

Living in an apps-driven world

Viewpoint paper

EMBRACE

new revenue sources.

Innovation in mobile devices and the rapid growth of mobile applications are driving the communications market toward a new and exciting era. HP and PwC examine the challenges and opportunities for today's communications service providers.





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The continued proliferation of mobile applications will open vital new revenue opportunities for communications service providers (CSPs).¹

Executive summary

The emergence of apps has triggered a mobility revolution in IT. The promise of Internet via the mobile phone has finally started to become a reality as a result of innovation and the emergence of a new ecosystem to create and support apps. Consumers are increasingly influencing innovation through open minds and rapid adoption. Consumer demand is being stimulated by an ever-growing range of providers from large new entrants to “garage” type start-ups. Established players in key sectors such as media and mobile devices are being forced to rethink their entire product strategy and business model in response to these shifts.

What if apps is not just a fad and precipitates a fundamental change to not only mobile, but to all laptops and PCs, offering opportunities to CSPs to confidently enter new markets and access new streams of income?

The apps ecosystem where users rely on devices, computing, and connectivity for their apps requirements is in transition and rapidly evolving: Consumers are increasingly influencing innovation in a dynamic provider landscape. Device and bandwidth requirements were previously driven by browsing and email access. Now apps appear to be the new driver of innovation, requiring increased device processing power, improved displays, and reliable bandwidth. Each element of this ecosystem offers not only challenges but distinct and related opportunities for IT companies and CSPs to carve out differentiating value propositions in a highly competitive marketplace. Established players in key sectors such as media and mobile devices are being forced to rethink their strategy and business model in response to these shifts.

To address these challenges and harness the opportunities in this apps-driven world, CSPs may want to consider several strategic implications to support their growth plans. We have seen the first tentative signs of leveraging apps from smartphones, through tablet devices onto laptops and PCs, liberalising new ongoing revenue streams from traditionally low yield assets within the enterprise or family wallet. Further, as the majority of homes are now packed with various mobile and fixed computing devices, media players and even smart TVs, it may allow the CSP to become the technology partner of choice. Some CSPs are better positioned to address these markets, the mobile CSPs typically have a high street presence, and some fixed network operators have major online retail presences.

Apps are creating new revenue opportunities and in some cases entire new value chains. Technology companies are supporting this explosive growth through investments in virtualisation and cloud technologies. In turn, this is fuelling further consumer and enterprise demand as users increasingly expect to be able to access apps and supporting data from the “cloud” wherever and whenever. Users will soon rely on apps in the same way we already expect the global network of ATMs to dispense cash at any point of time in any place.

The new opportunities above linked to more traditional levers, such as innovative pricing, will provide added incremental benefits and give CSPs a greater stronghold on their mobile network capability. This will leverage apps across platforms to yield a new source of revenue—upgrading the user experience both in terms of scope of service, ease of use, data security and user control to gain share of mind and spend, and finally, redefining the value chain to deliver the “connected home” and gain a competitive advantage by managing users’ dual domains of home and work.

¹ This paper primarily addresses the consumer market; apps in the enterprise market are addressed only where the two markets are related.

CSPs must identify their specific opportunities for value creation in this fast-changing ecosystem. The revenue possibilities are very large, but ruthless execution of major change will be required. Success will require clear strategies, radically different operating models and new business partner relationships. The power of the apps driven ecosystem depends on the success of all its components including new devices, better communications technologies, and the cloud. CSPs have a vital part to play in making this a success, but it will require a return to high levels of innovation and effective deployment of new services.

Innovation in applications, accelerated by increasing mobility, is driving the communications market toward a new and exciting era. The added intelligence, processing power, and screen capabilities apps demand will spur additional development in devices, computing, and networks infrastructure alike. CSPs should embolden themselves and confidently grasp these new opportunities before the new energised entrants into the CSP value chain build on their bridgeheads into the market.

In this paper, we'll examine the challenges and some CSP strategies for competitive success—like exploring innovative pricing strategies, leveraging app use across devices from handheld and tablets to home computers, and providing wireless apps services within the home.

