

Contents

1 Introduction	3
2 Key Drivers for Development of Digital Services	5
2.1 Proliferation of Devices and Deployment of Necessary Infrastructure	6
2.2 Evolution of the Technology Ecosystem to Support Digital Services	6
2.3 Changing Consumer Behavior	6
2.4 CSPs' Quest for New Services and Revenues Streams	6
3 Defining Digital Services in the realm of CSPs	7
3.1 Mobile Money Transactions	8
3.2 OTT Services	10
3.3 Internet of Things/M2M	12
3.4 Big Data and Analytics	12
4 What's Next for the CSPs' Digital Services Strategy?	15
4.1 CSP Initiatives	15
4.2 Net Neutrality — How it Should be Redefined in the Coming Years	18
5 Technology Services Eco-System	19
6 Conclusion	21

1 Introduction

The advent of mobile telephony and widespread deployment of the internet have been the greatest recent developments since the dawn of modern communications industry in the mid-twentieth century. The communications industry has already gone through major transformations over the last few decades and will continue to do so for the foreseeable future, including in the nature and the content of the services it delivers. Today, on one side, the communications industry is being disrupted by the increasing role of third party digital communication services, also known as Over the Top (OTT) services providers, which are bypassing the traditional service providers and have gained great popularity with subscribers. On the other side, as the global economy turns digital, there is a great role for the Communication Services Providers (CSPs) to play in the advancement and digital transformation of various industries.

Therefore, in this increasingly digital environment it is vital for CSPs to reinvent their business model and provide new services for the digital age, in addition to their current traditional carrier services — voice, messaging, data and video. These new services, that we refer to as Digital Services, have a key specific feature — contrary to traditional communications services where CSPs are in control of the end-to-end delivery, they are delivered by CSPs' in tandem with other players. The industry must therefore figure out how to better leverage its unique position to optimize its role within the Digital Services value chain.

Nonetheless, the communications industry has already taken the initial steps towards offering Digital Services. A case in point is the success of mobile based payments and micro-banking solutions provided scores of under-banked communities the advantages of banking services; thus bypassing the socio-economic development curve that leads to establishment of traditional financial systems in the normal course. Further advancements such as mobile payments and mobile-commerce are going to become mainstream and enhance the role of CSPs.

Similarly, rapid advancements of other Digital Services such as widespread deployment of interconnected 'things' other than traditional communication devices have brought about a revolution of sorts. Also known as the Internet of Things (IoT), this is a remarkable development in the field of communications that has potential to transform many other industries.

According to estimates, currently Digital Services constitute less than 8% of leading CSPs' mobile revenue, but they are expected to reach 15% by 2017¹. We expect this revenue shift to be even more pronounced towards the end of this decade, and it is up to the CSPs how they position themselves in the Digital Services value chain.

So, Digital Services present a great opportunity for the CSPs to come on board as not only the bit-pipe provider but as the full-service partner. But are CSPs prepared?

CSPs already own the fully-integrated 'last mile' of communication pipes and relationship with the end consumer — thus, well placed to leverage Digital Services as the next driver for their growth. However, in the near future, the transformative forces are going to be even more radical and disruptive; and much more needs to be done if the industry has to thwart the disruption brought on by non-CSP players.

Currently, CSPs are yet to adapt to the needs of the digital era, both from an organizational perspective as well as reforming their business models to better align to the needs of digital demographic.

According to a recent Capgemini Consulting-MIT survey, CSPs are already playing a key role in enabling Digital Transformation through connectivity products and services. However, CSPs have not fully adapted all the elements of Digital Transformation themselves. Most CSPs use digital technologies extensively, but do not show the same level of sophistication in managing internal digital transformation. While CSPs remain ahead of other industries to launch digital initiatives, they do lag when it comes to integrating and

Figure 1

aligning these initiatives across organizational silos. The best industries, which we refer to as 'Digiratis' are transforming across three key dimensions — Business Model, Customer Experience and Operational Excellence. To join the Digiratis, CSPs will have to implement new technologies and platforms to support Digital Services, as the complexity and rigidity of their legacy systems are among the obstacles to grow in the Digital Services areas.

