopter une approche collaborative de l'infrastructure, tout en recourant à des techniques plus sophistiquées pour gérer les dépenses d'investissement.

par Rolf Meakin et Brian Potterill

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Faire place nette

Alors que les opérateurs de télécommunications du monde entier poursuivent la modernisation de leurs technologies réseau pour améliorer les performances et accroître les capacités, un grand nombre d'entre eux doivent assurer la maintenance de multiples générations de technologies et de réseaux. Face à la complexité et au coût de la maintenance de ces réseaux, et à la nécessité de libérer, pour les réutiliser, des actifs précieux mais occupés par des technologies anciennes et moins efficaces, les opérateurs ont commencé à préparer la mise hors service de leurs réseaux anciens. Nous présentons ici les points saillants et l'analyse d'une enquête récente de PwC sur les projets et les efforts des opérateurs pour mettre les réseaux hors service.

par Dan Hays et Greg Chiasson

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Pequeñas empresas, grandes oportunidades

Los operadores que quieran liderar el sector de las telecomunicaciones no deberían ignorar a las pequeñas y medianas empresas, un segmento que representa hasta un 45% del valor de mercado de los servicios corporativos de telecomunicaciones. Si bien antes la innovación se centraba en el producto, ahora el éxito reside en la venta y en la creación de relaciones con el cliente con una propuesta convincente. Al innovar el modelo de canales, los operadores pueden iniciar colaboraciones y así adquirir experiencia técnica y comercial que les permita crear más valor en los servicios de las tecnologías de información y comunicación.

por Cledwyn Jones y Tom Birtwhistle

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Los monederos móviles en retail

El comercio móvil es mucho más que simplemente el pago a distancia. Sus servicios van desde la publicidad personalizada y localizada, hasta la oferta de billetes de transporte o desde los programas de fidelidad hasta el control de acceso en edificios. Para ofrecer todos estos servicios de forma coherente e integrada en los dispositivos móviles, los operadores ya están iniciando alianzas, pero aún hay muchas oportunidades. Así, los operadores pueden colaborar entre sí —y con “retailers”— en el uso de monederos móviles y en el comercio móvil para rehacer y redefinir la experiencia de compra y de relaciones.

por Colin Light y Peter Stubbs

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Informe: “Emerging mHealth: Paths for growth”

Como PwC considera de gran importancia la salud móvil, confió recientemente a la unidad Economist Intelligence Unit (EIU) un análisis sobre la situación actual y el potencial de la salud móvil, las barreras a su adopción y las oportunidades para las compañías que buscan crecer en el sector de la salud móvil. En el presente artículo se presenta un resumen del informe completo, titulado “Emerging mHealth: Paths for growth”, cuyas conclusiones se basan en encuestas y entrevistas realizadas a expertos del sector.

por Economist Intelligence Unit

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Una inversión más inteligente: cómo asegurar el retorno de la inversión en la tecnología 4G

El sector de las telecomunicaciones tendrá que realizar nuevas inversiones de capital importantes durante los próximos tres a cuatro años, si quiere cumplir la demanda de espectro y redes 4G/LTE. A medida que se aproxima la necesidad de inversión, se intensifica la batalla por el capital. Para tener un retorno razonable de sus inversiones —y evitar lo sucedido con la tecnología 3G— los operadores deberán mostrarse selectivos a la hora de adquirir espectro y colaborar en el tema de las infraestructuras. A la vez, deberán emplear técnicas de gestión más sofisticadas para controlar los gastos de inversión.

por Rolf Meakin y Brian Potterill

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Informe: “Clearing the way”

Los operadores de telecomunicaciones de todo el mundo continúan actualizando sus tecnologías de red para mejorar el rendimiento e incrementar su capacidad. Pero a la vez, un gran número se enfrenta a tener que mantener múltiples generaciones de tecnologías y redes. Por ello, algunos están preparando el desmantelamiento de sus redes más antiguas y así abordar la complejidad y los costes ligados al mantenimiento de esas redes. Además, deben liberar activos valiosos ocupados por tecnologías más antiguas y de menor eficiencia a efectos de su reutilización. En este artículo, se presenta un extracto de la encuesta “Clearing the way”, elaborada por PwC sobre el tema del desmantelamiento de redes por los operadores.

por Dan Hays y Greg Chiasson

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Kleine Unternehmen, große Chancen

Jedes ambitionierte Unternehmen auf dem Markt für B2B-Telekommunikationsdienstleistungen sollte den Mittelstand nicht aus den Augen verlieren – ein Segment, das 45 % des Marktwerts für B2B-Telekommunikation repräsentiert. In der Vergangenheit waren Innovationen hauptsächlich Produkt-fokussiert. Der Erfolg liegt jedoch in dem Verkauf und der Schaffung von Kundenbeziehungen durch überzeugende Angebote. Mit Innovationen im Bereich Telekommunikationskanäle können Betreiber neue Partnerschaften nutzen, um notwendige technologische und kommerzielle Expertise zu gewinnen und damit größere Mehrwerte aus Informations- und Telekommunikationsdiensten zu generieren.

von Cledwyn Jones und Tom Birtwhistle

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Mobile Geldbörse: Bedeutung für den Einzelhandel

Mobile Commerce ist mehr als das kontakt- und bargeldlose Bezahlen. Die Dienstleistungen reichen von personalisierter, ortsbasierter Werbung bis hin zu Fahrscheinen für den Personentransport und von Treueprogrammen bis hin zu sicheren Gebäudezugangssystemen. Um all diese Dienstleistungen gut in mobile Endgeräte integriert anbieten zu können, fangen die Netzbetreiber bereits an, Partnerschaften zu schließen. Viele Möglichkeiten bleiben unserer Meinung nach aber nach wie vor ungenutzt. In Zusammenarbeit mit einander und mit dem Einzelhandel können Netzbetreiber mobile Geldbörsen und M-Commerce dafür zu nutzen, um das gesamte Einkaufserlebnis und die Beziehung zu Kunden neu zu definieren.

von Colin Light und Peter Stubbs

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Wachstumsmarkt Mobile Health – Wege zum Erfolg

Im Rahmen unseres langfristigen Fokus-Themas Mobile Health Markt, hat PwC kürzlich die Economist Intelligence Unit (EIU) beauftragt, den aktuellen Status und das Potenzial des Marktes für mobile Gesundheitsdienstleistungen aufzuzeigen sowie die Herausforderungen für Unternehmen, die von diesem Wachstumsmarkt profitieren möchten, zu identifizieren. Wir präsentieren hier einen Auszug aus dem Gesamtreport „Emerging mHealth: Paths to growth“. Die Studie basiert auf Umfragen und Interviews mit Industrieexperten, die von der EIU durchgeführt wurden.

von Economist Intelligence Unit

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Smarte Investition: Das ROI bei 4G-Netzen sichern

Um die Nachfrage nach 4G/LTE-Spektrum und -Netzwerken zu bedienen, wird die Telekommunikationsindustrie eine neue Investitionswelle in den nächsten drei bis vier Jahren starten müssen. Da diese Notwendigkeit immer näher rückt, herrscht ein harter Wettbewerb um das benötigte neue Kapital. Um einen akzeptablen Return on Investment (ROI) für die hohen Investitionen zu erzielen – und um die Geschichte, die mit 3G passiert ist, zu vermeiden – sollten die Netzbetreiber einen selektiven Weg für die Gewinnung von Bandbreite und einen kollaborativen Weg für den Infrastrukturausbau gehen und dabei intelligente Techniken zur Verwaltung von Kapitalinvestitionen einsetzen.

von Rolf Meakin und Brian Potterill

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Den Weg frei machen

Während Telekommunikationsbetreiber auf der ganzen Welt weiter ihre Netzwerke ausbauen, um die Leistung und Kapazität zu verbessern, sehen sich viele mit der Herausforderung von dem Instandhalten von Netzwerken aus verschiedenen Generationen konfrontiert. Um mit dieser Komplexität und den Kosten umzugehen, und um die wertvollen Anlagen für die Nutzung mit neuen effizienteren Netzwerktechnologien frei zu machen, haben Netzbetreiber angefangen, die alten Netzwerke für die Stilllegung vorzubereiten. Wir präsentieren hier die wichtigsten Ergebnisse und Analysen aus einer aktuellen PwC-Studie über Pläne und Maßnahmen der Netzbetreiber zur Stilllegung von Netzwerken.

von Dan Hays und Greg Chiasson

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小企业，大机遇

任何有雄心要领航于电信行业的运营商都不应该忽视中小型企业——一个占据整个行业45%市场价值的领域。过去，电信创新主要围绕产品展开，但其创造的价值却取决于营销和建立客户关系。而通过渠道模式的创新，运营商可以利用合伙制来获得技术和商业专长，进而从信息技术服务中取得更大的收益。

作者：Cledwyn Jones, Tom Birtwhistle

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零售业中的手机钱包

移动商务已经不只是简单的免触支付，其服务领域非常广泛，无论个性化的、定位精确的广告营销到交通票务服务，还是从忠诚客户奖励计划到大楼安检系统都需要运用到移动商务。为了能够稳定的、一站式的使用手机提供移动商务服务，运营商已经着手与形形色色的合作伙伴开展合作，但是本文作者认为该领域仍有巨大的商机有待开发。运营商可以通过相互合作及联手零售商，借助手机钱包和移动商务来重塑客户的零售体验和零售关系。

作者：Colin Light, Peter Stubbs

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新兴的移动医疗：产业增长轨道

随着对移动医疗的持续关注，普华永道近期委任经济学人智库（EIU）来研究移动医疗的现状和潜力，以及企业在该领域寻求增长所面临的机遇和障碍。以下为您提供了一份《新兴的移动医疗：产业增长轨道》的报告摘录，该报告基于EIU对该领域专家的调研和访谈完成。

作者：本文来自经济学人智库

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更明智的投资：确保4G技术的投资回报率

为了满足4G/LTE技术对频谱和网络的需求，通信行业将在未来三到四年内掀起资本投资的新浪潮。随着需求的日益迫切，资本竞争也将愈发激烈。为了取得合理的4G投资回报并避免类似于3G投资的历史重演，运营商需要更加有针对性的挑选频谱并合作建设基础网络，同时运用更为精确的手段来管理资本支出。

作者：Rolf Meakin, Brian Potterill

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扫清障碍

由于全球的电信运营商不断升级其网络技术以提高性能和增加容量，许多运营商正面临着同时维护多代技术和网络的挑战。为了应对维护复杂性及控制维护成本，并且释放陈旧、低效技术占用资产以备再利用，运营商已经开始淘汰陈旧网络。以下为您提供了一份普华永道的最新调查报告，其中突出强调和分析了运营商对于淘汰陈旧网络的计划和做出的尝试。

作者：Dan Hays, Greg Chiasson

Message from the editor



In the last edition of *Communications Review*, we discussed the opportunities for communications operators in one of the world's newest and arguably most exciting marketplaces: Africa. In this issue, we shift the focus to look at new opportunities that are arising in some familiar areas that already represent well-trodden terrain for the industry. With this aim in mind, we offer three articles that examine revenue opportunities in channels or markets that operators are already in or are exploring, but where they may not yet have quite the right focus or strategies. We complement these revenue-oriented articles with two that focus on the costs side of the business.

All five articles are united in reflecting two further industry trends. Firstly, they all touch on the value and importance of collaboration. Secondly, they all highlight the potential of a 'virtuous circle' of spending. Spending makes innovative new services possible, and the resulting revenues support the developing of more new services – which lead to further revenues.

In the first article, 'Small business, big opportunity', authors Cledwyn Jones and Tom Birtwhistle begin by describing two major hurdles that historically have hindered operators' efforts to seize the huge opportunities that exist in the small and medium-sized business (SMB) space. The first is the market fragmentation and sheer diversity of SMBs, many of which number their employees in single figures. The second is that SMBs generally prefer to do business with other companies of similar size and to have face-to-face relationships. Cledwyn and Tom examine how operators can use indirect sales channels to overcome these two barriers. By structuring, managing and offering their indirect partners incentives designed to encourage the right behaviours, operators can build the appropriate SMB relationships and revenues.

As more and more mobile-commerce and mobile-payment offerings are emerging from a variety of providers, we take a look at the retail sector. Our second article – ‘Mobile wallets in retail’ by Colin Light and Peter Stubbs – turns the spotlight onto retail as another area of largely untapped opportunity for operators. Building on their article on the cross-industry potential of mobile wallets in a previous edition of *Communications Review*, the authors zero in on how mobile wallets are transforming the retail sector, and examine how and why operators are uniquely positioned to collaborate with retailers to make progress in this area. The outcome can be a complete reshaping and redefining of the retail experience and relationship, with operators sharing the resulting value and revenues.

Our third article, ‘Emerging mHealth: paths for growth’, looks at another familiar area of pent-up opportunity: healthcare. To investigate the global potential of mobile health services, PwC has been collaborating with the Economist Intelligence Unit (EIU) on a research project. This article is an excerpt from the latest research report, based on the EIU’s findings from subject matter experts. As the piece points out, mobile technology is expected to help increase access to care in emerging markets and to lead to less expensive, more prevention-

based and more patient-focused systems worldwide. But the experts interviewed by the EIU caution that several challenges need to be addressed if these ambitious goals are to be achieved.

Our final two articles move on to examine opportunities on the costs side of the house. In ‘Smarter investing: ensuring an ROI from 4G’, Rolf Meakin and Brian Potterill focus on the forthcoming wave of capital investment in fourth-generation (4G)/long-term-evolution spectrum and networks. And they ask how the industry can avoid a repeat of the relatively disappointing returns on their investments in 3G. In the authors’ view, the answer lies in taking a selective approach to spectrum and a collaborative approach to infrastructure, while also managing capital expenditures in smarter and more sophisticated ways.

Finally, in our fifth article, ‘Clearing the way’, authors Dan Hays and Greg Chiasson look at a challenge that is confronting operators around the world as they upgrade their networks to boost performance and capacity: the need to maintain multiple generations of technologies and networks. To find out how operators are rising

to this challenge, PwC surveyed industry executives globally, asking about their plans and approaches for decommissioning their networks. Drawing on the results of the survey, the authors find that network decommissioning represents perhaps the next great challenge for operators worldwide. They conclude that strong planning and execution, including accounting for potential offsets to costly decommissioning activities, will be critical to success.

In business, as in life, the need to constantly scan the horizon means it is often harder to see the opportunities that are under our noses. So in this issue we have explored some opportunities that we may risk overlooking because they are simply too close to home. I hope you find the articles, opinions and insights in this edition entertaining and informative, and I look forward to receiving your suggestions and feedback. Please send any comments to me at pierre-alain.sur@us.pwc.com, or feel free to call me on [1] 646 471 6973.



Pierre-Alain Sur
Partner
Global Communications Leader
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Small business, big opportunity

Operators can't afford to ignore small to medium-sized businesses (SMBs) – a segment that represents up to 45% of the market value for enterprise telecommunications services.

With the revenues from traditional sources stagnating, or declining, telcos are looking for opportunities in adjacent markets. Targeting information and communications technology (ICT) services for enterprises is nothing new, but we believe recent trends make it a credible possibility for operators, especially in the SMB segment. By innovating within the channel model, operators can use partnerships to acquire the technical and commercial expertise necessary to unlock greater value from ICT services.

Any operator with ambitions to lead in enterprise telecommunications shouldn't overlook SMBs. In the past, innovation has been focused at the product level but success lies in selling and creating customer relationships around a compelling proposition. Operators that take another look at their indirect sales channels have the opportunity to challenge the competition and make a meaningful contribution to the top line growth in their business-to-business services.

**by Cledwyn Jones
and Tom Birtwhistle**

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Businesses spend US\$630bn on telecommunications services globally. But that amount isn't distributed evenly. Multinational customers easily can have annual communication expenditures of \$100m+ and so can demand dedicated account management from a direct sales force. These kinds of accounts attract most of the headlines – and the associated coverage from analysts – but represent only part of the opportunity. According to our analysis, small to medium-sized businesses (SMBs) can represent up to 45% of the total market value for business-to-business telecom services. That's more than any other information and communications technology (ICT) segment.

Two major characteristics make tapping into the SMB opportunity difficult for large telecom operators. Firstly, more than any other customer segment, the SMB market is highly fragmented. For example, there are approximately 14m SMBs in the UK, and more than 50% of them have fewer than nine employees. Managing a direct sales force to target this type of segment is difficult. And it's uneconomical, because having a meaningful presence in the market requires investing significantly to get the right density and geographic spread of sales people.

Secondly, SMBs prefer to do business with other companies of similar size and to have face-to-face relationships. They believe they have

the opportunity to negotiate the best deals or prices from sales staff with access to reliable information and a local contact they can turn to for quick, uncomplicated resolutions of their service requirements. While consumers value the recognised brand name of a major telecom operator, many SMBs are reluctant to be treated as the anonymous customer account number of a 'big business' service provider.

Being relatively small in size and regional in focus, independent telecoms dealers are well placed to build and sustain face-to-face relationships with SMBs. This position makes the indirect channel a critical sales asset for telcos operating in the SMB market.

Changing direction, changing channels

Some operators perceive the indirect channel as a necessary evil, an unfortunate characteristic of the SMB market that necessitates an intermediary between the operator and the customer. Operators with an ineffective indirect channel complain of a lack of loyalty within their partner base, high churn and channel conflict with their direct sales resources.

Our experience has shown us four elements that characterise an ineffective indirect channel:

1. 'Anonymous' partner relationship with the operator. Partners are perceived, and treated, as an anonymous channel by the operator and are simply expected to execute against sales and performance targets with little support from the operator.

2. Lack of customer ownership boundaries between operator and partner. Channel partners feel they must own the customer relationships if they are to build a sustainable subscriber base and that third-party permissions and restrictions damage the credibility of partners.

3. Poor operational support for indirect channel. Partners are typically sales-based businesses with relatively limited operational scale and resource capability to manage complex operator processes and reporting. Operators often don't provide the operational resources to support and enable the indirect channel, hindering their success at selling and the trusted relationship between operator and partner.

4. Complex commissions and commercials and a lack of commercial 'WIN/WIN' understanding between operator and partner. Operators frequently change pricing and commission schemes, having little or no dialogue with the channel partner first. Operators create restrictive controls that limit partners' ability to manage customers' demands, like mid-term contract upgrades. And limiting partners in the value they can offer customers potentially increases churn.