The changing landscape for consumers and CSPs

The communications sector landscape is changing fast in keeping with new demands from today's mobile customers. Consider some key trends:

- CSPs need to provide users with expanded access to mobile data—but also face pressure on margins and revenue growth in traditional areas such as voice.
- Mobile usage is saturating rapidly in emerging markets, and operators there are looking at new ways to provide services at radically lower price points.
- Regulation, competition, and innovation are paving the way for previously unthought-of moves, such as the recent merger of Orange and T-Mobile in the UK to create "Everything Everywhere."

In a nutshell, end users are rapidly embracing new mobile technologies and the capabilities of 3G networks. These fundamental changes in end-user behaviour are also changing attitudes toward the capabilities of CSPs.

Smartphones and other innovative mobile devices from manufacturers such as Apple, RIM, and HTC are capturing the imagination of millions of users worldwide. At the same time, there's a flood of mobile applications into the market. People expect a virtually limitless ability to download these bandwidth-hungry applications to their devices, so the need for network capacity continues to increase.

This is the new apps-driven world we live in, and HP and PwC see it as a real growth opportunity for CSPs. How can they capture a share of the mobile applications market—estimated to reach €4 billion by 2014¹—whilst responding to related technology demands?

Apps everywhere

As background, consider some facts related to the amazing proliferation of apps.

Watching a clip through your YouTube app uses the same network capacity as sending 500,000 text messages (sms messages) simultaneously. 71% of smartphone users now regularly use apps, and with an average size of an iPhone app now 14.9MB, it's easy to appreciate the current capacity constraints on the network.²

At last count, apps have been downloaded from Apple's iTunes 6.5 billion times, which is about 200 every second globally. The average price of an app now stands at \$2.50 for iPhone and \$4.50 for iPad (probably higher due to the lean toward book purchases), with around a third of apps available free of charge.³ It's driving revenue for Apple, certainly—but also for HTC, Google, and others that are benefiting from increased smartphone penetration.

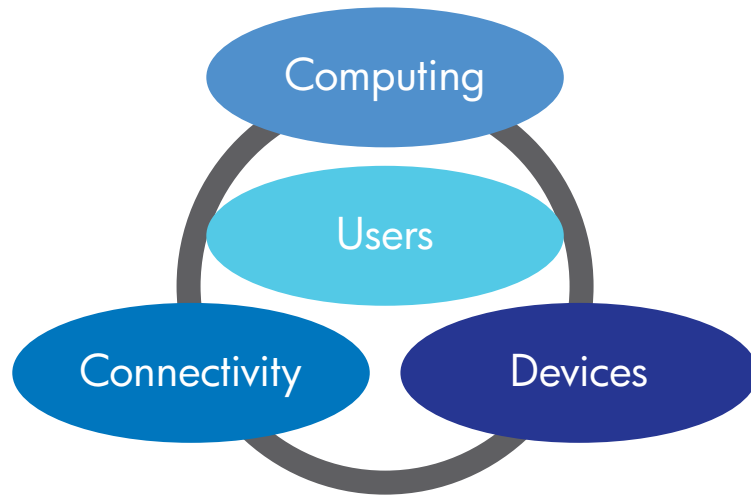
Apple has established a footprint of 70 million phones and 300,000 apps over the past four years. Their "walled garden" approach has introduced the market to the concept of an apps-driven world, and they continue to aggressively market apps for use on their own handheld devices and home computers, leveraging the apps opportunity across technology platforms. This is a logical move for vertical providers such as Apple, but the strategy is being adopted by other providers; Google has built a base of 30 million users and 100,000 apps over the past two years using Android phone software.⁴

1 PwC analysis

2 "iOS u=Update: 120m Devices and 6.5bn App Downloads," 1 Sep 2010; accessed at <http://www.mobile-ent.biz/news/38478/Apples-iOS-120m-devices-and-65m-app-downloads>

3 "Apple App Store UK Q3 2010 Analysis," Brandon Mesinga, 6 Nov 2010; accessed at <http://www.appmanifesto.com/insights/2010/11/apple-app-store-uk-metrics-analysis-q3-2010-analysis/>

4 *New York Times* "Microsoft Phone: Lots Left To Do But the Approach Is New," David Pogue, 28 Oct. 2010.