Of course, there are large global CSPs which have taken actions across these dimensions. But in general, the broader communications industry, as a whole, is falling behind to tackle the challenges and opportunities in future. They must holistically reassess their business models to ensure their relevance and viability in the digital age.

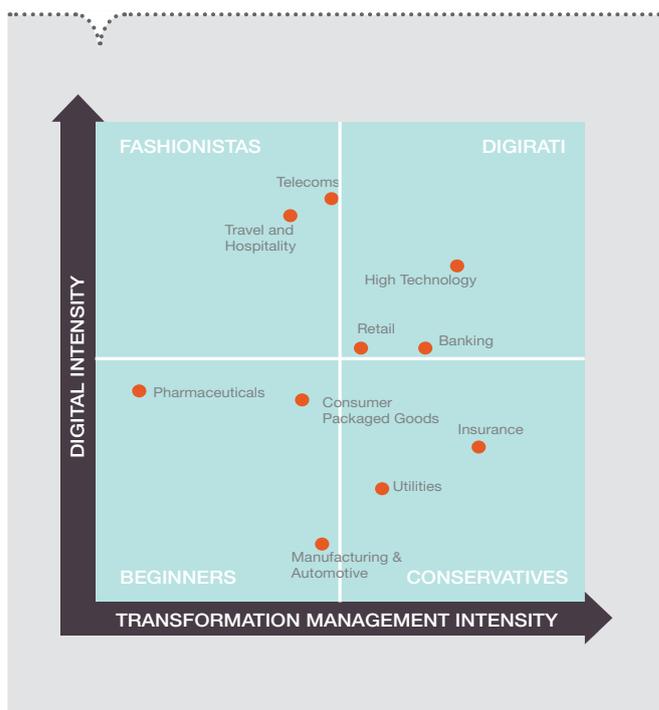
In our view, there are three key areas where a majority of the digital opportunities lie for telecom players — mobile based transactions, OTT services and IoT. Beyond the above mentioned generic definition, we define these services together as 'Digital Services' and explore these in this paper. We analyse specifically some of the drivers for adoption of Digital Services, understand key components of Digital Services eco-system and discuss how CSPs need to adapt to the changing business models.

Big Data Analytics related services are also a natural fit in the CSP digital services offerings landscape, considering CSPs technical prowess and historical experience in analyzing customer data. CSPs have traditionally exploited customer data to focus on churn reduction, design tariff plans and manage campaigns, and are well placed to leverage Big Data as a new source of revenue.

Several CSPs, in fact, have begun to explore offerings around the Big Data analytics proposition. In this context, CSPs' already have a huge body of data — in the form of networks and consumer behavior — that may readily be analyzed for consumption of other industries.

However, the topic of Big Data Analytics (although we make here a general reference) is beyond the purview of this paper and we plan to cover it in greater detail in another paper in this series.

SOME INDUSTRIES ARE MORE MATURE THAN OTHERS, BUT THERE ARE ALREADY DIGIRATIS IN EVERY INDUSTRY WE HAVE STUDIED



Source: Capgemini Consulting-MIT whitepaper²

As the global economy turns digital, Communication Services Providers (CSPs) have an important role to play in the advancement and digital transformation of various industries.

² Capgemini Consulting paper - The Digital Advantage: How digital leaders outperform their peers in every industry' – The paper is available here

2 Key Drivers for Development of Digital Services

Digital transformation of the global economy is naturally the macro-driver for the development of CSPs' Digital Services. CSPs' not only have to transform themselves as other industries have, but also need tap in the great opportunity to be enablers for the Digital transformation of other industries. To be more specific, we elaborate below on what we see as the specific drivers for CSPs are and will be building their Digital Services portfolio on.

2.1 Proliferation of Devices and Deployment of Necessary Infrastructure

Growing Usage of Smart Devices

More than one billion smartphones were shipped in 2013³, and an even larger quantity is expected to be shipped over the next few years. It is estimated that 73% of internet users in 2013 accessed the internet from a mobile device. This is predicted to rise to 79% in 2014 and further reach 90% in 2017⁴.