We believe that operators who use channel partners as suppliers of commodity transactions are missing an opportunity. Successful operators are innovating and winning within the indirect channel by creating an effective and mutually successful partnership. (See 'Case study: Segmenting indirect channel management.')

For dealers to be the growth engine of new business, they need adequate and appropriate commercial incentives, operational support and financial investment. Clearly defined tiers based on key performance indicators – like connections, churn, average revenue per user (ARPU) and affiliation – should focus dealers' behaviour and give clear incentives for improving performance. While commercial incentives are vital, nonfinancial benefits – like product training, marketing collateral or even transferring subscriber management from the direct channel to the partner – are important as well. Nonfinancial benefits create a clear differentiation among the tiers and the motivation to progress up the tiers. And they motivate partners to become more tightly committed to one operator as opposed to a general partner of many.

Of all the ways operators can shape their partner relationships, the terms of the financial payment to dealers probably are the most important. At the end of the day this game is a sales game, and nothing focuses the mind like an invoice. A number of commercial models exist: in-life or up-front revenue sharing, fixed up-front commissions, bonuses and subsidies. While various blends of commercial models can affect how partners perform, they also can affect operators' free cash flow and operating profit very significantly, especially during the transition from one model to another.

Customer ownership within the channel and partner autonomy are critical elements of a genuine win/win relationship, yet operators must retain control and influence within the channel. Operators must have accurate, timely and complete management information, including base size, acquisitions, churn and performance of small dealers when working through a distributor. With that information, operators can properly manage channel performance, can identify partners' behaviour and activity that may not be aligned to the win/win ambition and can take appropriate action. The relationships of smaller dealers working through distributors should be visible to operators so that they can monitor the performance of the whole channel, end to end.

An obvious, but critical, step is to align the strategic goals of the operator with its partners. A number of operators hope to offset the declining revenue from traditional voice and data services by expanding into adjacent ICT sectors. Having identified this opportunity, many of their channel partners already have used their existing

relationships with SMBs to expand into unified communications, cloud services or information technology support. An effective channel strategy should identify these converged dealer partners and should provide appropriate support and investment – whatever is required to help make these partners a ‘one-stop shop’ for the ICT needs of SMBs.

Finally, the indirect channel touches a number of the operator’s functions: sales and marketing, customer operations, finance etc. To present a single, unified point of contact for partners, the operator needs a strong commercial owner within its organisation. Some choose to set up a separate channel-management function responsible for end-to-end management and strategic direction. This mechanism can be effective for using both the operator’s internal resources and the partner’s relationship management or selling skills for the benefit of the end subscribers.

Going beyond connections

Convergence is nothing new in the telecoms sector. For over a decade, operators have been trying to expand from their legacy, bit-pipe operations into high-margin value-adding services. So far, their success varies, especially in the fragmented and price-sensitive SMB segment. But a number of recent trends may be changing that. Ubiquitous fixed and mobile-broadband network access, the growth of digital channels, and the ‘consumerisation’ of technology and services into on-demand cloud services are making the broader ICT opportunity – historically the domain of multinational corporations – more relevant and more accessible to SMBs.

Case study: Segmenting indirect channel management

An operator recognised that the saturation of traditional voice connections was leading only to churn under the legacy-connection approach to commissions – and that the growing demand for convergent fixed-mobile and ICT solutions was requiring different channel partners. The operator needed to segment the way it manages various types of channel partnerships, and it devised a win/win approach. The successful segmentation makes sure that appropriate resources and performance management targets are aligned to the win/win aspirations of each target market segment, enabling the operator to communicate a clear value proposition to its partners.

Historically, the operator/partner relationship was based on the partner meeting quarterly connections targets, and the dealers enjoyed no certainty of the rules of the game. So, instead, the operator defined performance level tiers that incrementally reward its partners as they meet the targets and sustain their enhanced performance. Partners get financial rewards and also benefit from greater access to the scale and resources of the operator as they achieve success at higher tiers.

Examples include access to the operator’s marketing, dedicated training on solutions, access to the operator’s retail network for fulfillment support and additional back-office support. These changes give dealer partners a clear road map to their own development and a credible path to creating value that results from the operator having a consistent, longer-term commitment to the partnership.

In addition to tiering the status and rewards for traditional dealers, the operator has recognised that to expand into ICT it needs to broaden its range of channel partners. These dealers are different to traditional connections-based dealers and require a different partnership model. Some involve a joint, go-to-market strategy for converged mobile/ICT solutions. Others require a white-label solution from operators, or even a joint-venture partnership for a defined market segment. These innovative partnerships are managed separately to the traditional channel partnerships, allowing the right skills and performance metrics to be applied to create a win/win approach that is suited to each category of partner.

Because of these changes, the operator has formed deeper relationships with selected partners resulting in more of the dealer’s activities to be focused on this operator. The incentive structures ensure it is in the dealer’s interest to keep the end customers with this operator as opposed to churning them to another operator, resulting in the dealer realising lower churn results than the operator’s headline. The operator has even considered migrating more of its customer base to the dealer to manage.

Making the most of the ICT opportunity requires operators to first make sense of it. The ICT services offered to SMBs range from hardware and software deployment, to provision of on-demand networked services, to integrated solution design and after-sales service. So in the ICT market, certain adjacent categories are more likely candidates for network operators to exploit (see Figure 1).

While these opportunities are potentially lucrative, few telcos are likely to have the technical expertise to go it alone. We believe that by innovating within the channel model, operators can finally unlock the value of ICT. From our research of and experience with ICT providers to SMBs in multiple markets, we found that partnerships with operators were attractive, but there was no one-size-fits-all model.

What's more, getting partnerships right is hard. Defining strategy and identifying and selecting partners are important, but most partnerships come unstuck because of poor execution. We've found this to be mostly the result of poorly defined roles and responsibilities and of poor handovers when delivering services across a value chain of activities.

Based on our research, we identified four distinct models for partnership and the related responsibilities:

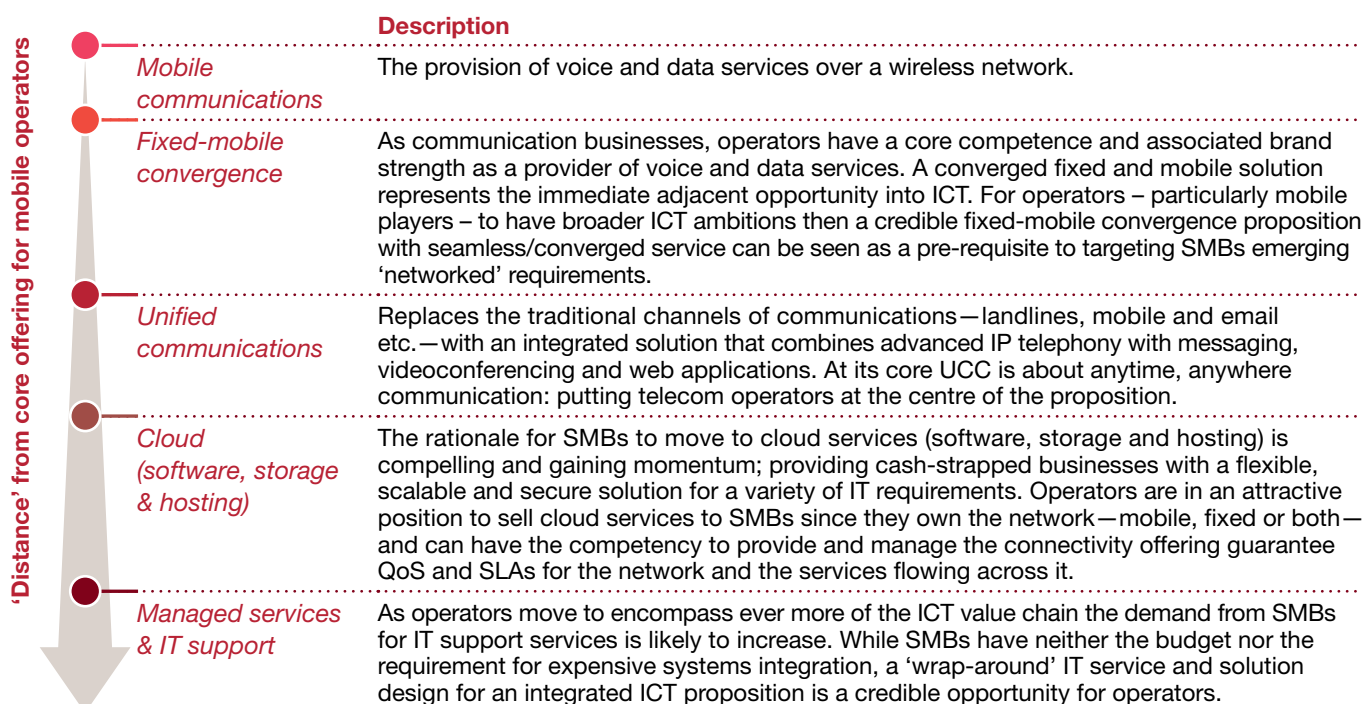
1. White label. An operator sells a white-labelled product to a partner, which owns the customer relationship and positions itself as a one-stop shop. Typically, a communications specialist with fixed-line or mobile capability aiming to position itself as an end-to-end communications provider will use this model.

In this model, the operator is responsible for maintaining and developing the network infrastructure and sells a wholesale or white-label service to a partner. The partner owns the customer relationship and is responsible for billing and for all front-office activities.

2. Partner adds connectivity. An existing ICT services provider adds a mobile/fixed solution to its current product and services proposition. This model typically is for smaller ICT providers that have an established client base and routes to market and that are looking to broaden their service portfolio.

This model takes the form of a traditional dealer model, in which the operator provides mobile/fixed services and products to a partner that re-sells operator-branded connectivity to the end customer. The operator may contribute to marketing, including co-branding, to make the most use of their brand's strength in the marketplace.

Figure 1: Which adjacent ICT markets are operators addressing?



Source: PwC analysis.

3. Operator primes. An operator owns the customer and re-sells the ICT services of a provider under the operator's brand. For a specialist provider of a limited range of ICT services (like contact or data centres), which traditionally sell through channel partners, this model is most appealing.

Here, the operator develops the infrastructure, such as a cloud platform, to give the operator the capability to aggregate a broad range of ICT services under one point of contact with customers. The operator owns the customer relationship but uses partners for service delivery and some technical support.

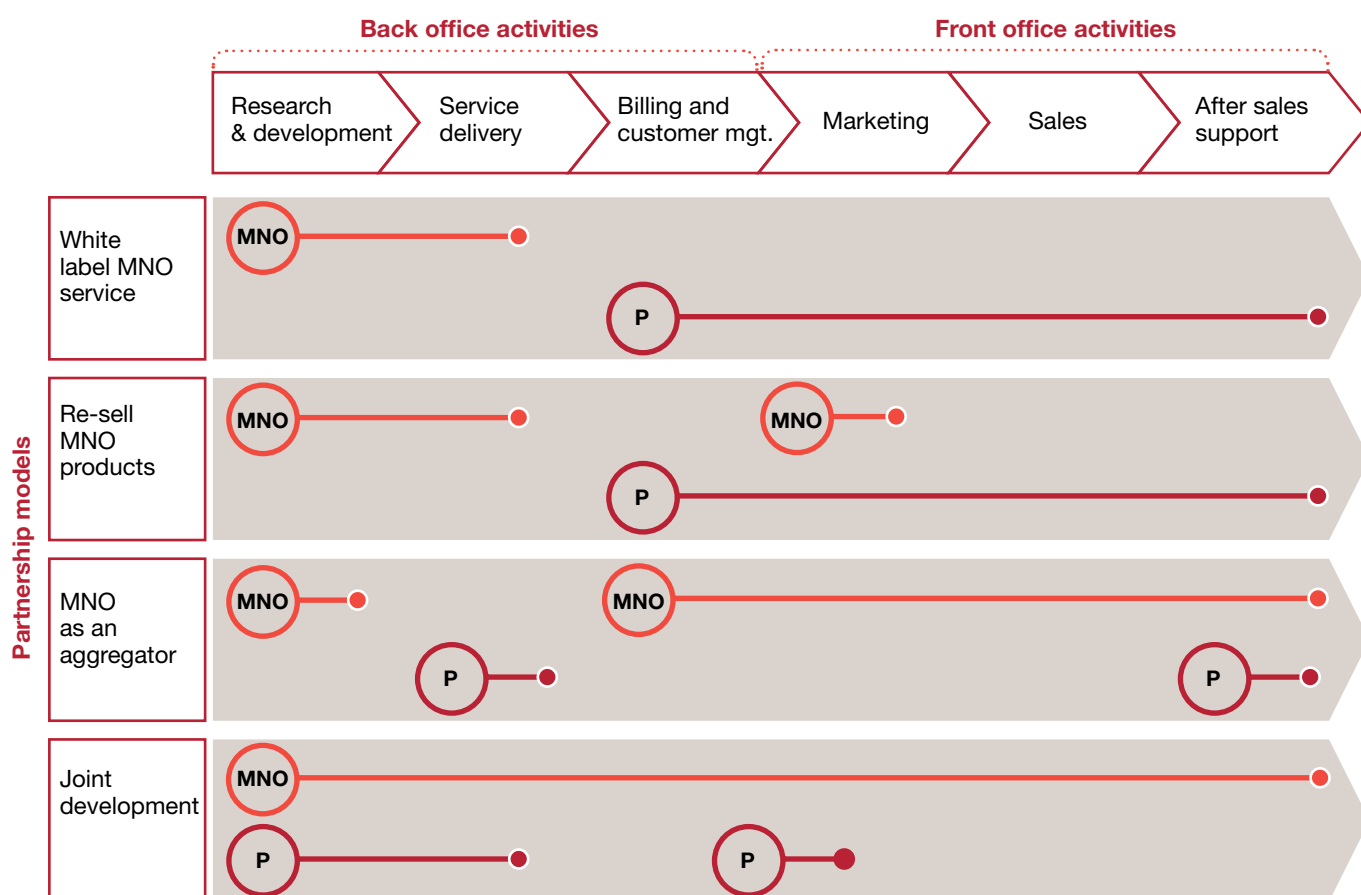
4. Joint development. An operator works with partners to develop joint propositions and strategies for going to market. Each partner invests in the relationship to develop a unified proposition. This model is apt for large ICT providers with a strong brand reputation and established, deep expertise in specific sets of products.

The operator partners with a provider that is competent and experienced in technology or communications to co-develop propositions. The operator is responsible for owning the end customer but may make use of the partner's brand for marketing purposes.

Shoehorning ICT partners into an existing channel model won't work. ICT partnerships don't necessarily create another sales channel. Many may be used for collaboration on existing research and development efforts, or to represent a specialist resource for direct sales support. For this reason we suggest that operators take time to consider how partners fit within the SMB sales organisation.

Each of the four partnership models defines a way of working with your partners. Making the model clear at the outset and integrating it into the negotiation process improves the likelihood that a partnership will succeed (see Figure 2).

Figure 2: Partnership models and value chain of activities



Note: 'P' refers to partner, 'MNO' refers to mobile network operator.
Source: PwC Analysis.

Creating the right behaviours through commission models

Commission models are the framework agreements between operators and dealers to provide remuneration for customer sales and retention. Traditionally, many of these models have been focused on sales, paying one-off commissions on a per-transaction basis. But as markets have matured, the role of a dealer has changed.

Commission models have evolved to include a number of features to encourage various behaviours: reduce churn, increase ARPU, bundle products and develop operator loyalty.

Getting commissions right isn't just about handing over ever-increasing payments to your partners. Commission models come in a bewildering range of shapes and sizes. Many telcos adopt a number of models simultaneously, often with contradictory objectives. But when they're used correctly, commission models can be one of the most effective tools available for encouraging behaviour within the channel.

The first step in designing an effective model is to identify and understand the factors influencing and the interrelationships among the operator, dealers and competitor operators. The elements that constitute a commission model – sales commissions, revenue share (both up-front and in-life) and bonuses – need to be assembled in a way that creates the most equitable alignment among those three market forces.

Achieving that is no easy process. And as markets mature, operators can no longer throw more money at the channel by trying to outbid competitors. Further, this is not a one-time process. The market is constantly evolving, and as new developments influence the market, operators will need to reassess the effectiveness of commissions approaches and competitive positioning (see Figure 3).

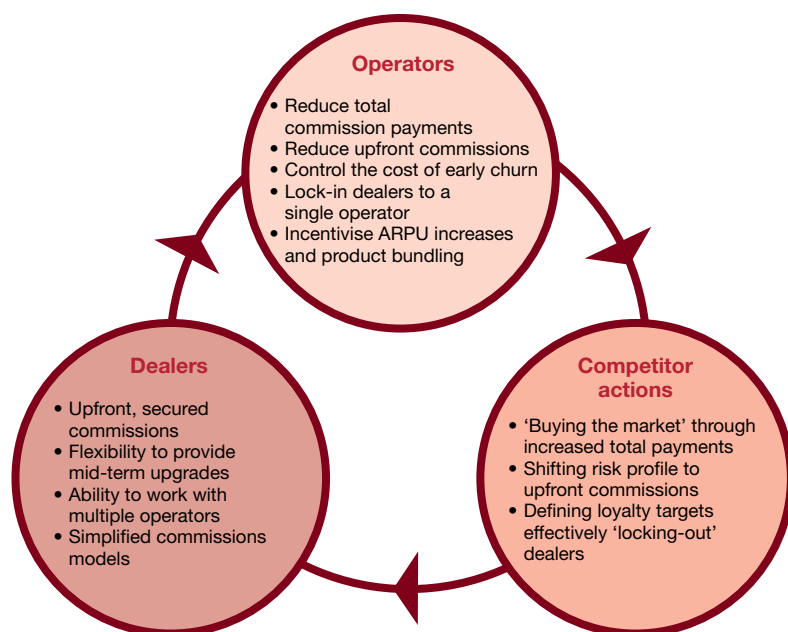
Effective commissions do more than stimulate sales. In our experience, operators can use commissions to manage some of the bigger challenges within the indirect channel: partner

loyalty and the cost of churn. In the following section we highlight how to use various commission components to target operator behaviour effectively.

Lock-in is the strategy of providing incrementally more lucrative revenue-sharing arrangements to partners that fulfil predetermined performance metrics. Rewarding more than incremental activity gives dealers incentive to produce a more stable subscriber base profile. The approach also offers dealers greater commitment and clarity through the opportunity to build and enhance the recurring value of their subscriber 'asset'.