Source: HP and PwC Analysis

An apps ecosystem in transition

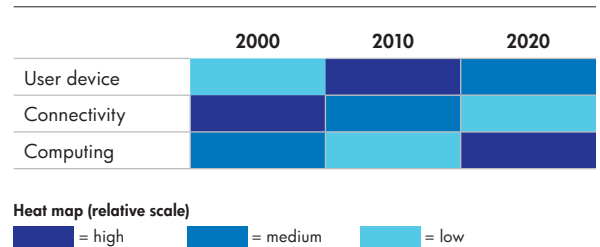
As the apps market evolves, enabling technologies will become more standard across vendors, and consumers will demand ever-greater processing power. They'll increasingly want to access their data "cloud" when they want, wherever they are, and with lightning speed. They'll begin to rely on it in the same way we rely on the global network of ATMs to dispense cash at any point of time, in any place.

HP and PwC see this dynamic apps market in terms of an ecosystem where users rely on devices, computing, and connectivity for their apps needs. See Figure 1.

Whereas device innovation used to be the prime driver for the communications market, now it's mobile apps—along with the enhanced processing power and reliable connectivity these apps command. See Figure 2.

Each aspect of this evolving ecosystem offers related competitive opportunities for communications providers.

Figure 2
Shifting Focus for Mobile Investment



Device: Innovation Accelerated by Mobility

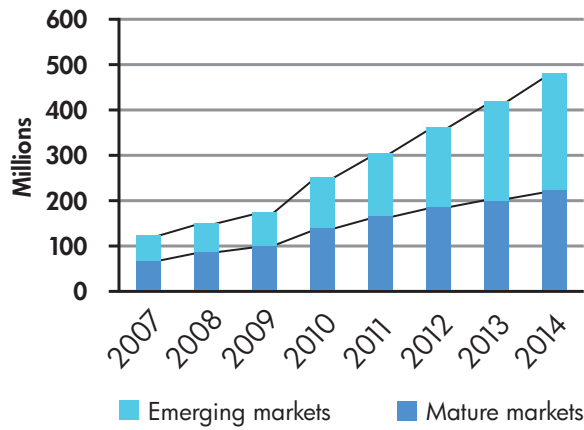
As markets saturate, CSPs typically look to grow revenue by improving the user experience. Consider how ongoing innovation in mobile devices has built a new market:

- The vast majority of young adults (aged 16–24) now use a mobile phone.
- Each household in the UK has an average of three mobile phones,⁵ with smartphone penetration of 30%.⁶

⁵ IET, "2010 Gadget Census," 20 Sept 2010; accessed at <http://kn.theiet.org/magazine/issues/1014/2010-gadget-census-1014.cfm>

⁶ Enders Analysis, "Mobile User Survey 2010: The Rise and Rise of Smartphones," July 2010; accessed through internal PwC intranet research.

Figure 3
Smartphone Shipments



Source: IDC

The smartphone market, measured by annual shipments, is forecast to grow from 250 million in 2010 to 480 million in 2014, with shipments in emerging markets projected to exceed mature markets in 2013.⁷ See Figure 3.

Such a rapid growth rate for mobile devices is likely to go hand in hand with cheaper components and lower prices—similar to what we’ve seen for other types of devices, such as the high-definition televisions, personal computers, and laptops. Markets saturate quickly as unit prices fall.

So far, device manufacturers, such as Apple, have managed to hold up unit prices relatively well compared with CSPs. Is this a cause for concern or an opportunity?

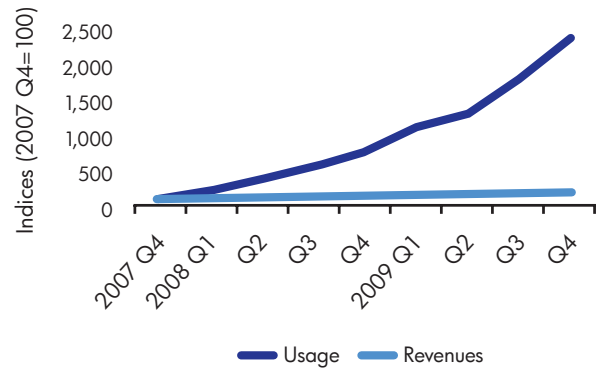
Computing: Processing Power Enabling Apps Capabilities

In an apps-driven world, computing power will be a key factor for end users when they’re evaluating potential service providers.