In India and China, a large majority of first-time users access internet from their mobile devices. Specifically, in China, the number of internet users going online with a mobile device — such as a smartphone or tablet — has overtaken those accessing the internet with a personal computer (PC) for the first time.⁵

According to industry forecasts, the number of mobile internet connections will exceed 10 billion by 2018⁶ and will be 1.4 times⁷ greater than the world's population. All of these facts establish the importance of the mobile platform, and has led various industries such as financial services and healthcare to sharpen their focus on the mobile interface.

Expansion and Advancement of Network Infrastructure

As of end 2013, half of the world's population was covered by a 3G mobile broadband network. Owing to the ever increasing demand for faster internet connections, migration to 4G or long-term evolution (LTE) based networks is happening at a much faster rate compared to the earlier migration from 2G to 3G networks. At the end of 2013, commercial LTE networks were operating in more than 80 countries. According to Ericsson, 65% of the world's population will be covered by LTE by 2019.

Beyond the ongoing global rollout of the 4G technologies, the telecom industry as a whole is working actively at developing 5G solutions, which will further advance the networks and services landscape. In addition, with the advent of next generation architecture approaches such as Software Defined Networks (SDN) and Network Functions Virtualization (NFV), the networks infrastructure will be in the future much more open to the introduction of new digital services.

3 IDC Press Release, "Worldwide Smartphone Shipments Top One Billion Units for the First Time, According to IDC," Jan 27, 2014

4 eMarketer, "In Middle East and Africa, Nearly All Web Users Are Mobile", Jan 6, 2014

5 Reuters, "China has more people going online with a mobile device than a PC", July 21, 2014

6 Cisco VNI 2014

7 Cisco VNI 2014

Further, governments around the world have been actively pursuing universal broadband access projects as a matter of policy. For example, Europe's Digital Agenda's goal is for all EU countries to adopt national strategies for universal broadband access, 30Mb/s connections for 100% of households by 2020⁸ (64% of EU households have access to 30 Mbps as of mid-2014⁹), and half of all EU citizens connected at 100 Mb/s by 2020.

2.2 Evolution of the Technology Ecosystem to Support Digital Services

The advent of several new technological inventions and their seamless integration in modern business environment has laid foundations for a technologically superior future. Some key recent development in technology and applications are acting as key enablers for the future of advanced digital services.

The advancement in design and manufacturing processes of computing chips, the development of smaller, cheaper, low/self powered sensors, the implementation of IPv6¹⁰, the progression of cheaper cloud computing resources, and as discussed above faster communication standards such as 4G-LTE and beyond — together form the great technology platform to support in creation and delivery of digital services.

Cloud computing has witnessed increasing migration of firms to cloud environments to achieve cost-efficiency, scalability and agility. In-memory computing has been a major breakthrough in enabling application and analytics to run at incredible speeds. Implementation of IPv6 ensures superior quality of service (QoS) for the more advanced internet applications. IPv6 offers uninterrupted, secure end-to-end connectivity for peer-to-peer (P2P) as well as machine-to-machine (M2M) applications, such as collaborating through video conferencing without the need for expensive servers and extensive traffic management requirements.

Other developments such as the quest of deriving more insights from big data, the ongoing research and development on wearable smart devices and the wider acceptance of new technologies by every industry is leading to rapid commercialisation and deployment, and greater technological breakthroughs.

2.3 Changing Consumer Behavior

Ever increasing usage and ownership of digital devices is increasingly changing the way consumers engage with their community and seek information about topics that matter to them. This 'digital demographic' is at the core of the modern day digital economy — the global network of economic and social activities interconnected by platforms such as the Internet, mobile and sensor networks.

The digital demographic has kept pace with advancements in technology and have come to expect their service providers keep up with the pace of technology adoption as well. This behavior is expected to be more pronounced and consumers will seek ever-smarter and more efficient ways to access information, find products and engage with their communities.