As a partner realises the benefits of increased revenue sharing across its entire base of customers, the value, and the associated opportunity cost, of 'graduating' into higher tiers of a commission scheme can be significant. At the boundaries of a performance tier, a small number of incremental customers can trigger new revenues against the entire base. This mechanism in effect locks dealers in to a single operator by giving them the strong incentive to remain loyal or risk losing this incremental value of their performance.

Figure 3: Illustrative market forces and drivers influencing the choice of commission strategy



Source: PwC analysis.

Figure 4 illustrates the number of value of the lock-in in terms of subscriber numbers for various revenue-sharing increases that are awarded at certain thresholds. Because the revenue share uplift applies to the entire base, the incremental value of a single subscriber at the boundary can be significant. That makes it hard for a competing operator to commercially justify churning subscribers away by offering better commercial terms. The game becomes one of all or nothing. Unless a competitor can be confident it will succeed in churning large quantities, the dealer is effectively locked in to a single operator.

This strategy, then, can dramatically reduce churn that takes place as a result of short-term campaigns targeted at other operators through independent dealers.

Creating an effective lock-in mechanism is as much about the components that make up a commission strategy as about total payments. For example, sales commission payments have no potential to create a lock-in situation. Commissions are paid for new connections, and the commission value per connection can be linked to other criteria (like base size, churn or ARPU). But complex measurements and reporting are required in calculating the appropriate value to the dealer, especially if the dealer crosses performance boundaries in the middle of a reporting period.

Up-front revenue sharing is a more transparent mechanism for rewarding outcomes on the basis of total subscribers – like size, new connections or quality – by providing a share of the generated revenue. Paying up front can be applied only to new connections, not to the existing base, so this mechanism isn't very effective in creating a lock-in situation.

Paying revenue shares 'in-life' allows changes to revenue share value to be applied to all subscribers, new connections and those in the base. This creates an effective mechanism to create a lock-in environment to incentivise dealers across the line, and ensure that they don't lose value by slipping through a performance tier.

Conclusion

From our work and experience in multiple markets we have observed how competitors had chosen to use a commission-led strategy to fundamentally transform the indirect market. The competitors introduced a tiered partnership programme, supported by a structured commission model. The purpose was to offer dealers loyalty incentives that fulfilled key performance indicators (including connections, loyalty, bundling, ARPU, churn and customer service), all of which were challenging. To recognise improved performance, each operator supported the growth of their partners through targeted investments in product training, technical accreditation, marketing collateral and exclusive

promotional events. This unique approach created a genuine win/win relationship that provided real benefits for both parties.

Our analysis highlighted – for the first time – how competitors' actions not only had created a pool of super dealers, which considerably outperformed the market, but also effectively locked these dealers out by a commission strategy that incentivised loyalty to a single operator.

Operators can gain an advantage over others in their markets by being the first to try to lock up the best partners in the market. Operators that don't raise their game may find themselves picking among the fragmented tail of potential partners left as their competitors have picked off the top performers.

The opportunity from the SMB segment is large, typically representing 40-50% of the domestic connectivity market. The broader ICT opportunity for SMB is gaining momentum as virtualisation and cloud technologies mature and ubiquitous broadband access enables a broader range of software and information technology services to be sold and offered through a utility model.

Operators have built a successful network of channel relationships that have driven connections for them. As the market matures and the focus switches to relationships and the broader ICT wallet, operators will need to enhance their channel capabilities – including how they structure and manage their indirect partners.

Figure 4: The number of subscribers a lock-in is worth at a performance boundary, for different base size and revenue share uplift combinations (illustrative)

		Base size		
		10,000	25,000	50,000
Revenue share uplift	5%	545	1,362	2,725
	10%	1,090	2,725	5,450
	20%	2,180	5,450	10,900

Note: Indicative customer contract value of \$430 over a 2-year contract used to calculate lock-in.
Source: PwC analysis.

Mobile wallets in retail

Late last year in Communications Review, we shared our vision for the expected meteoric rise of mobile commerce – a future made possible by the transformation of the increasingly ubiquitous smartphone into a mobile wallet for m-commerce transactions. As we highlighted, m-commerce is about much more than simply contactless payment. Its services range from personalised, location-specific advertising to transport tickets, and from loyalty schemes to secure building access. To deliver all these services in a consistent, integrated way on mobile handsets, operators are starting to collaborate with partners like banks and fast-moving consumer goods companies.

But in our view, a large opportunity is still waiting to be exploited. Operators can collaborate together – and with retailers – to use mobile wallets and m-commerce to reshape and redefine the entire retail experience and relationship.

by Colin Light and Peter Stubbs

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A collaborative yet fiercely competitive mobile-commerce marketplace is rapidly taking shape. The number of entrants is growing – communications operators, banks, alternative payment services, providers of online applications and mobile operating systems, and more. They're moving in to capitalise on the opportunities consumers have opened up by embracing smart devices and quickly adopting digital mobile behaviours.

Many of these diverse players are working together in focused partnerships, pooling their complementary capabilities to enhance their success in specific areas. And the commitment they share is strengthened by the fact that all the elements necessary to support the mass adoption of m-commerce and mobile-wallet services are now in place.

As we highlighted last year, we believe operators – with their established (and largely trusted) billable relationships with customers – can lead the growth in this high-potential area of economic activity. But in trying to lead the development of this new marketplace, operators face fierce competition.

Such over-the-top giants as Google, Apple and Facebook and a raft of other Internet players are all aiming to replicate their dominance in online and mobile advertising in the m-commerce world. Facing such heavyweight competitors, the best way for operators to realise the m-commerce opportunity is by collaborating with peers and competitors, which will bring the benefits of scale, standardisation and seamless access to their combined subscribers.

Collaboration gathering pace around the world

This is a high-level summary of the point of view we presented last year. And in the months since we did so, our thinking has been validated by how the industry has progressed in various parts of the world towards collaborative approaches to m-commerce and mobile wallets.

In early 2012, the UK's three largest wireless operators – Vodafone, O2 and the Everything Everywhere joint venture between T-Mobile and Orange – submitted proposals to the European Commission. They wanted to create a joint venture to operate a mobile wallet platform based on near-field communications (NFC) and an advertising sales house reaching all their respective subscribers. In response to this

proposal, and a number of other equivalent collaborations being lined up throughout Europe, the European Commission immediately opened an in-depth investigation into the proposals under the EU Merger Regulation. But the commission stressed that its action doesn't prejudge the final decision – and that it wants to see Europe's m-commerce develop successfully.

Joaquín Almunia, the commission's vice president in charge of competition policy, commented: "The Commission is in favour of any initiative that will develop the promising mobile commerce sector in Europe, and bring new and innovative payment and interactive advertising experience to consumers. At the same time, we need to make sure that competing services can keep emerging on this market, so that incentives to innovate remain and customers get the best mobile commerce services at the best cost."

Collaboration has been strong in the US as well. Three US operators – AT&T Mobility, T-Mobile USA and Verizon Wireless – announced their Isis joint venture in late 2010, describing it as a "national mobile commerce venture

that will fundamentally transform how people shop, pay and save". Operating under the tagline 'Everything in your wallet, now on your phone', Isis forged a partnership with Visa, MasterCard, Discover and American Express in July 2011, and then in May 2012 announced the first of its local merchant partners in Austin, Texas, and Salt Lake City, Utah. Isis said that Coca-Cola, Dillard's, Foot Locker and Macy's would be "among the first national merchants to join with Isis in advancing mobile commerce". And it added: "Today's announcement signals the mobile commerce experience has arrived."

Collaboration is also breaking out elsewhere in the world but usually involves operators teaming up with non-telco partners. In the United Arab Emirates, the mobile operator Etisalat is partnering with the payments network Visa, the technology provider Gemalto and the Dubai-based bank Emirates NBD to introduce the MoneyMobile payments service. Currently the staffs of the collaborative partners are conducting a pilot of the service – based NFC – before launching it widely to consumers.

Similar ventures are being established around the world, although true collaboration between mobile operators is still in its infancy.

Initially, operators hesitated to give up their perceived differentiation from each other. The initiatives now under way indicate that mobile operators worldwide increasingly are accepting collaboration as no longer just potentially desirable but actually *required* to fight off the threat of disintermediation by the non-telco competitors.

To date, the competitive battle for revenues from mobile apps and mobile media has been won largely by the likes of Google and Apple. The current wave of collaborative moves reveals operators' determination to keep the same thing from happening in the potentially much bigger m-commerce services marketplace.

Operators do face a battle to lead this marketplace, partly because alternative-payment providers are pressing ahead with mobile offerings. For example, PayPal is now rolling out the PayPal inStore app for iPhone and Android handsets in the UK to let users pay for items at high street stores owned by Aurora Fashions. It's significant that the app doesn't use NFC, which avoids the need for new NFC-enabled handsets and equipment. In early 2012, PayPal doubled its estimate for its global mobile-payment volume during the year to US\$7bn, and said that the number of customers making regular purchases through their mobile phones had doubled to 17m.

Figure 1: How Brand X can use the ecosystem to deliver a compelling customer experience



Source: PwC analysis.

The other over-the-top players are also making headway. In 2011, Google collaborated with Citi, MasterCard, Sprint and First Data. They rolled out the NFC-based Google Wallet, which lets users store credit cards, loyalty cards and gift cards on their mobile handsets and redeem sales promotions. So far in 2012, Facebook has rolled out an improved, two-step mobile-payments flow for mobile web apps; Visa and MasterCard both have launched their own online digital-wallet services; and Apple has unveiled an e-wallet app called *Passbook* for iOS 6.

And the momentum is set to keep growing. At the time of writing, press reports are predicting the imminent launch of the Google Wallet 2.0, equipped with an NFC-enabled, cloud-based wallet. Microsoft has announced that an NFC-based mobile wallet will be built into its new Windows Phone 8 operating system. There have been suggestions that Apple may incorporate NFC-enabled mobile payments into the iOS 6 *Passbook* app. And Apple's iPhone 5 smartphone, anticipated in late 2012, is expected to include an NFC chip to support mobile payments.

Towards the new collaborative service model

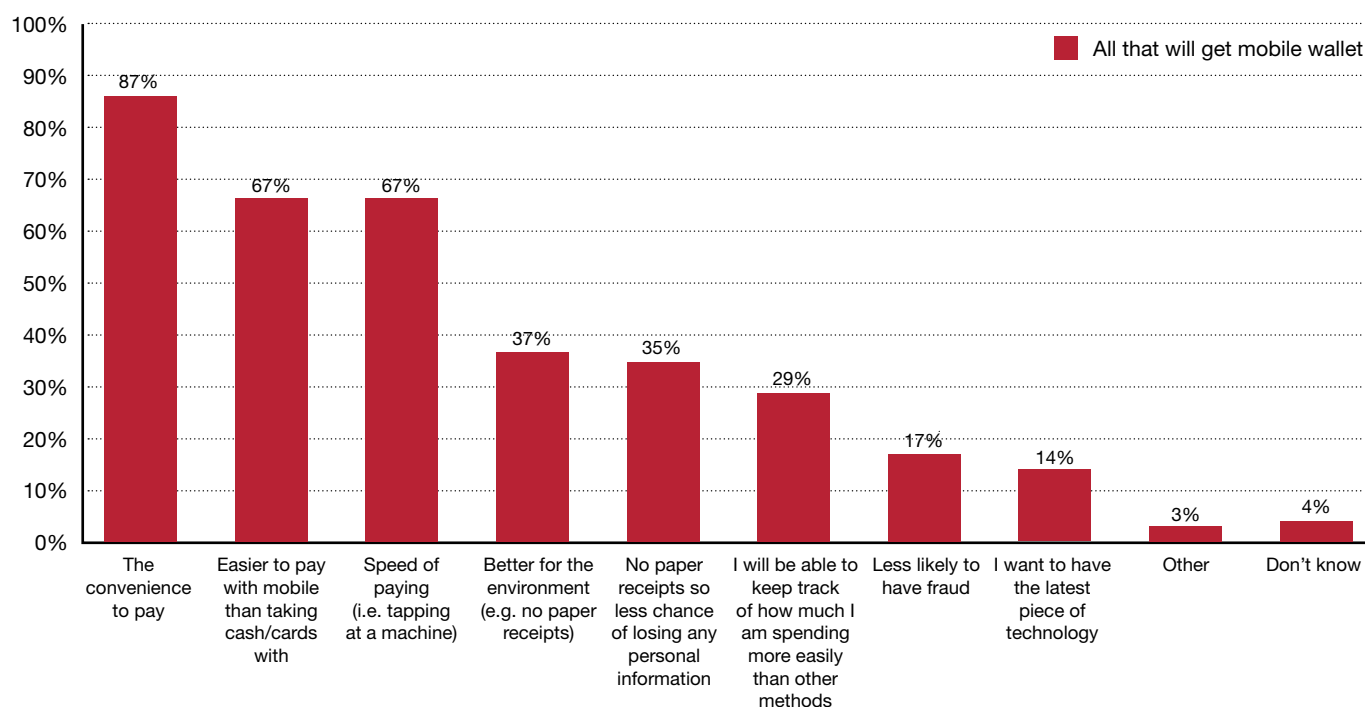
With these various developments, the market as a whole is evolving towards a collaborative, multiservice model and ecosystem that unites three interrelated services:

1. A new **mobile-advertising marketplace** gives brands and advertising/media agencies the ability to target consumer-focused campaigns direct to mobile.
2. A new secure, standardised, convenient environment for **online and mobile wallets** contains not just payment cards (both debit and credit) but also loyalty schemes, vouchers, discount offers, travel tickets and so on.
3. A back-office **data analytics** environment and capability offers brands and agencies anonymous insights into transactions and behaviours across collaborating operators' aggregated customer base.

By integrating those three services within the new ecosystem, brands can create a coordinated virtuous circle that's always improving their targeting and campaign effectiveness and their customers' experience. Figure 1 – reproduced from our 2011 article for ease of reference – shows an illustration of how a fictional 'Brand X' might achieve a virtuous circle.

The operator-led collaborative initiatives in various markets focus on slightly different areas. For example, the Isis joint venture in the US centres on payments, while the collaboration in the UK embraces both advertising and payments. Differences aside, if these various initiatives succeed then the type of ecosystem – and the resulting virtuous circle – shown in Figure 1 will become a real possibility for brands and retailers of all types and sizes. Also, consumers across the world are demanding the ever-expanding diversity of offerings and lifestyle benefits that such an ecosystem could support. For example, extensive research in the UK reveals many reasons consumers would adopt mobile payments, from convenience to reducing the risk of fraud (see Figure 2).

Figure 2: Consumers' reasons for adopting mobile payments



Source: YouGov 2011 "Mobile Wallet" Consumer Research, UK.

Retail: the next m-commerce opportunity

So, as the collaborative ecosystem takes shape, which types of organisations will be the primary customers for the operators? Obvious answers include the advertising agencies, big brands and fast-moving consumer goods companies that fit naturally into the mobile-advertising market, and the banks and card issuers that will be integral to mobile wallet and payment offerings. All those organisations are engaged in current collaborative ventures. There is one constituency, though, on which we think operators have yet to focus sufficient attention: retailers.

Almost without exception, the world's major retailers have identified the 'mobile/digital channel' as a huge opportunity. As a result, they're investing heavily to build and improve their capabilities in this area, and they're shifting the focus of their efforts from online to mobile. This trend will lead them to target m-commerce transactions. Ultimately, retailers will try to build on their m-commerce capability by creating the type of virtuous circle of rising engagement and loyalty that we outlined in Figure 1.

Many retailers may start with a basic perspective on the m-commerce opportunity and simply install NFC-enabled terminals in their physical store outlets. Operators will want to be at the front and centre of this implementation effort and help roll out the service. But simultaneously building both consumers' use of NFC-based mobile payments and the installed base of NFC terminals is a chicken-and-egg process: customers need to have NFC handsets for retailers to justify the cost of rolling out the terminals – but customers won't take up the handsets unless they know they can use them at the point of sale in their favourite shops.

NFC: Not the only platform for in-store m-commerce

In recent years, there was a widespread perception that NFC would emerge as the standard platform for in-store m-commerce transactions in the retail sector. But NFC isn't the only option. Other (often cheaper) alternatives can also provide a viable basis for conducting m-commerce.

For example, retailers can link their existing, installed Wi-Fi networks to an app and/or coupons on the customer's handset – creating an m-commerce environment without the expense of NFC terminals. Significantly, PayPal's latest wallet app doesn't use NFC and is designed to work online through other available links like Wi-Fi or a 3G data connection. When no signal is available, the app stores bar codes for when it gets service again.

Also, alongside the opportunity for retailers to use m-commerce as a channel in itself, mobile is recognised for its ability to help join up both online and offline transactions. For many retailers, the online channel has allowed them to start understanding and interacting with their customers directly. But in the bricks-and-mortar world, many retailers are still blind to the behaviour of customers because they have no way of identifying individuals and their associated transactions – unless, of course, they have a widely used loyalty or reward scheme in place.

Mobile devices have the potential to change this situation. They can be used as an identifier of the individual in a store through transactions, either NFC or another platform, and also through in-store Wi-Fi or location-based technology such as 'geofencing'. That means the impact of mobile is to create not just a new channel but also a deeper understanding of the complete multichannel shopping experience. It also means that many retailers who have relied on research and demographics to understand customers will be able to build a detailed picture of each customer's personal behaviours, habits and preferences.

The role operators can play in retailers' goals

Clearly, operators have a part to play – alongside merchant acquirers – in helping to spur the adoption of mobile-payment-enabled point-of-sale (PoS) terminals in stores and thereby handsets. But their potential role doesn't end there. To scope it out, we need to understand the wider goals retailers are trying to achieve.

In general, retailers are aiming to meet three objectives:

1. Get more footfall in stores.
2. Increase the average value per customer transaction.
3. Gain a deeper and more personalised understanding of their customers as individuals, so they can improve each customer's retail experience and sell to them more effectively.

Many operators will focus their m-commerce initiatives on NFC, but that platform isn't the critical path for all retailers trying to capitalise on the opportunities of m-commerce (see 'NFC: Not the only platform for in-store m-commerce'). The challenge for operators is to recognise the differences in approach, and to continue to embrace and nurture the retail ecosystem in the short term, during a period when NFC is still in its infancy in terms of consumer and PoS adoption.