Software applications will be more powerful and used more often. This will require sophisticated technology both in user devices and within the networks that support them. Data is likely to be stored in clouds or stored locally on a shared network of PC or laptop hard drives. Regardless, mobile devices will need to access this data securely, at any time, and from anywhere in the world.

⁷ IDC, #225054, “Worldwide Business Use Smartphone 2010-2014 Forecast and Analysis,” 29 September 2010.

Figure 4
Mobile Device Data Use and Revenue, UK



As a result, pressure will be on the providers to offer greater processing capability. Technology companies are already making this a focus area by investing in virtualisation and cloud-based service delivery, where they’re supporting clients in various markets such as computer gaming and e-commerce.

That said, vendors will still be able to differentiate themselves by improving the computing capabilities of mobile devices themselves—as their demands for application processing, 3G connectivity, and screen resolution continue to grow. Providing greater power efficiency, ancillary power sources, and faster recharging times will be vital.

Connectivity: Dealing With a Bottleneck

End users’ improved access to data and services through smartphones has led to an explosion of data usage across global 3G networks. See Figure 4. From 2009 to 2010, the UK saw data usage surge by 240%,⁸ and the rapid increase is driven by a relatively small proportion of the user base.⁹ As a result, traffic outstrips capacity in some markets—and with 4G not yet available for mass market commercial purposes on a global scale,¹⁰ there’s concern over what to do next.

⁸ Ofcom, “The Communications Market 2010 (August)”; accessed at <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr10/>

⁹ Enders Analysis, “Mobile User Survey 2010: The Rise and Rise of Smartphones,” July 2010; accessed through internal PwC intranet research.

¹⁰ Commercial launch in its infancy, e.g., TeliaSonera launched a 4G service in Denmark in December 2010.

As the network bottleneck becomes more apparent, delivering reliable connectivity will be crucial for gaining the confidence of consumers and retaining their business.

Yet demand for bandwidth-hungry applications is likely to continue to grow quickly, driven by new services such as mobile video conferencing, online mobile applications stores, presence- and location-based services, and rich communications services.¹¹ Secure connections for payment, share dealing, and gambling services will be vital as 100% coverage and reliability become standard offerings in an increasingly demanding and more connected community.

Strategic implications for CSPs

These challenges related to devices, computing, and connectivity have profound implications for CSPs in today's apps-driven world. Looking forward, CSPs need to consider the following in support of their growth plans or risk missing out on the biggest opportunity facing the sector for more than a decade:

1. Innovative pricing
2. Apps across platforms
3. Upgrading the user experience
4. Redefining the value chain: the connected home

Creating Innovative Pricing Strategies

CSPs should rethink their pricing strategies in areas where the supply/demand balance shifts from "unlimited" capacity to supply constraint.

Some companies are looking to test new pricing models for data usage. Usage has soared whilst revenue has remained flat (as shown in Figure 4), so operators are moving toward capped data bundles. But this will likely only slow usage down minimally—and given increasing levels of smartphone ownership, it may prove ineffective. Smarter pricing methods—such as the return to the pay-as-you-go model for data or premium upgrade paths—will provide CSPs with added incremental benefits and are already being discussed within the industry.

Recent developments amongst Internet Service Providers point to a case for "two-speed" access. They're managing network traffic more effectively by setting two pricing options based on the quality and bandwidth the customer needs or, in some cases, on use at on-peak or off-peak access times.¹² This idea could be extended to CSPs, giving them a greater stronghold on their mobile network capability. As apps become more widely used by consumers and businesses, there may be significant reason to segment the markets.

Targeted capacity development and investments with line of sight to incremental and premium revenue are also worth investigating. One possibility is robust session management and handover to the nearest cell site. As technology evolves and the supply/demand balance shifts, there may be a case for charging for mobile connectivity by time and location (similar to a congestion charge in the City of London). CSPs can even explore using location-based service technologies as a way to charge for mobile connectivity by location—whilst also differentiating their services.

¹¹ Infonetics Research, VoIP and Unified Communication Services and Subscribers, March 2010.