2.4 CSPs' Quest for New Services and Revenues Streams

Over the last few years, CSPs all over the world have been witnessing increasing pressure on traditional revenue sources with the commoditization of voice and messaging services. Saturating markets and growing competition within the industry and also disruptive substitution by OTT services have increased the business challenges for CSPs. This has forced CSPs to look beyond the core business of providing voice and data services, and explore and experiment different approaches to find new niches in the digital economy.

Digital Services such as mobile money, IoT and Cloud-based consumer and business services offer encouraging prospects for CSPs, which are aiming to create double-sided business models to either compete or forge tie-ups with players such as OTT service providers. The established customer and billing relationships, along with large amount of behavioral data are key advantages for CSPs to widen their presence across the Digital Services landscape.

Further, CSPs are busy creating dedicated business units to offer Digital Services, demonstrating their focus on these new services and revenue streams. Telefonica Digital (though, later merged back), SingTel's Digital Life and SK Planet exemplify early CSPs' initiatives towards offering Digital Services.

8 TechCentral.ie, "EU member states have 100% broadband coverage – Kroes", October 18, 2013

9 Forbes, "The European Commission Wants High Speed Broadband Everywhere. But Is It Worth It?", July 10, 2014

10 IPv6 is short for "Internet Protocol Version 6". IPv6 is the internet protocol for the further advancement and growth of Internet, and is designed to overcome the limitations of the current internet protocol, IP Version 4 or IPv4.

In simple terms, IPv6 allows a much larger number of users and devices to communicate over the Internet by using larger numbers to create IP addresses. Compared to IPv4, every IP address is 32-bits long allowing 4.3 billion unique addresses, IPv6 addresses are 128-bits. IPv6 addresses allow for approx. three hundred and forty trillion, trillion unique IP addresses.

3 Defining Digital Services in the realm of CSPs

In a hyper-connected world, CSPs are best positioned to leverage their core assets to capitalize on future Digital Services opportunities that will emerge across industries. We discuss below four key areas, which we see as the main components of the Digital Services landscape and which we believe will drive future growth for CSPs — Mobile Money Transactions, Over-the-Top services, Internet of Things and Big Data Analytics.

3.1 Mobile Money Transactions

The term Mobile Money Transactions (MMT) encompasses Mobile Payments, Mobile Banking and Mobile Commerce. With nearly seven billion mobile devices and growing compared to about two billion credit cards, mobile offers a growing opportunity in the payment ecosystem. In developed markets, MMT adds value not only to the CSPs but also to the financial institutions. In developing markets, which has limited access to financial institutions, MMT can play an even greater role towards providing banking services to the unbanked population. At the end of 2013, there were 219 mobile money services operational in 84 countries, compared to 179 services in 75 countries at the end of 2012¹¹, which indicates growing adoption of MMT services among CSPs. Global MMT market is expected to grow to US\$721 billion by 2017 from US\$235.4 billion in 2013.¹²

Currently, majority of the CSPs offer simple money transfer services which accounted for nearly 71% of total transaction value in 2013. The primary reason for this is the wider availability of services and transaction costs that are lower than those of traditional bank services. However, and while there has been limited success so far in these areas, CSPs are contemplating to offer more advanced transactions and banking services.

Globally, there are three major operating models in place for mobile money transactions:

- **CSP Driven:** Owing to the direct connect with their subscribers, CSPs are well positioned to gain from mobile based financial services. In a CSP driven model operators develop, own and maintain the necessary infrastructure for their financial services offering, without the involvement of a financial institution. For example, in Kenya, Vodafone's M-Shwari is a banking product for M-PESA customers, which allow basic depositing and borrowing through mobile phones while earning interest on the money deposited. In favorable regulatory environments, CSPs may also look to acquire banking licenses, which would allow them to offer services similar to traditional financial institutions. A case in point is The Philippines, which has fairly advanced jurisdiction for mobile money. The country has two of the earliest mobile financial services — SmartMoney (by Smart Communications) and G-Cash (by Globe Telecom) — regulated by the country's central bank.¹⁴
- **Bank/Financial Institution Driven:** Financial institutions (FI) have been using the mobile interface as an additional channel to reach their customers. In an FI driven model, CSPs partner with FIs and leverage the FIs' credibility and expertise. For instance, in Pakistan, UBL Omni offers a current account which can be operated through mobile