Whatever the technology used at the point of sale, the blend of mobile advertising, wallet and analytics at the core of operators' collaborative m-commerce ecosystems can help retailers realise all three objectives of increasing footfall, average transaction value and understanding of their customers. So we believe operators have a major opportunity. Working, ideally, in their collaborative ventures to reach the most customers, they can offer both m-commerce and mobile solutions to retail companies. When retailers have help making the most of the mobile opportunity, they can boost their customer revenues, margins, loyalty and transaction sizes.

The attractiveness of mobile offerings to retailers is strengthened by the range and scale of benefits they can deliver. As Figure 3 shows, an integrated, effective m-commerce capability brings advantages to retailers throughout the life cycle of a customer. Such capability can reduce cash management and sales costs and can lead to more accurate segmental and location-based targeting and more efficient cross-selling.

Also, as our analysis in Figure 4 demonstrates, the resulting benefits increase over time. They start with operational savings from store efficiency and cash replacement together with improved security, and then build up to the much bigger, revenue-generating opportunities that come from improved targeting of marketing, offers and loyalty programmes and from better insight into customers.

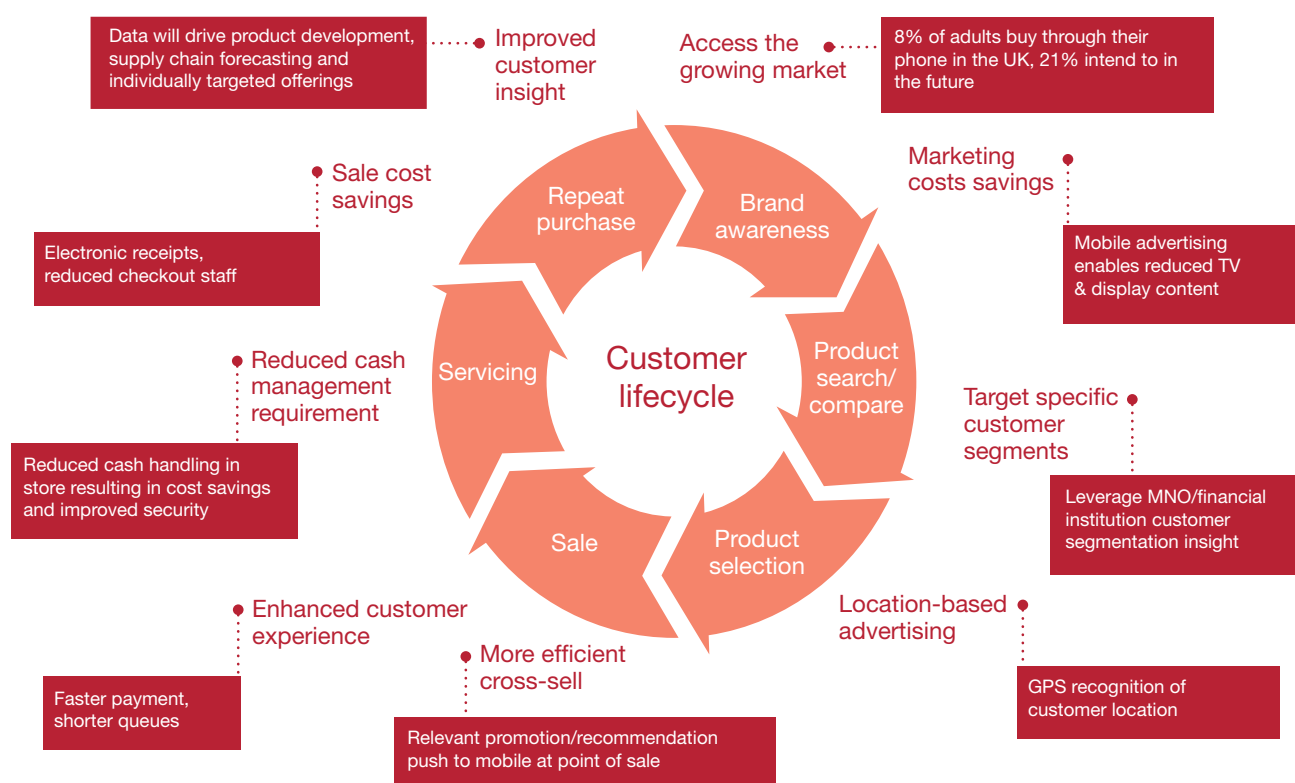
A shared agenda: building value for customers

Why should retailers turn to operators to help them achieve these benefits? Well, retailers traditionally have gone to specialist online agencies for services such as building websites, developing online shopping baskets and creating links into channels like Amazon. But an operator acting as an m-commerce services provider actually has a lot more in common with a retailer's core objectives for building customer value. Having their interests aligned creates a win/win situation.

For example, based on joint awareness of the customer's location, both the operator and the retailer want to push location-specific offers and coupons to get people to use their mobile wallet services and enter physical stores. Both want to build ever-greater relevance and personalisation of their respective offerings to their shared customers. Once the customer is in the store, both parties want to encourage and enable quicker, cheaper transactions through NFC and other platforms.

A further attraction for retailers is the potential for operators' m-commerce services to create loyalty far more effectively than most retailers have done to date. For a variety of reasons, many retailers – from major grocery and convenience store chains to leading fashion stores focused on the youth market – still don't have sophisticated customer loyalty systems or schemes. Some have chosen not to go down the loyalty route because of its high

Figure 3: Benefits that digital wallets will bring to retailers across the customer life cycle



Source: PwC analysis.

costs and patchy record of success. Although those retailers can still capture transactions at the till, and their value, they don't know who their customers are or what their last purchase was.

By collaborating to provide m-commerce capabilities in stores, operators can help retailers fill gaps in their customer data and also benefit them in a range of other areas (see Figure 5). As the chart shows, three areas – selecting the method of payment, conducting the payment itself and reconciling store receipts with transactions – exist or have been enhanced, and will save on costs and improve efficiency. In two other areas, new marketing and revenue-generation opportunities will result partly from higher loyalty: goods selection/purchase decisions and after-sales service. As Figure 4 showed, the marketing and revenue benefits will be several magnitudes greater than the cost savings and efficiency improvements.

Three opportunities to pursue in retail subsectors

The benefits offered by operator-led m-commerce services apply to all retailers, but the angles that are most attractive to companies in specific subsectors of the industry will depend on their positioning and target customers. Our initial analysis has identified three distinct opportunities for operator-led collaborative groups that want to build an m-commerce customer base in the retail sector:

1. Major grocery and convenience store chains

The first and perhaps most obvious opportunity is with the large grocery and convenience store chains. These businesses vary widely in the maturity and sophistication of their current loyalty schemes, so the ability to build greater loyalty at high scale and low cost probably would be attractive to them.

Some haven't adopted loyalty schemes and have used 'everyday low pricing' models instead. For them, mobile presents a way to begin shifting mass marketing to far more focused, relevant promotion to individuals without having to bear the costs of a loyalty scheme. More efficient and secure transactions, and less handling of cash, will also be strong selling points.

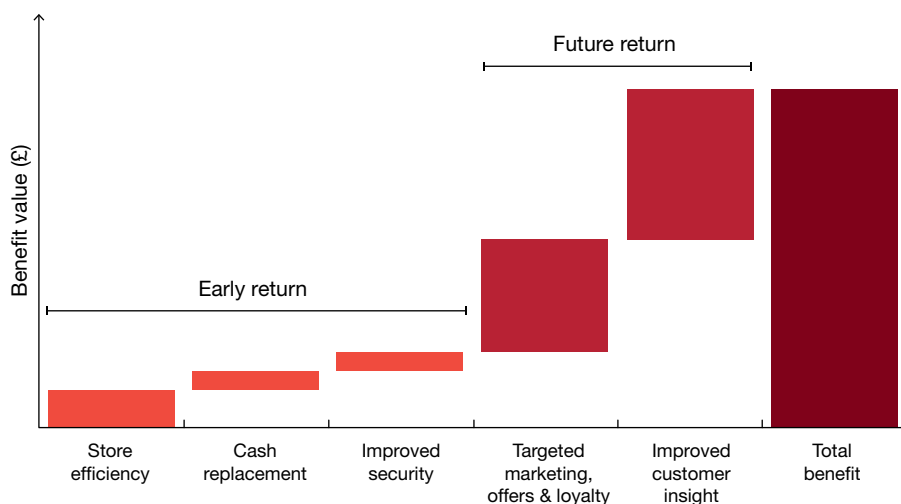
Location-based and segmented advertising and vouchers that target individuals with in-store offers and discounts will help these businesses boost footfall as well as transaction volumes and size. By far the most attractive benefit to those without existing schemes is the opportunity to build powerful insight capabilities that could deliver benefits far greater than the advantages related to efficiency or reduced handling of cash.

2. Niche and premium-brand retailers

Niche and premium-brand retailers trying to sell to specific demographic groups – such as youth-orientated clothing or the high-end, premium segment – will be attracted by a slightly different mix of benefits available from operator-led m-commerce services. More important, the customer segments they target are likely to be early adopters of mobile technology, particularly m-commerce, and to use social media heavily.

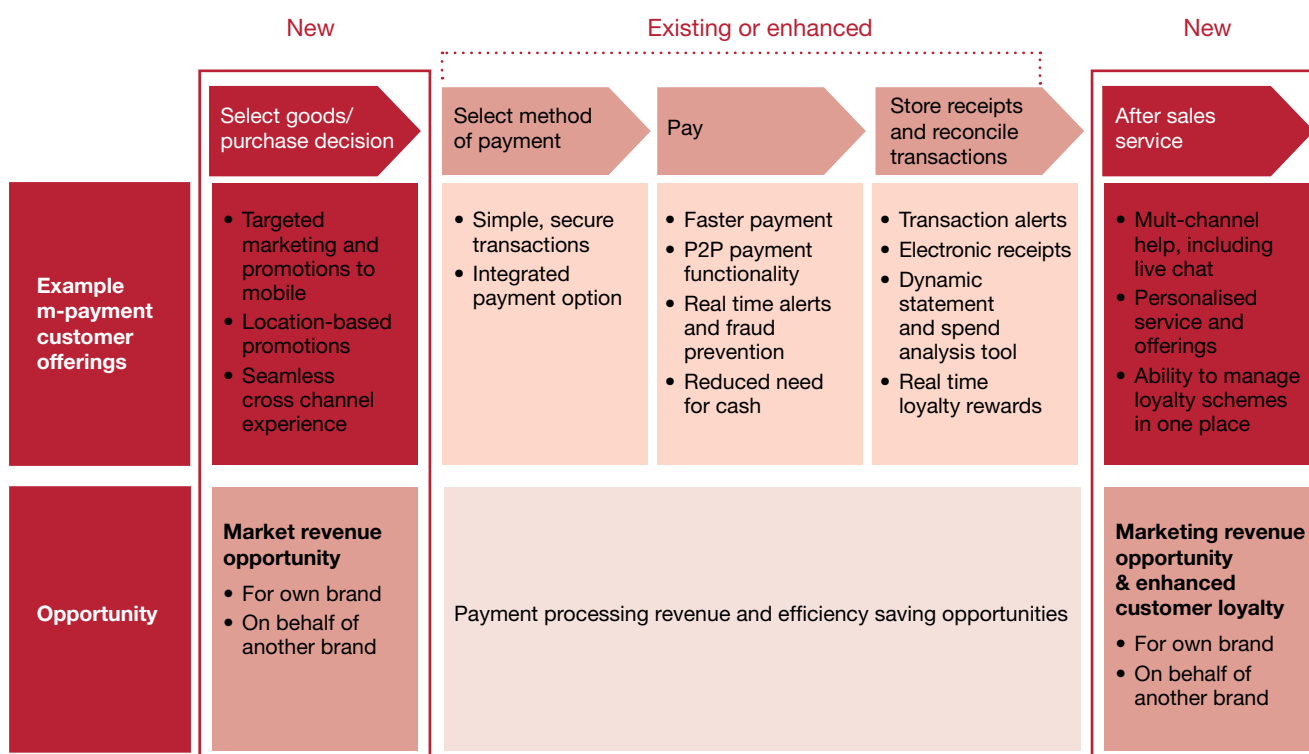
For these retailers, the main selling points will include the potential to integrate promotional and loyalty campaigns into mobile social networking. For those targeting the youth market, mobile payments have the added advantage of letting parents place money in either a wallet or a mobile voucher in the device of their children (under age 18). These young shoppers will then be able to shop independently of their parents without the risks of carrying cash.

Figure 4: Retailers' justifications for moving to digital wallets



Source: PwC analysis.

Figure 5: Valuable opportunities for retailers up for grabs



Source: PwC analysis.

Given the high use of smartphones by younger consumers, these niche retailers will also use a wide range of mobile apps to increase footfall and sales. The possibilities include location-based marketing to alert passing customers to in-store events and offers; event advertising on mobile apps; social gifting by smartphone-based loyalty cards; emailing receipts (including to parents); shareable online wish lists; in-store window signage that uses image recognition technology; and unique customer identities to purchase items and receive marketing and branding messages. All of those can be tied together at low cost using existing in-store Wi-Fi.

3. Bricks-and-mortar retailers fighting online competitors

A number of retailers – notably catalogue stores and, to an extent, bookshops – are competing fiercely with ‘pure-play’ online retailers. With operators’ m-commerce offerings, they will compete more effectively by being

able to offer their customers a fully integrated retail channel, including payment – supported by personalised offers, enhanced loyalty schemes, and targeted ‘push’ mobile marketing and advertising. Like grocery and convenience chains, these retailers will be attracted by the more efficient and secure transactions of m-commerce and by the reduced need to handle cash. Where needed, after-sales service also will be more streamlined, effective and cost-efficient.

The physical stores also will be able to offer more ‘social experiences’, such as letting customers check stock availability on their mobile device or see other customers’ reviews of an intended purchase. Both of these capabilities can be enabled by using QR code or image recognition technology, and a number of retailers are already testing these concepts aggressively.

No time to lose

Across the world, growing numbers of retailers are now mapping out and starting to implement their m-commerce strategies, whether alone or in partnership with competitors and/or other types of providers. At the same time, the alternative-payment providers and over-the-top players are stepping up their efforts to occupy the m-commerce domain with the same degree of success they achieved in apps and mobile media.

Given these market dynamics, the window of opportunity for operators’ collaborative grouping to succeed in offering m-commerce solutions to retailers won’t stay open for long. There’s no two-year breathing space in which to consider the options before acting. In our view, operators need to either take steps now to head off the competitive threat or face playing a game of catch-up that will be very difficult to win.

Emerging mHealth: paths for growth

In 2010, we ran our first article in Communications Review exploring the opportunities for telecom operators looking to broaden their services within the newly emerging mobile-healthcare market. We followed this with an article a year later that discussed the need for operators to radically transform the way they think about their business to aggressively develop services and solutions for the healthcare market. As part of our continued focus on mobile health, PwC recently commissioned the Economist Intelligence Unit (EIU) to examine the current state and potential of mobile health (mHealth), barriers to adoption and opportunities for companies seeking growth in the mHealth space.

The following is an excerpt from the full report, Emerging mHealth: Paths for growth, based on surveys and interviews with key subject matter experts conducted by the EIU.

by Economist Intelligence Unit

For information on the survey or PwC's mHealth practice, please contact Christopher Wasden, managing director, by phone at [1] 646 471 6090 or by email at christopher.wasden@us.pwc.com.

For a copy of the full report, please visit www.pwc.com/mhealth.



Expectations are high that mobile technology will help increase access to care in emerging markets and will transform the developed world's costly healthcare behemoths into less expensive, prevention-based and patient-focused systems.

Pilot projects around the world point to the plethora of possibilities. These range from the Patient Link programme in Tianjin, China, that provides rural patients access to medical professionals, to a host of programmes across Africa that educate the public about AIDS, through SMS messages to SmokefreeTXT, which helps young Americans to give up smoking.

Most experts interviewed for this study, though, are much more cautious. "We all need to come back down to earth," says Patricia Mechael, executive director of the mHealth Alliance, a multi-stakeholder group dedicated to advancing mHealth. "In the next year the hype cycle will reach its peak, we will move into the trough of disillusionment and we will then move back up to a happier place." Steinar Pedersen, chief executive officer of Tromsø Telemedicine Consult, adds that currently "you have a research environment that produces papers, a business environment that produces expectations and a healthcare environment that creates healthcare. So far they have not met. This will happen, but how long it will take I'm not sure."

Such words of caution suggest that change, while certainly desirable and likely, is not simple. As with any important new technology, mHealth can enable incremental innovation (improvements to existing practices) or disruptive innovation (fundamental changes that alter healthcare provision). Professor Christopher Taylor, director of the University of Manchester's mHealth Innovation Centre, sees 'some quick wins to be had'. For example, the increasingly common practice of texting appointment reminders to patients substantially reduces costs from missed attendance. These innovations have value but don't change the way medicine is delivered.

To meet current and future challenges, healthcare systems need disruptive change. For mHealth to enable that, though, it will have to deliver in the teeth of an industry with a long history of effectively resisting disruption. Clayton Christensen, one of the leading scholars on innovation, once described healthcare as perhaps ‘the most entrenched, change-averse industry in the US’.¹ Analyses of other countries are similar.

If mHealth succeeds in delivering such things as a greater focus on prevention, better monitoring of chronic conditions and patient-centred care, its impact will be dramatic. But the scope of the task and the resistance it engenders shouldn’t be underestimated. As Eric Dishman, Intel’s director of health innovation, puts it, mHealth “is about fundamentally changing the social contract between patients and doctors. It will take time.”

Healthcare innovation: a school of patience

Innovation in healthcare – particularly disruptive reorganisations of processes, care pathways and even job responsibilities – is famously difficult and slow. Although mHealth has a broad range of potential uses and benefits, a common set of powerful barriers also exists. These are both diverse – ranging from technology to culture, from incentive structures to regulations – and mutually reinforcing.

Technology: Technology still presents challenges for mHealth adopters. Both doctors and payers list privacy and security concerns as leading barriers to greater use of mHealth, and only around half of doctors believe that the mobile Internet facilities at their workplace are reasonably secure.

Poor integration also impedes uptake. Just 53% of doctors say that the mHealth applications and services they use work with their organisations’ IT, and even fewer say they’re integrated with technology in other parts of the health system (see Figure 1).