¹² BBC News, "Minister Ed Vaizey Backs Two-Speed Internet," 17 Nov 2010; accessed at <http://www.bbc.co.uk/news/uk-politics-11773574>

Leveraging Apps Across Platforms

Experience from the technology sector suggests innovation cycles tend to shorten, growth rates accelerate, and integration between technologies increases as markets evolve. For example, today's smartphones are often as powerful as desktop computers were a few years ago; with the exception of not being able to support full-fledged office productivity software such as Microsoft Word and PowerPoint, they're capable of handling many other tasks just as well as a modern-day PC does.

But smartphones are being used to their full capacity to deliver the next generation of apps, whilst much of the power and capacity of PCs sits unused. As a result, there's an opportunity for apps to be leveraged across technologies—and this would represent an evolution in both consumer and enterprise computing models. 60% of smartphone users always carry their phone with them, even whilst at home,¹³ so there's potential for the smartphone to become the new personal computer—a way to access apps and associated data from the PC data server or cloud through the home wireless network. Some technology companies are already experimenting with this approach. Apple, for example, offers consumers the opportunity to easily link music, television, and data in a home network.

Imagine the potential if open software providers also offer portfolios of apps in a home network. You'd be able to leverage apps across a number of different technology platforms, supplied by different vendors. For example, a weather app would be able to check

the temperature and automatically communicate with your home's central heating, setting the correct and comfortable temperature for when you arrive home. Similarly, a kitchen app could automatically turn on your oven, notifying you when it has reached the required temperature. Technology companies and operators alike are already investigating these so-called "machine-to-machine" opportunities. They could lead to increasing demand for connectivity and computing/processing power, which could become a welcome new source of revenue for CSPs.

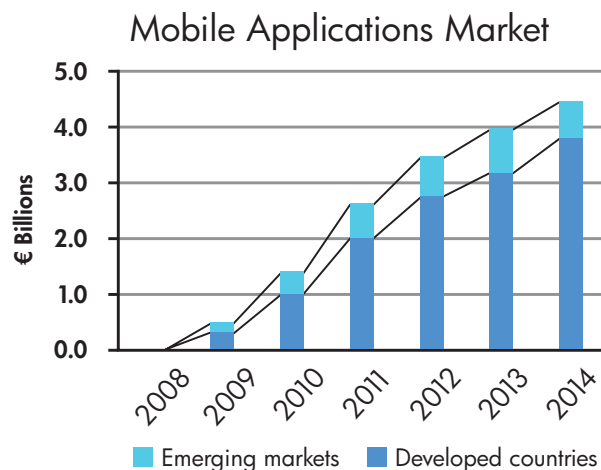
On one hand, smartphones flourish due to ease of use, but have limitations in some applications. On the other hand, laptops and PCs stand out in terms of storage and processing power and are largely underutilised. Will tablets bridge between these discrepancies?

Upgrading the User Experience: Power, Reliability and Security

The main benefactors to date from the apps market have been the manufacturers themselves—and, in particular, Apple. As apps become more complex and "real time," the demand for them and the devices capable of running them expand.

One way CSPs can gain a bigger slice of this market is to provide consolidated, more personalised services that take the user experience to the next level both in terms of scope of service, ease of use, and user control. Processing power for applications needs to be high, but the reliability—and more important, security—of network connections will become increasingly paramount. For example, games, gambling, payments, and share-dealing apps—all of which allow real-time, worldwide multi-play involving consumers' real cash—command computing power that is reliable and fast.

¹³ Morgan Stanley, "Mobile Internet Report," December 2009; accessed at http://www.morganstanley.com/institutional/techresearch/pdfs/2SETUP_12142009_RI.pdf



Source: PwC Analysis

By offering secure and guaranteed mobile Internet connectivity and charging a premium for it, CSPs can gain share of mind and share of spend in the growing apps market, shown in Figure 5. CSPs can offer premium products, such as upgrade paths for consumers or “two-lane” services for corporate accounts and professionally sensitive use by consumers. These new approaches will price more accurately for bandwidth usage and help revenues to better track network demand.

The vision of a multidevice future shows the power that apps can have on the upgrade path of the user experience. As apps become more complex, using more processing power and running on higher-resolution screens, we’ll see users demand upgrades to their high-spec devices; this, in turn, will lead to invigorated devices entering the market, which in turn will become increasingly dependent on secure connectivity.