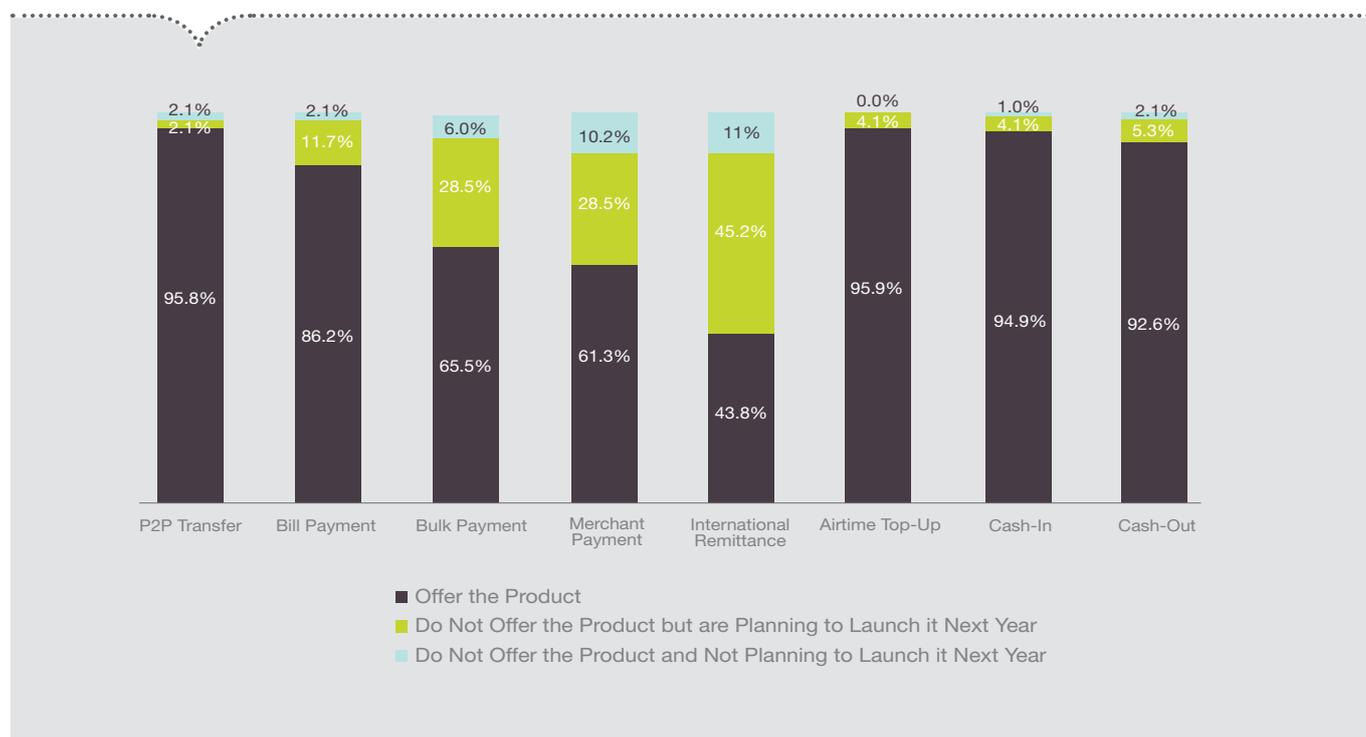
¹¹ GSMA, "State of the Industry 2013 – Mobile Financial Services for the Unbanked", February 2014

¹² Gartner, "Gartner Says Worldwide Mobile Payment Transaction Value to Surpass \$235 Billion in 2013", June 2013

¹⁴ Alliance for Financial Inclusion, "Case Study: Mobile Money Regulations in the Philippines", July 2010

Figure 2

PRODUCT OFFERING (JUNE 2013)



Source: GSMA¹⁵

phone simply by activating the SMS channel on the customers' Omni account.