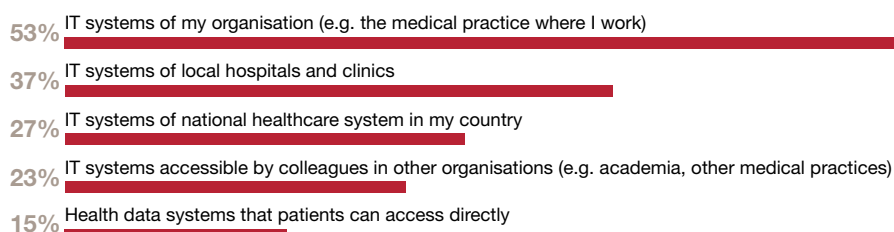
Lack of interoperability between technologies is often to blame. Claudius Metzger, business solutions architect in the Healthcare Unit at SAP, notes that almost every healthcare customer has “many disparate systems that are hard to integrate and where only the vendor knows the secret of how to get data out.”

Nor will technological issues ever completely disappear. Dan Brostek, head of member and consumer engagement at Aetna, explains that one of the biggest challenges in mHealth is rapid change in consumer technology. “When a new operating system comes out, people almost expect within a month that its new capabilities will be layered into your applications. It is complex to move at that speed.”

Culture: But technological issues fade next to the complexities of bringing about change in healthcare. “It is very easy from the technology point of view to say that this is the future, but [those saying so] don’t take into account the traditions of the healthcare system,” says Mr Pedersen. Electronic health records, for example, have been on the cusp of revolutionising care since 1985 but have been unable, in most countries, to break through these broader barriers to change.

Figure 1: Poor integration of IT systems impedes uptake of mHealth

% of respondents who say mHealth applications and services they use at their organisation are well integrated with the following



Source: Economist Intelligence Unit, 2012.

¹ Clayton Christensen, Richard Bohmer and John Kenagy, “Will disruptive innovations cure healthcare?” *Harvard Business Review*, September-October 2000.

In fact, 27% of doctors and 26% of payers cite an inherently conservative culture as a leading barrier to mHealth. Thierry Zylberberg, head of Orange Healthcare, notes that this isn't inevitably a bad thing: the field changes by consensus precisely because if innovation doesn't work out as planned, the risks to human health can be substantial and difficult to foresee.

However understandable the roots of such a cautious approach, though, it can stand in the way of a clearly beneficial change, even one that doesn't carry much risk.

Size and complexity: Most national health systems are both vast and fragmented. The UK's National Health System (NHS), for example, is the seventh-largest employer worldwide and Europe's biggest, but decision-making powers are diffuse. Ian Leslie, professor of computer science at

Cambridge University and an expert in mHealth in China, notes that one strategy for mHealth entrepreneurs is, as much as possible, to 'avoid interacting with the humongous thing' that is the health system.

Figuring out the levers of change in one country isn't necessarily helpful elsewhere because systems vary markedly. They frequently include dominant monopolies, substantial state control and high costs for and regulatory barriers to new entrants, all of which are inimical to entrepreneur-driven innovation.

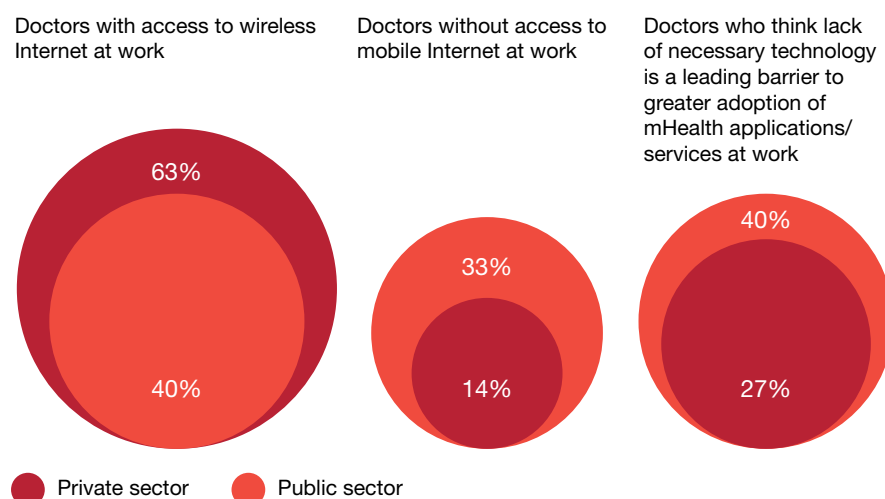
State control is particularly relevant for mHealth. Government retrenchment has created a technological gap that will slow adoption. The lack of existing technology is the biggest barrier to greater use of mHealth, according to the public-sector doctors and payers surveyed (see Figure 2). One-third of public-sector doctors don't even have

mobile Internet at work, compared with 14% in the private sector. Obtaining the economic benefits of mHealth will therefore require governments to invest more to catch up technologically.

Regulation: The highly regulated nature of healthcare also hinders innovation. For rapidly changing technologies, the problem is frequently either a regulatory void – which increases risk for providers – or the application of inappropriate regulations from earlier technologies. Forty-five per cent of payers and doctors believe that the latter is holding up mHealth.

Bakul Patel, a policy adviser at the US Food and Drug Administration (FDA), notes that his organisation wants to support mHealth and is developing new ways to deal with the attendant regulatory challenges. For example, to allow faster innovation, the FDA has broken new ground by issuing a description of low-risk mHealth areas, such as patients' self-management, that wouldn't be regulated even if those areas meet the regulatory definition. Mr Patel acknowledges that regulators continue to face a pressing challenge in seeking to balance patients' safety with potential benefits in this fast-changing field: "There is a lot more work in terms of how regulators can add value to this ecosystem. As part of that effort we are developing a new framework for the small subset of high-risk mHealth devices that will be able to accommodate the rapid innovation cycles of these technologies."

Figure 2: A technology gap exists between the private and public sectors



Source: Economist Intelligence Unit, 2012.

Perverse incentives: Perhaps the greatest difficulty for innovation in healthcare is the complex incentive arrangements that created and that continue to reinforce current systems. An mHealth product will be adopted only if a stakeholder sees an advantage in paying for it, but finding such a purchaser isn't always straightforward.

One of the best-known mHealth services, run by Ghana-based NGO mPedigree, exemplifies the challenge in finding purely market support for mHealth innovation. The service allows consumers purchasing drugs in certain parts of Africa to text a coded number on the packaging to the service, which will either verify that the product is legitimate or warn that it is counterfeit. The widely praised programme benefits a wide variety of stakeholders – including pharmaceutical firms, pharmacies, purchasers and mobile phone companies that carry the data traffic. Nevertheless, mPedigree hasn't found a commercially viable model. Pharmaceutical companies provide some sponsorship, but the programme also relies on prize money, grants and donations of low-cost or pro bono services from a variety of companies.

More daunting still is the ability of insiders to fight innovation that disrupts them. “With many mHealth solutions you need to understand what is in it for the person who pays your bill and, even more important, you need to understand whose toes you are stepping on,” says Axel Nemetz, head of Vodafone mHealth Solutions. He recalls one project that clearly provided superior care for the patient at home and had the support of medical

personnel. Hospital administrators, while recognising the benefits, sought to block the scheme because they would lose income from the resultant reduction in hospital-based services. In the end, compensation workarounds were developed in the interest of patients and other stakeholders. This isn't an isolated incident but, rather, traditional behaviour inside the health sector, where actors use diverse economic, regulatory and organisational levers to protect themselves.

Emerging markets, emerging solutions

However daunting, the difficulties of innovation in healthcare are neither insurmountable nor universal. Disruptive innovation typically occurs on the fringes of a sector, where consumers have fewer resources and where entrenched interests are weaker or nonexistent. mHealth is no exception.

Mobile healthcare solutions are being deployed more rapidly in emerging than in developed economies. “We see it on the ground in countries we work with. While the US thinks about dealing with fundamental issues like secure electronic health records, in places like India, China and Singapore mHealth is taking place,” says Mr Dishman.

In the emerging markets surveyed, patients' awareness and expectations of mHealth are, on average, far higher than in developed countries (see Figures 3 and 4). More important, far more patients are already using mHealth: 59% of patients in emerging markets use at least one mHealth application or service, compared with 35% in the developed world. And among those who don't, residents of emerging markets are more interested in starting.

Payers and doctors in emerging markets are also more active in mHealth. More payers currently cover the costs of, or plan to pay for, every mHealth-related service in the survey than do their counterparts in wealthier countries (see Figure 5 on page 30). Doctors in these markets, meanwhile, are more likely to have some form of mobile Internet at work and to have their own applications integrated with local and national healthcare data systems.

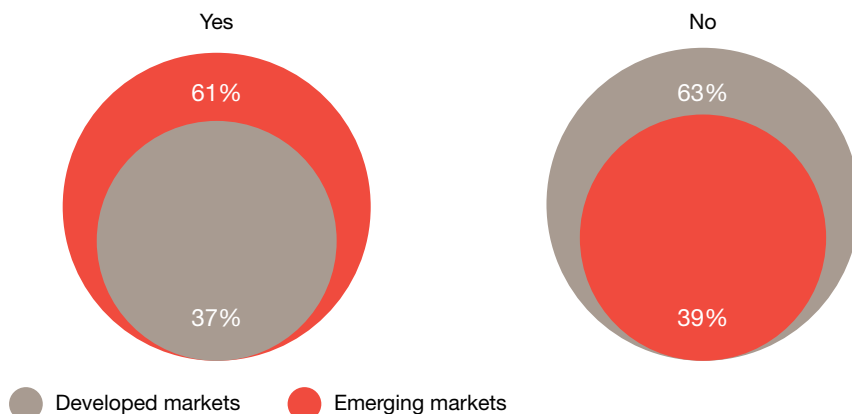
mHealth already has brought about substantial change in the doctor-patient relationship for 27% of emerging-market doctors (compared with 16% in developed countries) and a marked internal restructuring of their workplace for 34% (compared with 19%). Collectively, doctors and payers in emerging markets are also much more likely to recommend that patients use mHealth, either on their own or to let medical personnel monitor their conditions (68% to 59%). In China and India in particular, this figure rises to eight in ten.

The scope of mHealth is also broader in emerging markets. Mobile technology has proved particularly effective in public-health activities, such as outbreak tracking in remote areas. The data-gathering programme in Brazil's Amazonas State, for example, provided nearly real-time information on dengue outbreaks that previously took one to two months to collate.

Ms Mechaél expects mHealth in many emerging countries to support frontline health workers before it addresses consumers' wishes. Our survey reflects this: 29% of public-sector health executives in emerging markets associate the term mHealth with community-health promotion or education, the third most common choice for that group.

Figure 3: Patients are more aware of mHealth in emerging markets

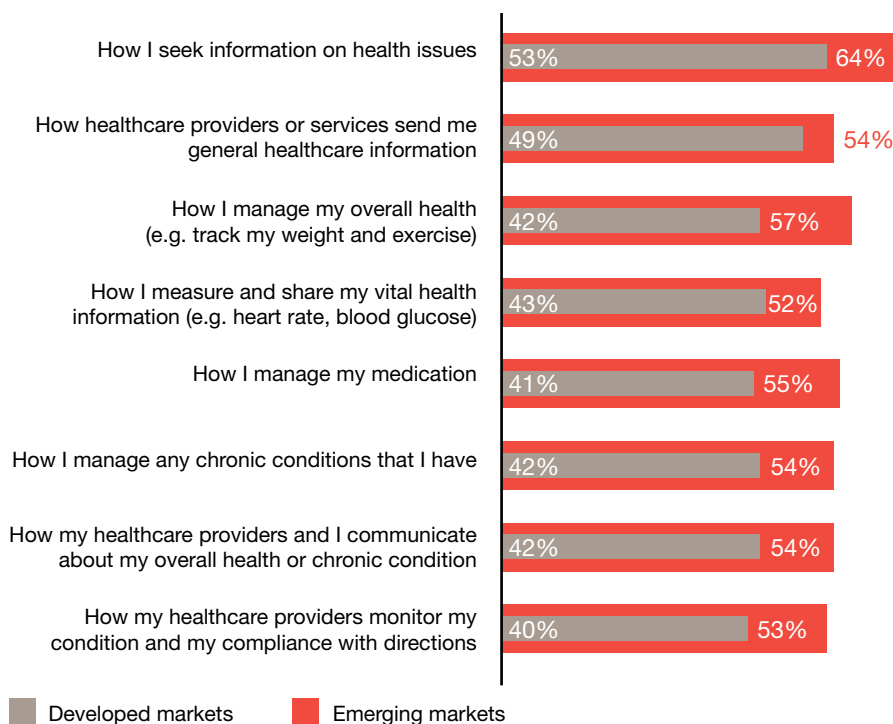
% of patients who are familiar with the terms 'mobile health' or 'mHealth'



Source: Economist Intelligence Unit, 2012.

Figure 4: Emerging market patients have great expectations of mHealth

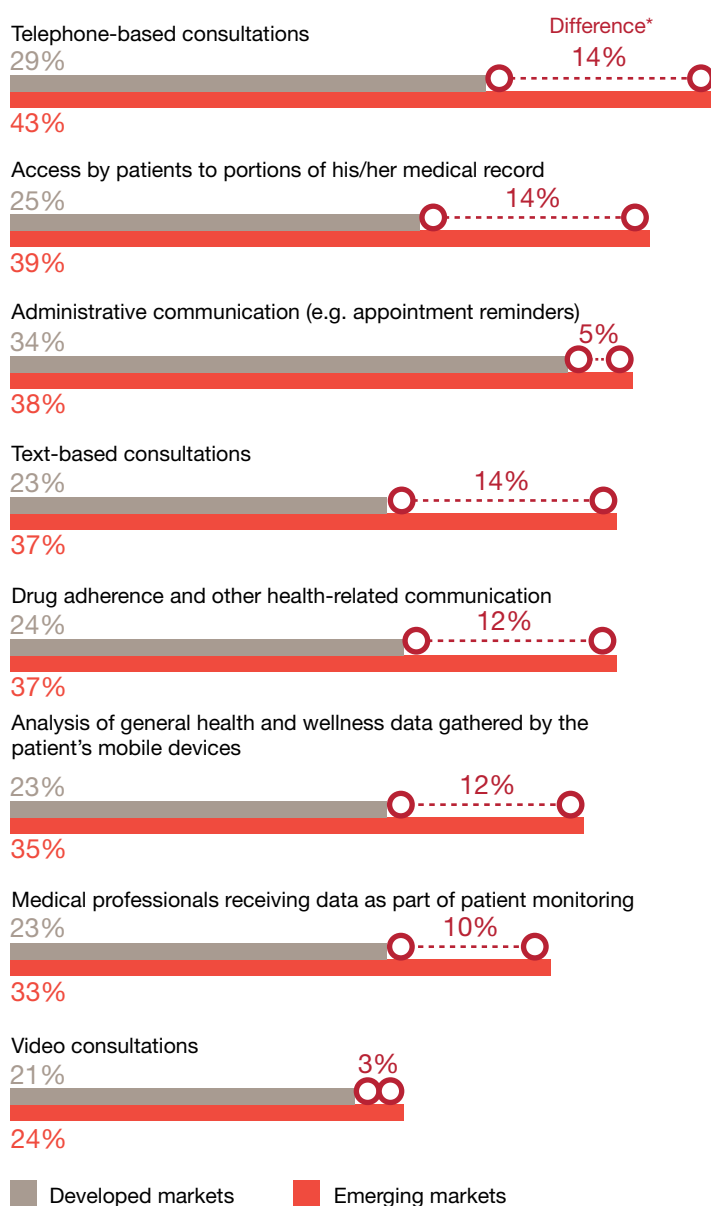
% of respondents who say that in the next three years, mHealth will change:



Source: Economist Intelligence Unit, 2012.

Figure 5: More mHealth services are covered by payers in emerging markets than developed countries

% of respondents who say their organisation has started to pay for the following types of services provided via mobile devices



Source: Economist Intelligence Unit, 2012.

*Numbers may differ due to rounding.

Finally, while ‘pilotitis’ remains a problem in developed countries, the scale of mHealth projects is starting to grow in emerging markets. Brazil’s Sistema Tele-Eleto-cardiografia Digital allows ambulances across the country to send cardiograms to the telemedicine unit of a specialist heart hospital in São Paulo. Within five minutes they receive a diagnosis to guide emergency treatment. In Turkey, Acibadem Mobile runs an mHealth nutrition service with 450,000 members, and in less than two years an emergency healthcare service offered in conjunction with Turkish Telecom has grown to 100,000 members. In Mexico, meanwhile, Medicall Home has 5m subscribers who pay \$5 a month on their phone bills in order to access medical advice. Finally, South Africa is preparing to launch a national mHealth-enabled programme to increase HIV/AIDS screening. Such projects suggest that mHealth is maturing beyond basic experimentation.

Greater need and fewer options

Overwhelming necessity helps explain the more rapid adoption of mHealth in emerging markets. “In mature markets, [healthcare involves] a luxury problem: am I going to receive first-class treatment in the hospital, in the physician’s office or at home? In emerging markets, the challenge is completely different,” says Mr Nemetz.

The number of doctors per head in the surveyed countries gives some indication of the disparity, but the distribution of medical personnel makes it even starker (see Figure 6). Doctors worldwide tend to be concentrated in urban areas. This has a particular impact in developing countries – where there are so few doctors overall – and it’s especially

relevant in India, China and South Africa, where so much of the population lives in the countryside. In such rural areas, medical care is often provided, if at all, by those with only the most basic training.

In emerging markets, care is also often expensive: 53% of patients there cite cost as a driver of greater use of mHealth, compared with 34% in developed countries. In many cases mobile technology is the only viable tool to reach people. As Peter Benjamin, managing director of Cell-Life, points out, “the cell phone in Europe is a nice gadget but a substitution for other technology. For a majority of Africa it is not a substitution for anything but [rather] the only access.”

This is also true in much of Asia. Bangladesh’s Grameenphone, in cooperation with the Telephone Reference Centre, set up Healthlink to allow its customers (and others using

village phone centres) to talk with a doctor any time of day or night. It isn’t surprising that, in a country with fewer than one doctor per 4,000 people, the service has fielded 3.5m calls in the last six years.

The lack of healthcare infrastructure means that emerging markets don’t face the challenge of entrenched interests that can impede mHealth in developed countries. Barriers to change remain, of course: China’s hospital system is notoriously fragmented, making reforms difficult. Overall, though, as Mr Leslie notes, “In the developed world, the problem is this enormous medical infrastructure that is very conservative and resistant to change. In emerging markets, you have all the drivers of innovation without the barriers.” Sangita Reddy, executive director of operations for Apollo Hospitals (India), who oversaw the growth of Apollo’s mHealth business, adds, “When you have no legacy, it is easy to build.”