How will all these mobile devices be managed? As it becomes increasingly important for us to access more of our data faster and more securely, is there room for an “all-in-one” managed solution?

Successful management will depend on improving the intelligence of the network. Upgrading from carrier of traffic to manager of the user experience is already a growth journey operators want to take. This includes fixed-mobile convergence and unified communication and collaboration services. As a consequence, CSPs will need to make additional investments in services and applications (the upper layers in the OSI¹⁴ stack) to nurture potential differentiation.

Business intelligence, data management, customer relationship management, and enterprise resource planning are other areas where CSPs can modernise and transform their operations to more efficiently deliver applications to customers over today’s increasingly clogged networks.

Redefining the Value Chain to Deliver the “Connected Home”

In an apps-driven world, we’ll see a vast increase in the number and capabilities of mobile devices in households and businesses alike. HP and PwC see it as an opportunity for CSPs to provide a home network of the future that links all the household’s entire wireless devices together in one system. With such a network, users can securely access all their applications and data from their personalised cloud, from anywhere in the world, with broadband and mobile connectivity guaranteed through managed service contracts. It’s a “one-stop” solution billed monthly on a utility model.

Such a complex proposition requires a number of skills, and some CSPs may want to partner. Some large CSPs are already well placed to deploy the required managed network and cloud computing services. Careful investigation into the right technical solution and marketing approach is key.

Providing a connected-home proposition will not only allow CSPs to gain a foothold in the new data era (4G) but also to regain their deep relationship with customers. After all, the evolution of smartphones has begun to detach customers from their “operator experience,” and providers are brought up to the same competitive playing field with these new devices.

¹⁴ Open System Interconnection

The connected-home opportunity, extended with mobility, is important not only in relation to consumer behaviour and entertainment but also to work/lifestyle choices and new ways of doing business. According to IDC, the mobile workforce exceeded 1 billion in 2010 and is still growing.¹⁵ Work is something people do—not necessarily somewhere they go. Mobile users often act as consumers and workers interchangeably, and increasingly they're using the same device for different purposes (e.g., checking personal email and business email when travelling). Capabilities for managing users' "dual domains" could be a source of competitive advantage in an apps-driven world.

Conclusion

Innovation in applications, accelerated by increasing mobility, is driving the communications market toward a new and exciting era. The added intelligence, processing power, and screen capabilities apps demand will spur additional development in devices, computing and networks infrastructure alike.

If apps start to become leveraged seamlessly across tablets, laptop computers, and other devices, there are great opportunities for CSPs to redefine their value chain. This could entail new value propositions:

- Creating innovative new service and pricing strategies
- Leveraging apps across platforms
- Transforming from carrier of traffic to manager of the user experience
- Owning the future wireless household

CSPs will need to be more open with enabling partners to realise the revolutionary benefits available in this space. To capture share of this new era, CSPs and technology companies have to invest in building the supporting capabilities—infrastructure, convergence, service, and applications. CSPs should be more assertive and confident harnessing opportunities within their service area and adjacent value chain.

¹⁵ Market Analysis Worldwide Mobile Worker Population 2009-2013
Forecast, December 2009, IDC #221309,

About the authors

Ole Krogh Buus

Ole Krogh Buus is an associate partner in HP Enterprise Services, CME Industry Consulting. Buus has 20 years of experience in management consulting and business development in industry, focusing on IT and telecommunications across mature and emerging markets. Buus was strategy director at TeliaSonera in Denmark. During his time, the business transformed from a start-up venture to a viable business. In this role, he led Business Development, responsible for strategic planning, new business development initiatives, and M&A. He has eight years of management consulting experience from Deloitte in the UK where he was a member of the TMT Strategy Consulting management team. He holds an MSc in economics and an MBA from London Business School.

Jim Davies

Jim Davies is a director at PwC and leads technology in the UK for the Telecoms and Technology sectors. He has 15 years of experience in telecoms and management consulting, ranging from strategy, enterprise architecture, and major complex transformation programmes. He consulted across many functions of telecoms including strategy, product development, finance, operations, and many aspects of technology, developing deep understanding and insights into the industry. His list of clients includes leading CSPs in mature and emerging markets.

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