- **Third-Party Driven:** Third party payment service providers (PSP), offer services that are independent of mobile operators and financial institutions. Such services are deployable across different operator and involve multiple banks. Such PSPs may choose to partner with CSPs to leverage their network and tap their existing customer base. For example, Sprint USA has partnered with Google Wallet, while The Philippines' Globe Telecom partners with PayPal for integrating its GCash service¹⁵.

In addition, CSPs such as UK's EE (formerly Everything Everywhere) have introduced NFC controlled payment service — Cash on Tap on selected EE phones. It is a wallet like service that allows customers to save details of up to 5 different cards in their Cash on Tap account. EE allows customer to use Cash on Tap service for travelling on Transport for London (TfL) buses with similar price and infrastructure used for existing Oyster cards. EE plans to

allow Cash on Tap payment service on Tube, tram, DLR and London Overground services. Thus, CSPs are also exploring the contactless payment service in addition to money transfer services.

3.2 OTT Services

The rapid adoption of technologically capable smartphones and ready availability of high-speed data has provided consumers with access to a wide variety of communication services, which go beyond the traditional voice and messaging services provided by CSPs.

Industry players refer to such services as over-the-top or OTT services, which are essentially a network-agnostic delivery mechanism for Digital Services that were traditionally delivered in an integrated fashion with network connectivity.

Broadly these services refer to text messaging services, voice based communication services, delivery of audio-visual media,

¹⁵ Techpinas, "Send Money from Paypal to Globe GCash - Now Possible! G-CASH Partners with Paypal For Easy Remittances", June 2010