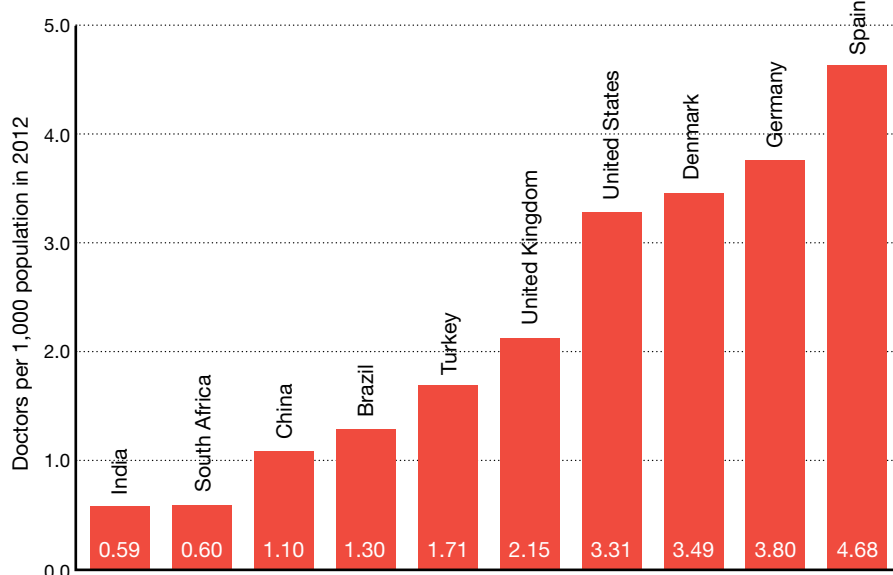
Finally, these emerging markets are doing well financially – having the technological infrastructure to engage in mHealth – and populations with expectations of improved care. Looking at all the factors in emerging markets together, Mr Leslie concludes, “In some ways, you can’t think of better conditions. Why waste time in the West?”

Emerging solutions

Emerging markets are likely to be the seedbed of innovation—an advantage they can leverage in the global market. Two of the best-known American mHealth services follow examples from emerging markets. GlowCaps, a tool that warns patients and their caregivers when the former fail to take prescribed drugs, is very similar in concept to SIMpill, a South African product that appeared several years before. Similarly, Text4Baby – a free, multi-stakeholder service that sends relevant information to pregnant mothers – is one of the few mHealth programmes to reach substantial scale in the US. Its design drew on Mexico’s VidaNet service (for patients with HIV/AIDS) and Kenya’s MobileforGood Health Tips. Technology transfer from emerging countries is likely to continue.

More important, the development of mHealth in emerging-markets countries can accelerate the development of ecosystems of firms – providers, technology companies, telecom operators, payers and others – that analysts agree are essential for mHealth’s long-term success. Given mHealth’s digital nature, an ecosystem won’t be restricted by national boundaries. This eventually will allow participants to support disruption in a host of markets. The future of Western healthcare may be developing in emerging markets today.

Figure 6: mHealth adoption may reflect relative need



Source: Economist Intelligence Unit, 2012.

A tale of two countries – India and the UK

Britain and India reflect the stark differences between developed and emerging markets in mHealth. For the latter, mHealth can address pressing healthcare needs; for the UK, it is simply an added luxury.

The healthcare landscapes of each country create different motives for using mHealth. Indians also cover about three-quarters of their medical expenses out of pocket, and adequate care is beyond the financial reach of many. The country has only 0.6 doctors per 1,000 people, and the vast majority of those doctors are concentrated in urban areas that encompass just 30% of the country's 1.2bn inhabitants. Rural residents usually receive care from Accredited Social Health Activists rather than more trained medical personnel. Given the degree to which specialists concentrate on metropolitan areas and semi-urban towns, 'tele-medicine and mHealth methods will have to be adopted', according to Sunderrajan Jagannathan, head of strategy at Siemens Healthcare India.

The UK, meanwhile, is reasonably well served by the National Health Service (NHS). The life expectancy of 80.4 years is above average for the developed world (78) and far above that of India (67.1). Moreover, the NHS's free service at the point of need removes the economic burden of care from most of the population. Instead, the currency British patients tend to pay in is inconvenience, with waiting lists a continuing problem.

The drivers of mHealth in each country are thus different. For Indian respondents, the three biggest attractions are cost reduction (cited by 58%), convenience of access (55%) and ability to obtain otherwise unavailable information (40%). Convenience is the biggest consideration of British patients (49%), but this is followed by a desire to take greater control of their own health (43%). Cost reduction (25%) is far down the list.

Cost is also the leading driver of mHealth for payers and doctors in India, followed by the opportunity to provide new services and to reach previously unreachable patients. These are much less important in the UK, where reduced administrative time is a leading concern. Indeed, UK payers were twice as likely to say that encouragement by regulators (34%) was a leading impetus for greater use of mHealth than improved outcomes (17%) was.

Even the people whom mHealth users are seeking to help differ between countries. In the last two years, users in India were slightly less likely than were British respondents to have acted on their own behalf (74% to 79%), but more than twice as likely to have done so for other family members (54% to 24%) and ten times more likely to have done so for friends and neighbours (29% to 3%).

The barriers to mHealth also reveal a telling difference in perspective. While cultural and medical attitudes are as much a problem in India as elsewhere in the world, the third-biggest barrier for British payers is that other areas need investment first.

The results are predictable. Among patients, 48% of British respondents don't engage in any mHealth-related activity, compared with just 12% of Indian ones.

A glance at headline projects tells the same story. India has a range of substantial mHealth activities. The Aravind Eye Hospital System's mHealth vans are often studied as a use of wireless technology. The Apollo Telemedicine Networking Foundation has more than 70 telemedicine centres in the country that allow contracting parties to serve rural areas. The government has announced plans for a variety of national telemedicine networks, including in oncology and disease surveillance. Still, Mr Jagannathan characterises India's progress in telemedicine and mHealth as "baby steps. It has a long way to go, but has big potential."

In Britain, meanwhile, progress is far less steady. Numerous mHealth projects exist, and stakeholders in Manchester are experimenting with the creation of a broadly based ecosystem of organisations to support the field. Nevertheless, after ten years and investing £6.4bn (US\$10.3bn), the largest eHealth project – the creation of electronic health records across the country – was abandoned as unfit for modern needs. In order to save money, the largest national telemedicine programme, NHS Direct, also is being replaced by a series of local facilities that will likely have less-skilled personnel – potentially a setback in healthcare provision.

Conclusion

There's good reason to be excited over mHealth. Mobile technology can enable much-needed, thoroughgoing change in healthcare systems worldwide, which in turn can bring significant social and economic benefits. The scope of the task ahead, though, should temper the current excitement.

The adoption of mHealth, if it is to be meaningful, must be part of a wider disruption of healthcare. But however ripe the sector is for change, the barriers remain substantial. Powerful stakeholders with contradictory incentives either fail to underwrite change that benefits the system as a whole but not themselves, or use the complexities of systems to block innovation that might harm them.

Disruption is never easy but is rarely impossible. Already mHealth is being adopted where the need is greatest and the barriers are lowest: among those who pay a large proportion of income for healthcare, among patients who aren't getting effective care from existing structures and, most of all, in emerging markets.

Most of all, advocates of the technology, especially those who come from outside the health field, need to avoid the trap of seeing mHealth as something apart from healthcare. Its greatest value will be how it integrates with health systems and allows them to care better for patients. In some cases, the promise of mHealth will prove illusory: personal contact between patient and provider will always have a place in medicine. But in other cases, mHealth will revolutionise the way care is provided.

Ultimately, mHealth will probably become so commonplace as to fade from notice. According to Mr Benjamin, in several years "the bits of mHealth that work won't be called 'mHealth'. They will be called 'health', in the way that nobody talks about 'electric health' and no country has a 'stethoscope society'." mHealth will have reached its full potential when it becomes ordinary.

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About the research

In developing this report, commissioned by PwC, the Economist Intelligence Unit conducted two surveys in ten countries: Brazil, China, Denmark, Germany, India, South Africa, Spain, Turkey, the UK and the US. The first survey asked 1,027 patients – with a broad distribution of economic backgrounds, ages, levels of education and states of health – about their opinions on various aspects of mHealth. The second survey queried 433 doctors and 345 executives from payer organisations. The respondents in the doctor group were drawn from the public sector (46%) and the private sector (49%) or were independent physicians (5%). The group is more urban (67%) than suburban (24%) or rural (10%), with 45% practicing in primary care, 45% in secondary care and 10% in tertiary care. The executives from payer organisations responding to the survey are roughly evenly divided between the public and the private sectors, with 55% C-suite or above.

In addition, the research included extensive desk research and 20 in-depth interviews of senior executives from healthcare providers and payers, technology and telecommunication companies and industry organisations, as well as leading experts from academia, think-tanks and nongovernmental organisations.

Finally, for nine of the countries covered by the survey the EIU commissioned internal reports on mHealth from its country experts.

Smarter investing: ensuring an ROI from 4G

To meet the demand for 4G/LTE spectrum and networks, the global communications industry will need to make a major new wave of capital investment over the next three to four years. As this requirement grows nearer, competition for capital remains fierce. The question for operators and shareholders is how the industry can be sure to get a reasonable return on this massive investment. There is a worrying precedent: a decade ago operators pumped tens of billions of dollars into 3G spectrum and network upgrades, only to have the resulting revenues and returns prove disappointing and much slower to come through than expected.

How can operators keep history from repeating itself? The answer lies in learning the lessons of the past, in taking a selective approach to acquiring spectrum and a collaborative approach to infrastructure, and in using more sophisticated techniques for managing capital expenditures.

by Rolf Meakin and Brian Potterill

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Huge opportunity, huge capital requirements

Projections for the global communications industry vary, but they all agree on one critical trend: that future growth will be primarily in mobile – and that within mobile, the expansion will be mainly in services and applications that use mobile data. According to the Telecommunications Industry Association's *2012 ICT Market Review & Forecast*, global consumer spending on wireless data will rise by 47% between 2011 and 2013, to US\$108bn, overtaking wireless-voice revenues.

This growth will be driven by headlong expansion in Internet-connected or 'smart' devices. A recent report from Ericsson projects that mobile connections worldwide will rise to 9bn by 2017, which means mobile handsets will far outnumber people. According to the Cisco Visual Networking Index Forecast 2012, non-PC devices – including tablets, smartphones and web-enabled TVs – will account for 30% of the total Internet Protocol traffic globally by 2016; and mobile-data traffic will represent more than 10% of that, up from just 2% in 2011. Looking further ahead, the increasing penetration of connected devices is expected to create a market opportunity for global business worth a staggering US\$4.5tn by 2020.

Realising this massive revenue opportunity will require much more than billions of smartphones and tablets across the world. Those devices will need to be connected, supported and enabled by fourth-generation (4G) and long-term-evolution (LTE) spectrum and networks with sufficient capacity and capability to carry the vast volumes of data traffic involved. Crucially – for investors and management – this infrastructure will need to yield a return that's sufficient to justify the necessary investments in spectrum and networks. Currently, how to achieve returns at this level remains unclear.

Potentially, LTE presents an opportunity for mobile operators to reduce their cost per Mbps. The increased spectral efficiency of LTE lets mobile networks carry ever-increasing volumes of mobile-data traffic without acquiring additional spectrum or costly site splitting. LTE may even provide site savings, meaning that operators can reduce the number of capacity sites required to serve their subscriber base. But there's no guarantee these cost savings ultimately will translate into higher profits for operators or lower data pricing to encourage more intensive use of data-related services.

Wave 1: acquiring 4G spectrum

So, how big is the industry's forthcoming wave of investment going to be?

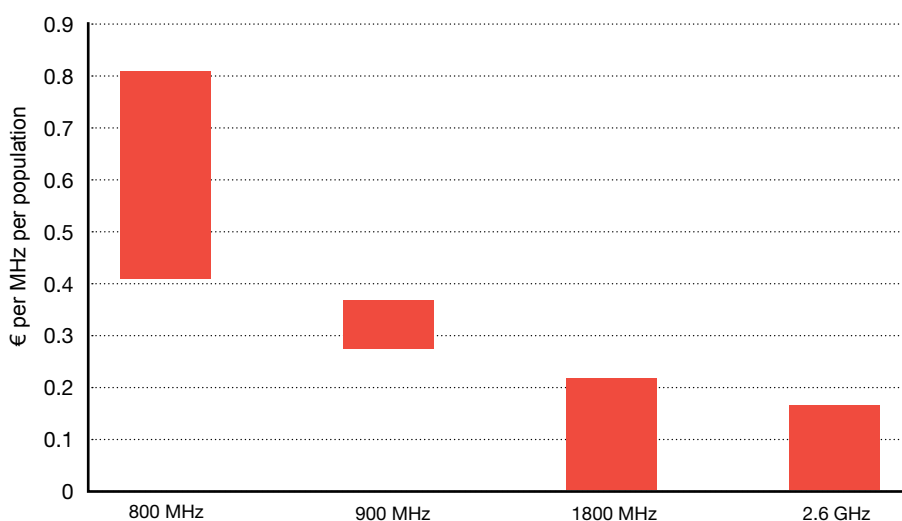
The first issue is how much money will be required to buy rights to 4G/LTE-suitable spectrum in markets across the world. In each case, a wide array of market-specific factors will affect the cost – including the extent of coverage sought, general levels of economic and market development, operators' views of the revenue and cost opportunities from deployment, and the extent to which each government is determined to use the 4G spectrum sales as an opportunity to raise funds.

Also, the bids for spectrum rights in the different territories will be subject to varying conditions, such as requirements to provide a prescribed degree of coverage in previously underserved rural areas within a particular time frame. All of these factors will affect the costs of buying spectrum and the level of investment required by operators.

What's clear is that spectrum costs are substantial and particularly those for low-frequency 800 MHz spectrum earmarked for LTE. Figure 1 shows the prices paid for spectrum at European spectrum auctions from 2008-2012. Once the auctions have finished, across the EU alone, operators will have spent around €20bn on LTE spectrum.

Figure 1: European spectrum auctions: prices paid 2008-2012

European spectrum auction prices (€/MHz/pop)



Source: PwC analysis.

Many operators are likely to find the choice of spectrum band to be a critical consideration. Unlike 3G, where the choice of spectrum bands was limited, 3GPP specifications for LTE define more than 30 potential bands. Having so many bands available will mean that in the long term there's sufficient spectrum for LTE. But in the short term, it may create challenges for international roaming and device costs.

Currently, vendors can incorporate approximately four bands into a device before power and cost constraints make it impractical. If an operator wishes its subscribers to be able to roam internationally, its devices will have to incorporate a frequency from each of the three major regions (US, Asia and Europe), plus its own network band. If, like most operators, its network uses multiple frequencies, then the operator faces a dilemma about which bands to incorporate. And if an operator uses a band for which devices are not in mass production, i.e. a band not supported by at least one major operator, then its device costs may be higher than those of its competitors. The difference could create a significant competitive disadvantage.

Such issues will be mitigated over time as vendors become more adept at 'squeezing' more radios into devices and as the volume of devices increases in all bands. In the short term, though, operators should give these issues consideration as part of their spectrum-planning decisions.

Wave 2: investing in the 4G network

Once 4G/LTE spectrum has been secured, the next hurdle is to build out the additional network overlays and technologies to make faster broadband speeds possible. This demands heavy capital investment, both in the front-end wireless networks to connect to devices and in the backhaul infrastructure.

In the US, Sprint Nextel, the third-largest US mobile operator, recently launched its LTE mobile broadband network. That consolidated the lead US mobile operators have established in deploying LTE technology. Sprint announced it intends to spend US\$10bn on its nationwide LTE deployment by the end of 2013, encompassing more than 250m customers with 22,000 cell sites. T-Mobile USA, another of the 'big four' US mobile operators, announced that it will spend US\$4bn in the next several years to build an LTE network over its 37,000 US sites. The first phase of T-Mobile's LTE network is expected to be operational in 2013.

In Asia, SK Telecom in Korea has made a US\$2bn investment to deploy LTE nationwide in an effort to cope with rampant growth in mobile-data traffic from smartphones. With the introduction of LTE, China is continuing to develop its mobile networks. Chinese networks are currently conducting a trial of the Time Division variant of LTE, until the end of 2012, and planning to launch LTE commercially in 2013. By the end of 2014, analysts predict, China will have spent US\$11bn on LTE networks.

With operators around the globe making multi-billion-dollar investments in LTE networks, it's easy to understand why analysts expect LTE deployments to be the primary source of wireless infrastructure spending by 2013. According to IHS iSuppli, global capital spending on LTE technology will reach US\$24.3bn in 2013, nearly tripling the US\$8.7bn expected to be spent in 2012.

New technology, new services – new needs?

Operators will invest in 4G/LTE spectrum and networks with the expectation that the faster wireless broadband speeds they enable will open the way for a new generation of wireless service offerings. The hope is that a plethora of new services will generate additional revenues to help offset the costs of acquiring spectrum and building out networks.

LTE will deliver noticeably better performance – in both speed and latency – for existing services. Higher-bandwidth services such as video will be better supported, with mobile performance on LTE matching that of many of today's fixed ADSL-based services. Even with today's smartphone sophistication, it's easy to imagine mobile being used for the same sorts of services widely used today on Wi-Fi and over fixed Internet connections. And at least in areas where fixed infrastructure is lacking, LTE will take its place.

Services in areas such as m-commerce, m-health, m-education, m-agriculture and m-banking/ payments are already developing rapidly and will get additional impetus from 4G networks. The nature and take-up of the new 4G-based services will vary by geography. Emerging markets are likely to be especially fertile ground for many services. That's a result of the relative lack of legacy, fixed-broadband infrastructure and of the potential for these new services to help inspire social development.

Many operators are likely to find the choice of spectrum band to be a critical consideration.

As for the future of services, if there's one thing the saga of 3G should have taught us, it's that we cannot begin to imagine how customers will develop new needs or how the new technology will serve them. But we can expect that needs will emerge and will become important.

For network operators, just as important as the types of services is where customers will use them. Knowing that is particularly important because the characteristic of 800 MHz spectrum that's the least replicable by other bands and that makes it most valuable is its ability to provide services in buildings. If we expect customers to use LTE in buildings, rather than to offload via Wi-Fi at home or through microcells in the workplace, then 800 MHz becomes more important. If we expect more offload, or indeed less use of services in buildings, then other, less-scarce spectrum bands may suffice.

Past mistakes

As operators seek to justify the business case for investing in 4G spectrum and networks, their efforts are overshadowed by the industry's experience with the 3G investments made in the early 2000s. According to

an analysis conducted in 2011 by the global law firm Freshfields Bruckhaus Deringer, mobile operators worldwide had paid an aggregate total of more than US\$150bn for 3G mobile licences during the previous decade. Ultimately, over a quarter (28%) of the auctions examined in the study involved licence winners that failed to deliver 3G services. And in cases where deadlines were imposed for rolling out services, more than half (55%) of these deadlines were not met by one or more of the licence winners.

The 3G spectrum auctions proved to be a good way for governments to generate additional revenues. But in many markets, the high prices mobile operators paid to acquire their 3G spectrum had an impact on the competitive landscape and slowed down the rollout of 3G networks. In effect, the approach of auctioning spectrum to the highest bidder brought hidden risks and costs by making it harder for operators to fund 3G infrastructure, thus hampering the delivery and the take-up of services by consumers, as well as the wider development of the market. In some cases, the huge combined cost of spectrum and network infrastructure prevented operators from rolling out 3G services at all.

The licence fees in some European countries were especially high. The prices were bolstered by the initial overly optimistic estimates of 3G's potential, and by governments using approaches to auction a restricted number of licences that drove up the prices paid.

The two countries that raised the highest amounts of revenue from their 3G licence tenders were Germany, with US\$46bn, and the UK, at US\$34bn. Significantly, both saw their massive costs affect their post-bid marketplaces. In Germany, one operator froze the development of its planned 3G network and ultimately had its spectrum licence revoked without a refund. Another returned its licence. In the UK, one mobile operator missed the deadline to achieve the level of coverage required under its licence.

In contrast, some countries rolled out 3G faster by deciding not to charge fees for 3G licences. One of these was Japan, which was the first country to adopt commercial 3G services. The approach taken by the Chinese government was to allocate spectrum to three state-owned mobile operators on the condition that they invest an agreed amount in 3G networks over a

three-year period and collaborate on building the necessary infrastructure. As a result, 3G services were rolled out in China within one year of the licences being awarded.

There's considerable anecdotal evidence that high licence fees contributed to consumers' disappointingly slow take-up of 3G services by crowding out investment in rollout, services and customers, and by obliging management to set prices at a premium to recover the large outlays on licences. Only now, ten years after the 3G licensing round in Europe, are we seeing the virtuous circle of investment and take-up. It's too early to tell whether the high prices paid in India for 3G in 2010 will stifle take-up there as well.

Lessons to apply and an opportunity to pursue

Overall, the wireless industry and governments worldwide have significant lessons to learn from the experience of 3G licensing and rollouts. With shareholders inevitably wary that the same mistakes might be made again, the question is how to make sure history doesn't repeat itself.

Looking first at the pricing and sale of 4G licences, many governments' need for revenues is, if anything, even greater in today's post-financial crisis environment than it was during the 3G bidding rounds in the early 2000s. Given the experiences with the 3G auctions and their aftermath, governments are fully aware that pricing 4G spectrum too high could severely hamper the rollout and take-up of 4G services.

Because making high-speed mobile broadband more widely available is now a social and economic priority for most governments, it seems they would be unwilling to endanger that priority by charging as much this time around as they did with 3G. Indeed, if they were to try to charge the same high prices, some operators might well walk away. Also, the legal and regulatory wrangles under way in some countries over the structure and process of the 4G auction will make governments all the more eager to keep price from becoming an additional barrier.

Something that will be different next time in some markets is the opportunity presented by spectrum refarming. The 1800 MHz spectrum currently being used for 2G is being considered by many operators for re-farming onto 4G, with network and device providers coming in line. As voice and data are progressively migrated onto 3G and 4G, the need for 1800 MHz for 2G capacity will fall.

The attraction of 1800 MHz is that there's sufficient spectrum to offer high-bandwidth services, leaving more spectrum available than with 800 MHz in most countries. The 1800 MHz doesn't match the in-building coverage capability of the 800 MHz, but with the existing high-density urban site networks it can be a reasonable substitute. Most important, 1800 MHz prices at auction are much lower than those of 800 MHz.

Turning to mobile operators themselves, we've identified three main areas where they can focus their attention to make sure the returns on their capital investment in 4G spectrum and networks come faster and are more attractive and more certain than they were with 3G. Operators can develop a strategy for value-oriented spectrum bidding, collaborate on networks, and better manage the timing and location of capital expenditures (capex).

Focus area 1: develop a strategy for value-oriented spectrum bidding

The critical elements of a value-oriented bidding strategy are:

- influencing the design of the spectrum auction
- considering the spectrum options and the value associated with each option
- using the strategy and tactics in the auction.

Of these, influencing the auction design is the most important, and operators should invest resources to understand and influence the design. Much of the wide difference in price outcomes among auctions is attributable to differences in design. Once the design is set, the bidding strategy can be complex. But a well-executed strategy is the norm, and there's little room for adding value through differentiated strategies.

With the 4G revolution looming, operators need to move fast to work out their capital management strategies for both acquiring spectrum and building their networks.

In preparing for the auction, getting an understanding of the spectrum options and the value of each option is important. More spectrum bands are being designated for mobile, and more of these bands are being licensed as technology neutral. The various spectrum bands can be considered parts of a portfolio, with different degrees of substitutability between bands, and many different portfolios that could result from an auction – each with a different network strategy.

With the ‘must-have’ lower-frequency spectrum being scarce, demand is highly price inelastic. That is to say, if demand at the auction can be reduced, either through judiciously evaluating alternatives or through legal collaboration, then the prices paid for spectrum will be much lower. One of the lessons learned from 3G was that too many bidders went into the auctions with an attitude that they must secure the spectrum at all costs. This time the industry is wiser and has greater financial constraints.

Technology improvements are producing greater spectral efficiency, and more spectrum is becoming available. Both are happening to the extent that in many markets, with the release of ‘digital dividend’ spectrum, overall, spectrum isn’t that scarce. Just the low-frequency bands are scarce, and that scarcity is making prices higher.

Network strategy and spectrum are inextricably linked. But taking a portfolio approach to spectrum, and considering alternative portfolios and network strategies, shows us that the answer doesn’t always have to be that any particular band is a ‘must have’. An important development is the emergence of LTE on 1800 MHz, which could be a viable substitute for 800 MHz. By understanding how viable – as well as what additional costs would be incurred to deliver service and how service quality would impact customers and revenues – an operator can understand the value of this alternative. Given the high costs of the 800 MHz spectrum, it’s worth knowing the value of an alternative option.

Focus area 2: collaborate on network infrastructure

To collaborate and spread costs and risk, operators need to work out which parts of their 4G investments they could share with other operators. To go beyond the familiar passive sharing of networks, they’ll need to ask questions. Could we share active radio components? How about spectrum? At a higher level, what will the overall collaboration model look like? And what is the endgame likely to be for the entire industry, both within specific markets and in terms of the potential for multi-territory alliances between operator groups?

Such questions are especially relevant in markets where the use of collaboration to save costs and create mutual business benefits is already well established. An example is the UK. The five mobile operators there have used collaboration to enable their networks to consolidate, ultimately, down to two main groupings – the Mobile Broadband Network Limited (MBNL) joint venture between 3UK and T-Mobile/Orange (now Everything Everywhere), and the Cornerstone collaboration between O2 and Vodafone.

Significantly, these two collaborative ventures are based on different models. MBNL combines the partners’ base stations and infrastructure to operate a single network (full RAN sharing). O2 and Vodafone use Cornerstone to share the structures where their radio equipment is located rather than sharing components such as antennae. The fact that different collaborative models for 3G networks are emerging within the same marketplace raises the question of whether the same could happen with 4G/LTE.

Focus area 3: manage capex timing and location more effectively

To manage capital more effectively, there are a number of principles operators can apply with their investments in 4G. One is to focus more actively on making sure they not only spend the right amounts, but also spend at the right time and in the right places. In the 3G investment wave, some operators invested their capital in the required networks too early in advance of demand. The result: returns came through much later.

With 4G, operators could benefit from tracking consumer demand and take-up more closely. And they should adopt a more flexible approach – one that involves committing capital only when demand is sufficient to give reasonable certainty of return in a relatively short time frame.

There are several other ways of investing capital in 4G more smartly than in previous step-changes in network technology. These include putting in place new management information capabilities and processes to manage the deployment of capital in the network much more efficiently and responsively.

For leading operators, the new ways of investing mean managing their investments carefully along two dimensions: geography and timing. Most operators are familiar with managing revenue or earnings before interest, taxes, depreciation and amortisation (EBITDA) by site or sector. But the emerging best practice involves planning and reporting assets on a similar site/sector basis, *and deducting an asset charge* from EBITDA. This requirement puts demands on planning, asset management and reporting, but deciding how to allocate capex by geography can generate radically different outcomes.

Taking this analysis further also makes for a more sophisticated analysis of the timing of the capex investment. In the early days of 4G/LTE, the incremental EBITDA from a particular site may not be sufficient to bear the increased ‘asset charge’ generated by the capex spending. As equipment prices fall and demand for bandwidth-hungry services rises, it will become possible to identify the inflection point where the EBITDA increase covers the asset charge. And that will indicate the optimal timing for the investment.

Conclusion: rewriting the future of 4G to generate returns

To paraphrase nineteenth-century Spanish-American philosopher George Santayana: “Those who ignore history are doomed to repeat it.” As the 4G investment wave approaches, mobile operators are in a good position to learn from the history of their own industry. As a result, rather than rewriting the past, they can rewrite the future of 4G networks – by developing well-structured spectrum bidding strategies, collaborating with their peers and improving how they manage their capital.

With the 4G revolution looming, operators need to move fast to work out their capital management strategies for both acquiring spectrum and building their networks. Players that act early to influence the design of spectrum auctions and that put in place the right network partnerships and capital-investment techniques will be positioned to generate a superior return on their investment. Those that hang back looking for the ‘second mover advantage’ or that treat certain spectrum bands as ‘must-have table stakes’ risk having to spend more than they need to capture revenues from tomorrow’s data-rich world. And in the world of saturated mobile markets, return on investment will determine the winners and losers from here on.

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Clearing the way

As telecom operators around the world continue to upgrade their network technologies to improve performance and increase capacity, many of them are confronted with the challenge of maintaining multiple generations of technologies and networks. Many wireless operators continue to operate second-generation (2G) and third-generation (3G) networks while deploying fourth-generation (4G) technology. Similarly, wireline operators continue to maintain copper access while overlaying fibre to reach customers. Dealing with the complexity and cost of maintaining multiple technologies, and needing to make assets that are valuable but occupied by older and less efficient technology available for reuse, operators have begun preparing to decommission their older networks.

PwC set out to understand the status of operators' plans and efforts to decommission networks. Highlights and analysis from our survey are presented here.

by Dan Hays and Greg Chiasson

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The PwC 2012 telecom network decommissioning study was led by Dan Hays, PwC's US wireless advisory leader, managed by Ayesha Datta, and supported by significant contributions from Brian Stahlhammer, Michael Flaherty and Shailabh Atal. PwC thanks the companies that participated in the study. Their support for this project and their candid responses are appreciated.



Setting the stage for network decommissioning

Wireline and wireless communications networks are becoming an ever more critical part of the fabric of our society worldwide. From video teleconferencing over high-speed broadband connections in order to remotely diagnose medical conditions, to using mobile location-based services to find a nearby restaurant, the Internet and mobile phones have brought even the most remote parts of the world closer together.

Indeed, the swelling adoption of communications services in recent years is straining networks like never before. According to the International Telecommunications Union, more than 2.2bn people, or 32% of the global population, now use the Internet, while more than 6bn people, or over 87% of the world, hold subscriptions for mobile services.¹ Furthermore, subscriptions for advanced services such as 3G mobile data are growing at 37% annually, accelerating the construction of new wireless networks and high-speed wireline networks that carry wireless traffic to its ultimate destination.²

New networks come in many forms, including the evolution from legacy copper wireline networks to those operating over fibre optics, as well as from 2G and 3G wireless networks to 4G mobile broadband technologies. But regardless of how you look at it, the deployment of new network technologies means that some older, legacy networks are becoming not only outdated, unreliable and underutilised but also more expensive to operate and maintain. When this happens, decommissioning is sometimes the only option.

1 International Telecommunications Union, World Telecommunication/ICT Indicators Database, <http://www.itu.int/ITU-D/ict/statistics/>

2 Ibid

Although removing small amounts of excess or failed network equipment is common practice in the telecoms industry, the wholesale decommissioning of legacy networks is uncharted territory for most network operators. Given this fact, and the surge of network decommissioning expected in coming years, PwC conducted a study to confirm the outlook for the decommissioning of communications networks. The study also assessed the plans, readiness, influential factors and concerns of telecom network operators around the world as they embark, many for the first time, on deconstructing outdated communications networks.

A world of growing networks

PwC's 2012 telecom network decommissioning study drew strong interest from both wireline and wireless network operators worldwide. Of the 31 participating companies that completed the survey, approximately half were from Europe, the Middle East and Africa (EMEA), and the remainder were from the Asia-Pacific (APAC) and Americas regions. Nearly 40% of the survey respondents operate both wireline and wireless networks. An

additional 48% operate only a wireless network, in line with the greater global adoption of mobile services (see Figure 1).

Network decommissioning is a topic of interest to carriers large and small. Participants' subscriber bases range from less than 100,000 subscribers to more than 100m, with an average annual revenue of US\$5bn for wireline network operators and US\$6bn for wireless network operators. More than half of the participants, both wireless and wireline network operators, have a subscriber base within the range of 1m to 10m.

Perhaps the most telling characteristic of participants' networks is the rate of traffic growth that each is experiencing. Nearly half of the respondents indicated that traffic on their networks has increased by more than 50% in the past year and nearly a third of the wireless operators reported annual traffic increases exceeding 150%. This survey reinforces widely published industry estimates showing that network traffic is growing rapidly practically everywhere, and that inevitably the required upgrades will lead to the rapid technical and economic obsolescence of legacy networks (see Figure 2).

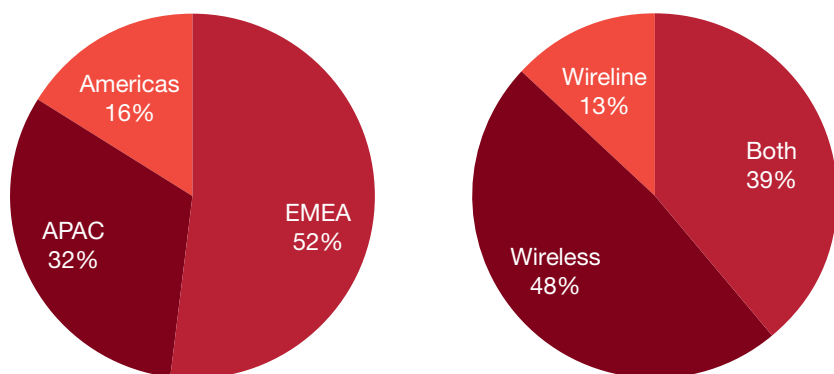
Decommissioning on the horizon

Operators worldwide clearly have decommissioning of their legacy network assets on their minds. Nearly 90% of the wireline operators and more than 60% of the wireless operators surveyed indicated that they intend to decommission legacy networks during the next five years.

Many factors are bringing about the high rate of intended decommissioning. First and foremost, both wireline and wireless network operators are aiming to reduce operating costs by decommissioning their networks (see Figure 3). Other reasons for decommissioning include improving their customers' experience, eliminating redundant or overlapping wireless networks and migrating traffic to more efficient networks.

Traffic migration, in particular, presents a significant efficiency in PwC's experience. Potentially, 4G networks can carry five to ten or more times the traffic on the same amount of spectrum as outdated 2G and 3G networks carry. Migration also enables the subsequent clearing and refarming of 2G and 3G spectrum for future use. Operators of 2G wireless networks noted that they're particularly influenced by the expected migration of wireless-voice traffic to Voice over LTE (VoLTE) or to other, more efficient voice technologies based on Internet Protocol (IP).

Figure 1: Participant location and network technology³



³ All charts throughout this article are measured in percentage of survey respondents.

Figure 2: Network traffic growth in last 12 months

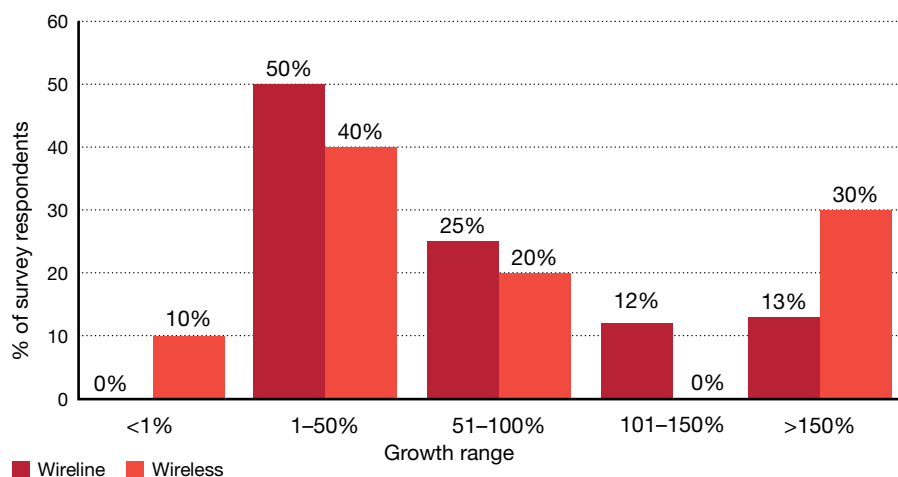
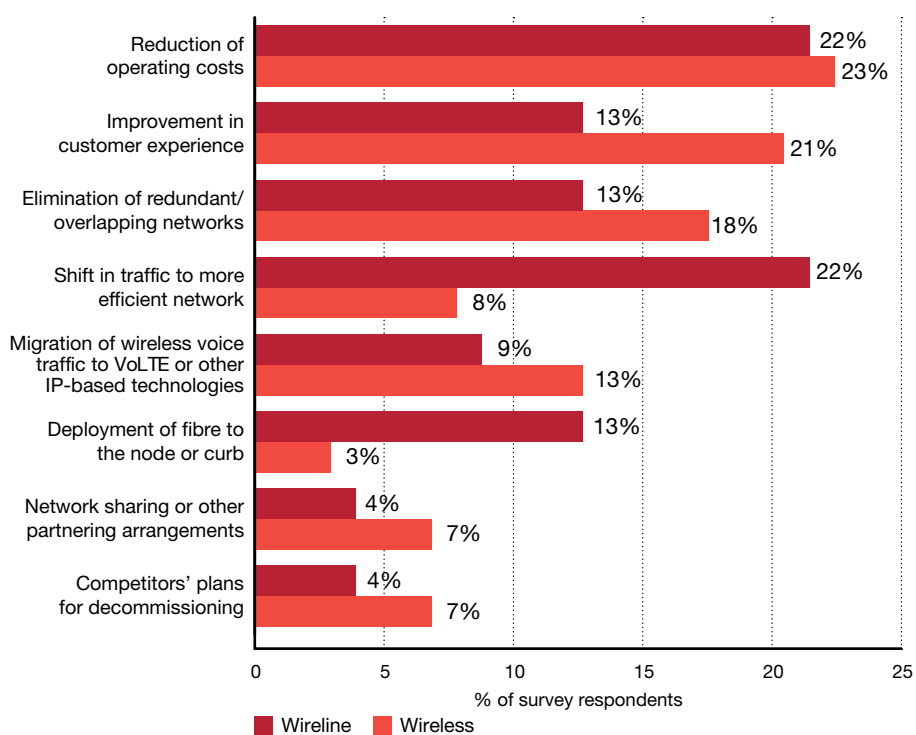


Figure 3: Reasons to decommission the network



PwC's experience suggests that disposing of network equipment can be critical in generating cash to offset the cost of network decommissioning.