Figure 3

CSP DRIVEN MOBILE MONEY TRANSACTIONS

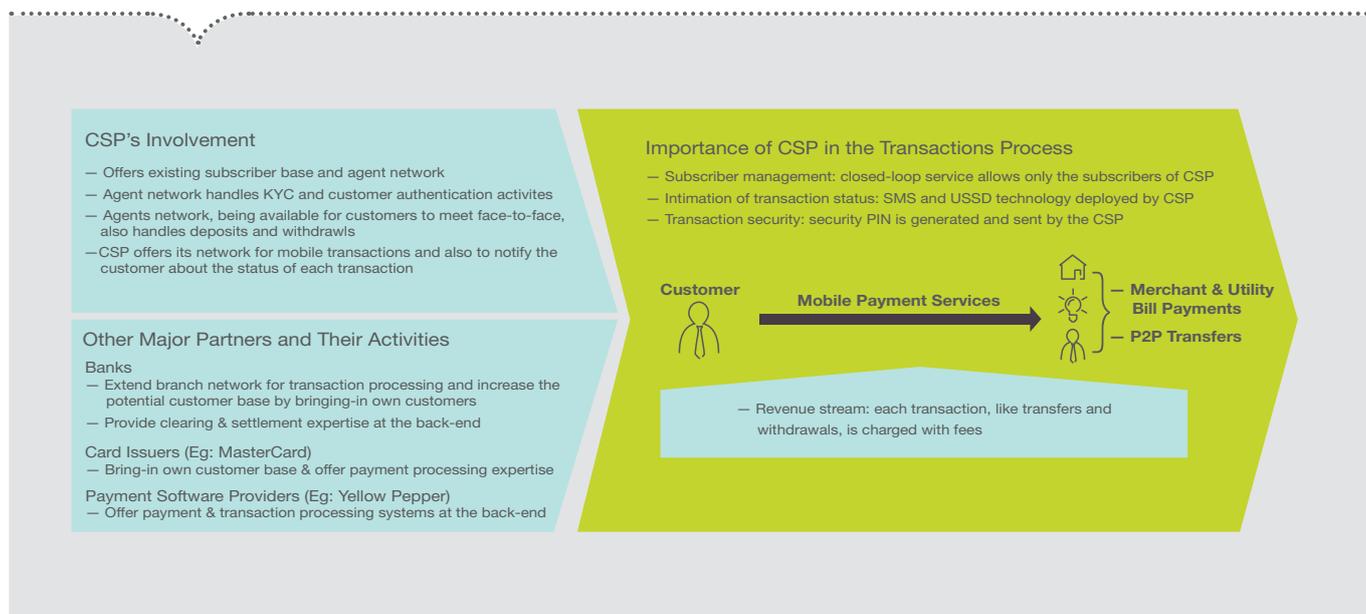
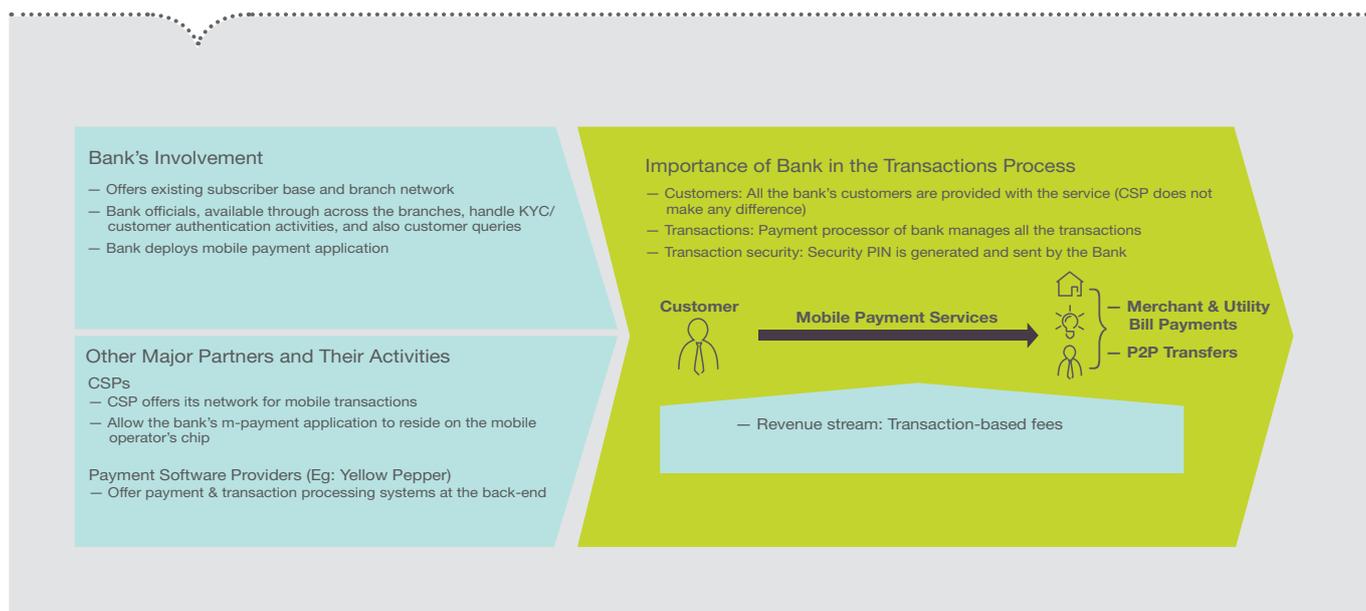
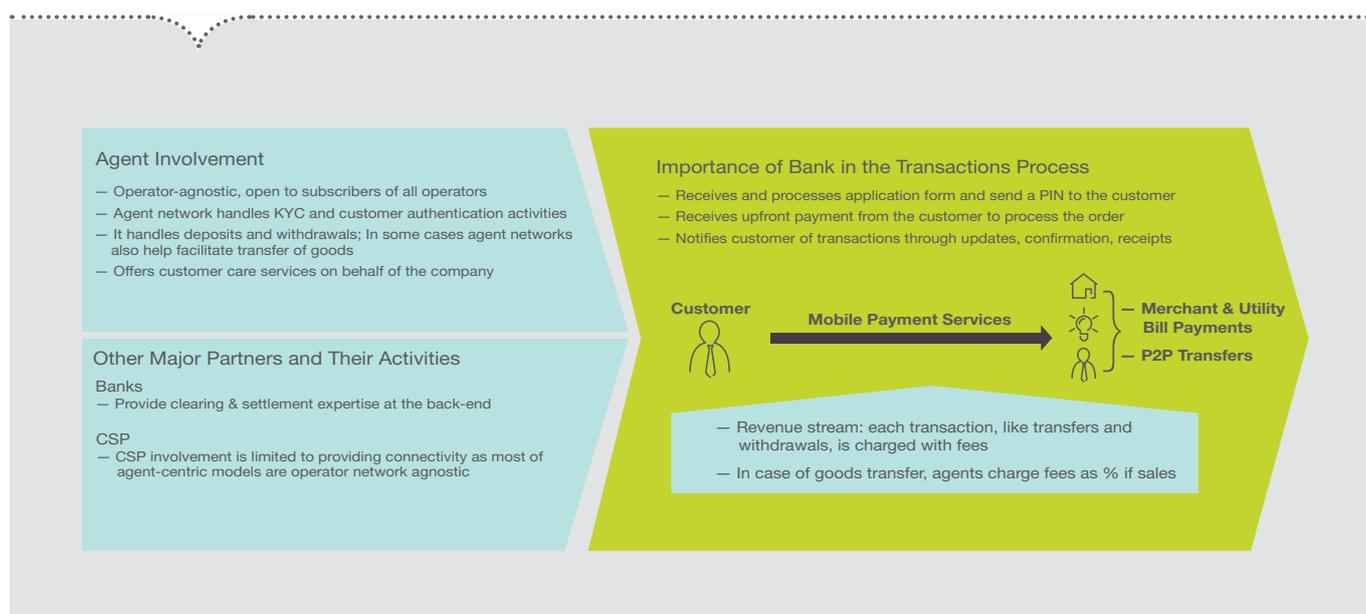