Copper-based networks – both local loop and coaxial – dominate the list of wireline technologies indicated in participants' decommissioning plans. In addition, 38% of wireline operators are planning to decommission either access MDFs, legacy interconnect to IP interconnect, ATM networks, or radio and fibre PDH. As advanced technologies such as fibre-to-the-home (FTTH) and Ethernet-over-fibre (EoF) grow in popularity, they clearly are causing operators to re-evaluate the costs of operating and sustaining legacy copper networks.

Also not surprisingly, more than 90% of those who intend to decommission a wireless network indicated that it would be a 2G technology. More than a third of the respondents also indicated the intent to decommission a legacy 3G network, which demonstrates the rapid growth of 4G technologies such as LTE. The implications are potentially significant for operators (shortened timelines in which to monetise their 3G investments) as well as for equipment vendors (a possible glut of used 2G and 3G network equipment in the market to withstand).

An important strategic element of decommissioning any network is deciding whether to simply 'turn off' legacy networks or to physically remove and/or dispose of the assets they contain. In PwC's experience, such decisions can make or break the economics of network decommissioning programmes, due to tax considerations, logistics costs and the potential for continuing payments to property owners for rights of way and space. In many cases, an analysis of decommissioning costs and benefits

must be run for each site or network asset location in order to control the costs and make the most from reusing, reselling or recycling assets. In addition, the company's controls on and processes for tracking the network assets if they're being reused, resold or recycled can be significant and resource intensive.

Both wireline and wireless network operators are split on their strategies for removing assets. Approximately one-quarter currently plan to turn down legacy networks and abandon them in place (see Figure 4). But more than 75% of operators plan to physically remove decommissioned assets from their networks, with the vast majority hoping to sell or otherwise dispose of them. Plans for disposing of assets efficiently may, in fact, represent a significant opportunity. PwC's experience suggests that disposing of network equipment can be critical in generating cash to offset the cost of network decommissioning. Even for equipment with little resale value, operators could risk harming their reputation for environmental responsibility if they adopt an incomplete abandon-in-place strategy. Failing to embrace environmentally responsible disposal solutions, including the vendors used and the policies adhered to, also could be risky.

The vast majority of operators intend to start decommissioning their networks in the next five years, and more than 80% of both wireline and wireless operators expect network decommissioning to require three to five years or less to complete. The operators may want to match capacity transitions to their

deployment of more advanced networks, but the time frame also appears to be grounded in the reality of dealing with decommissioning programmes that can require modifying thousands of leases and removing millions of assets.

Wireless operators are moving aggressively in their efforts to decommission their oldest networks. Forty-six per cent of wireless operators have already begun decommissioning networks. The average time in which they expect to complete the decommissioning of 2G networks is just 2.3 years, significantly below the 5.3 years they expect for 3G networks.

Establishing a clear understanding of the inventory and location of network assets is a critical prerequisite to the timely and effective completion of network decommissioning activities. When asked what percentage of network assets were captured in enterprise asset-management databases or similar systems, only one-fifth of the wireline operators and one-third of the wireless operators indicated that all of their assets were tracked (see Figure 5). In fact, one-half of the wireline operators and more than one-third of the wireless operators indicated that less than 50% of their assets are currently catalogued and managed. This lack of visibility is expected to make planning, controlling and maximising the value of network decommissioning efforts extremely challenging. It may also sacrifice the opportunity to get the most tax benefits or to optimise the impact on the balance sheet.

The vast majority of operators intend to start decommissioning their networks in the next 5 years.

Figure 4: Scope of decommissioning

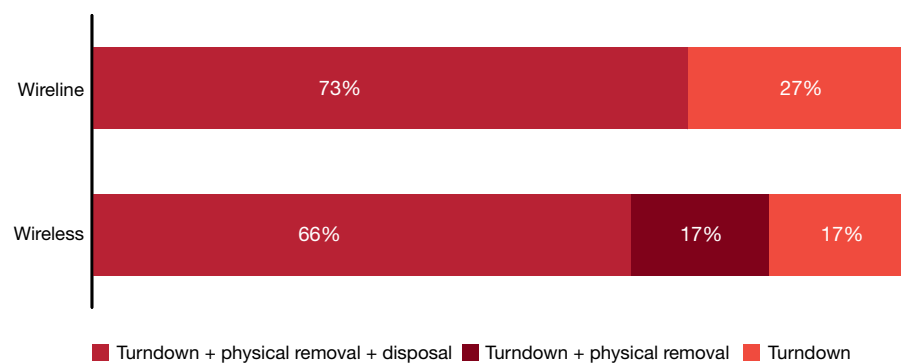
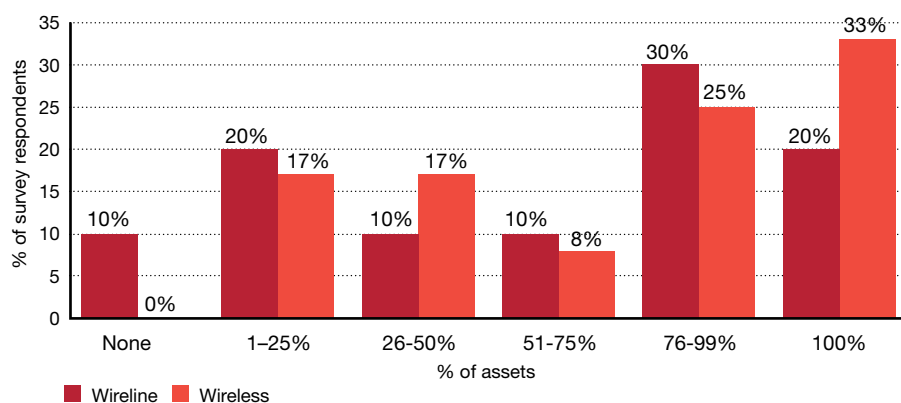
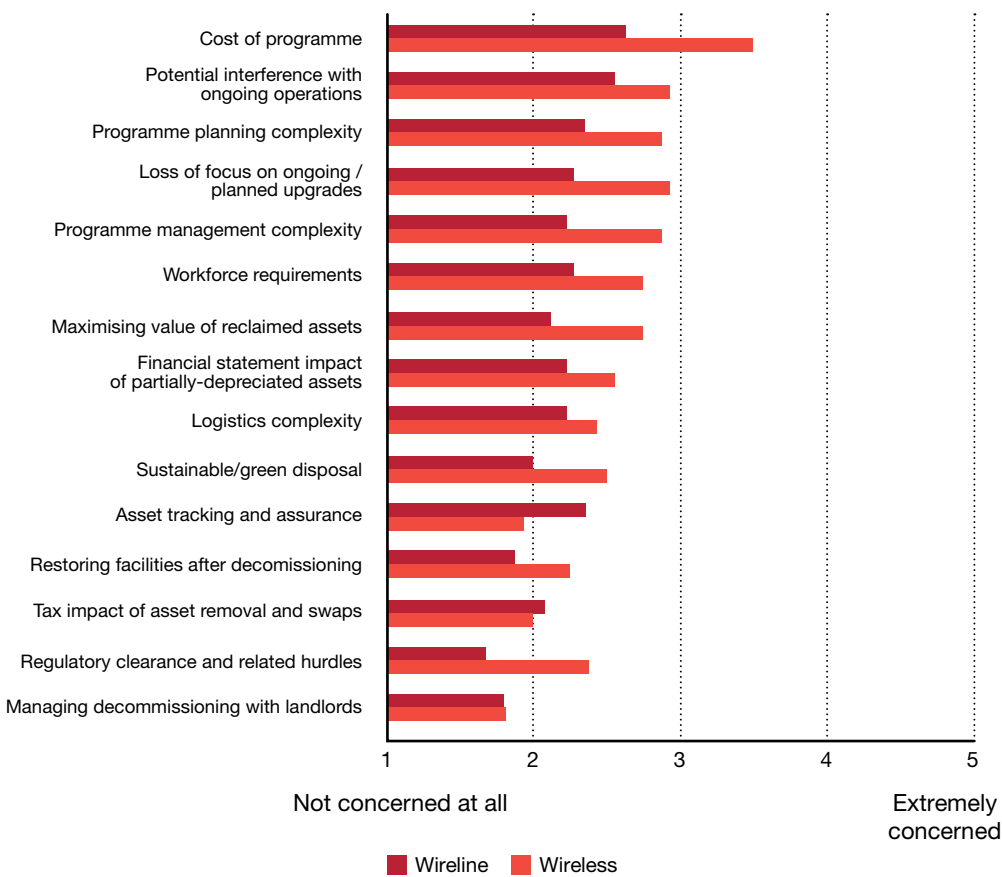


Figure 5: Assets managed through an enterprise management database



It's often necessary and may be inevitable, but decommissioning a network doesn't generate a stream of revenue. So, often it isn't visible to senior management.

Figure 6: Concerns about decommissioning



Ready or not, here we come

While decommissioning is on the minds of wireline and wireless operators alike, the results of our survey show a stark difference in the relative readiness of different types of operators. They also demonstrate the differing concerns and strategies being employed across categories.

The first difference between wireline and wireless operators is the relative readiness of their network decommissioning plans. Seventy-three per cent of the wireline network operators reported that they have decommissioning strategies and plans in place, in sharp contrast to 48% of the wireless network operators that have established strategies and plans.

Wireline and wireless operators also showed some differences in their concerns about network decommissioning (see Figure 6). The cost of a decommissioning programme and its potential to interfere with operations are both top concerns,

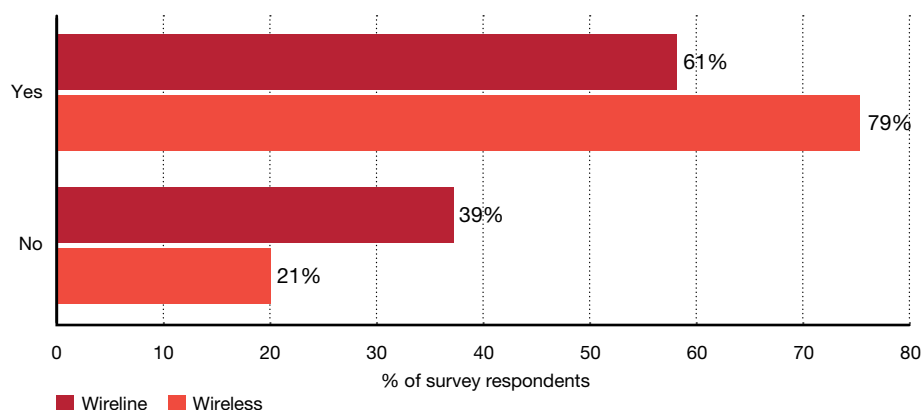
but wireline operators showed significantly less concern with asset tracking than their wireless peers did. The difference may be due to the relative immaturity of asset-tracking capabilities reported by wireline operators, which may be causing them to discount the importance of controlling their assets during decommissioning.

Surprisingly, both wireline and wireless operators expressed relatively little concern about managing decommissioning activities with landlords, whose numbers may run in the thousands, and about securing regulatory clearance, which can be unpredictable. In our experience, strategies such as staging decommissioning efforts to correspond with lease expiration dates, taking advantage of economies of scale for transportation and equipment marketing or disposal, and developing tax strategies to pay the least sales taxes on assets can be effective in reducing total decommissioning costs.

An increasingly common practice in the telecoms industry is for equipment vendors to take on both deployment and decommissioning activities. More than two-thirds of the network operators indicated that already their primary equipment vendors have approached them about participating in this activity (see Figure 7).

Both wireline and wireless network operators indicate that they expect to spend significant portions of their decommissioning budget on programme-planning activities, and that they envision higher spending for more complex and distributed wireless networks. Upfront planning is critical to the success of a decommissioning effort. But our experience indicates that investing in strong management of network decommissioning activities is equally important. Similarly, it's critical not to underestimate the potentially significant costs of removing and transporting physical assets, which easily can run into thousands of dollars per location, totalling tens, if not hundreds, of millions of dollars in some cases. Experience in planning complex reverse logistics programmes is of the utmost importance in controlling these costs.

Figure 7: Engaging equipment vendors in the decommissioning activities



For most network operators, decommissioning their network is a complex and potentially costly endeavour. It's often necessary and may be inevitable, but decommissioning a network doesn't generate a stream of revenue. So, often it isn't visible to senior management. Although operators tend not to integrate potential benefits into their decommissioning plans, our survey participants indicate that they see several potential cost offsets that should be incorporated in order to defray the expected costs of network decommissioning. Tax benefits, which vary widely by country, were cited most often by wireline operators as a possible cost offset, while wireless operators most frequently expected benefits from reselling assets. Cost benefits are listed in the box below.

Network decommissioning represents perhaps the next great challenge for telecommunications service providers worldwide. For many, decommissioning a working network will be a first-time activity. For nearly all, it will be a once-in-a-decade activity. Regardless of experience or frequency, strong planning and execution – including accounting for potential offsets to costly decommissioning activities – will be critical to success.

Our analysis suggests that, with their large asset bases and declining numbers of subscribers, wireline operators will take the lead in network decommissioning efforts over the next five years as compared to their wireless counterparts. It also suggests that the majority of wireline and wireless operators have overlooked the opportunity to significantly offset costs by disposing of network equipment and commodity materials. PwC's experience indicates that disposing of network equipment, which is both an opportunity to generate revenue and a risk due to information security and environmental concerns, should be integral to decommissioning efforts.

Wireline operators are more prepared for network decommissioning compared to their wireless counterparts. But the two sets of operators share similar concerns and risks focused on the costs they face and the possibility of the decommissioning affecting service delivery operations. These concerns are certainly worth noting, as they entail not only budget overruns, but also enduring effects on a company's relationships with its customers and on its brand and revenue streams.

Experienced globally with network deployment and operations, as well as extensively so in establishing and managing major reverse-logistics and asset-sale programmes, PwC has gained insights into best practices to follow in decommissioning a network. Most important is to take a 360-degree view of a decommissioning effort to evaluate not only the project's strategy and planning, but also such potential sources of value – significant value – as asset tracking and controls, environmental compliance, tax implications and asset resale.

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Potential benefits of network decommissioning

Wireline operators

- Maintenance and operation cost reduction
- Reduction of energy and support costs
- Reduction of costs related to cable theft
- Personnel related cost benefits
- Improved operating cost base

Wireless operators

- Refarming 2G spectrum for 3G use to save on spectrum costs
- Operational efficiency
- Government incentives
- Free swap from vendors
- Lower operating costs

During March and April of 2012, PwC conducted a global study of the outlook for the decommissioning of telecommunication networks. The study, conducted primarily through an online survey, included collecting information from executives at telecommunication operators worldwide. Survey questions covered plans, readiness, and factors influencing and concerns about decommissioning networks. PwC's global telecommunications practice developed the survey, and the firm's International Survey Unit (ISU) collected the data.

Companies participated voluntarily in the study, with all survey responses submitted by executives from individual companies. Individual survey results are kept confidential by PwC.

The following publications, authored by partners at PwC, provide thought-provoking and informative discussions of interest to various segments of the industry. To obtain PDF files or hard copies of the publications, please visit the websites listed below.

Global entertainment and media outlook: 2012-2016

PwC's *Global Entertainment and Media Outlook* is a comprehensive online source of global analysis and 5-year forecasts for consumer and advertising spending in 13 media segments across 48 countries. The E&M industry has entered a 'new normal', with digital embedded in business-as-usual and moving to the heart of media companies worldwide. In this edition of *Outlook*, we discuss three perspectives around which we believe successful players will reshape their business: 1) understanding the connected consumer through data analytics while heeding concerns over privacy; 2) devising new business models to reinvent the value proposition of advertising and content; and 3) developing the organisational models and collaborative capabilities to drive revenues from new behaviours. For more information, visit www.pwc.com/outlook.

We need to talk about capex

Global capex levels in the telecommunications industry have soared from US \$50 billion to \$325 billion, in real terms, over the last 30 years. This tremendous investment is not producing returns that telecom operators require. Based on our analysis of the financial performance of 78 fixed-line, mobile and cable telecoms operators around the world and a qualitative survey of senior telecoms executives, we developed an analysis and perspective of the situation. This paper explains the four key reasons telecom companies allocate capital inefficiently. It identifies 12 shared attributes of a well-designed capital management programme and is applicable to any type of organisation: fixed, mobile or cable, whether a new entrant to the market or an established major telecoms operator. To read or download the PDF file, please visit www.pwc.com/communications.

Technology Forecast: Reshaping the workforce with the new analytics (2012, Issue 1)

This issue explores the impact of the new analytics and a culture of inquiry enterprises can foster with the help of emerging data analysis tools and services. A new generation of data scientists have taken on the challenge of mining the social media data cloud, as well as the under-used data enterprises are collecting internally. What they're finding can provide direction and momentum to a wide range of different organisational change strategies. To read or download the PDF file, please visit www.pwc.com/techforecast.

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