Figure 4

BANK/FI DRIVEN MOBILE MONEY TRANSACTIONS



THIRD-PARTY DRIVEN MOBILE MONEY TRANSACTIONS



and similar services provided over the internet rather than via a CSP's own dedicated, managed network.

OTT services are delivered directly from such service providers to consumer using the open internet connection, which is independent of consumer's CSP, without the need for any major infrastructure investment on the part of the provider; and because there is little investment required by OTT service providers, they are generally lower in cost compared to similar services by CSPs. For instance, the cost structure of Whatsapp is about 2% of a typical MNO's cost structure¹⁶.

OTT services have already disrupted the traditional revenue models of CSPs — whether they are pure telecommunication service providers or cable/satellite companies. Some key examples of OTT service providers are WhatsApp (for text messaging), Skype (for long distance voice calls) and Hulu or Netflix (for audio-visual content).

The creation of OTT applications has led to a wide-ranging conflict between companies that offer similar or overlapping services. With increasing smartphone penetration, more consumers will be able to access OTT services via their smartphone¹⁷. An average smartphone user, for instance, can send a message via SMS, WhatsApp, Facebook, Viber

or Skype to name a few options. As OTT services proliferate further, more companies and developers will look to get on the OTT bandwagon, and flood the market with more OTT services. According to an estimate, by 2016 operators will have lost \$54 billion¹⁸ in SMS revenues alone due to the growing popularity of OTT messaging services.

After several attempts to thwart OTT provision of content and communication services, CSPs are finally moving to embrace OTT as a key digital service of the future. They are altering their strategic positioning and adapting their business models in response.

3.3 Internet of Things/M2M

Considered as the next wave of business transformation—following computers, the internet, and mobile communications — the Internet of 'Things' is going to expedite the next industrial transformation. IoT is essentially a network of physical objects, containing embedded technology to communicate/sensor interact with their internal states or the external environment. IoT has its roots spread across many vertical application domains, ranging from automotive and machinery to home automation and healthcare.

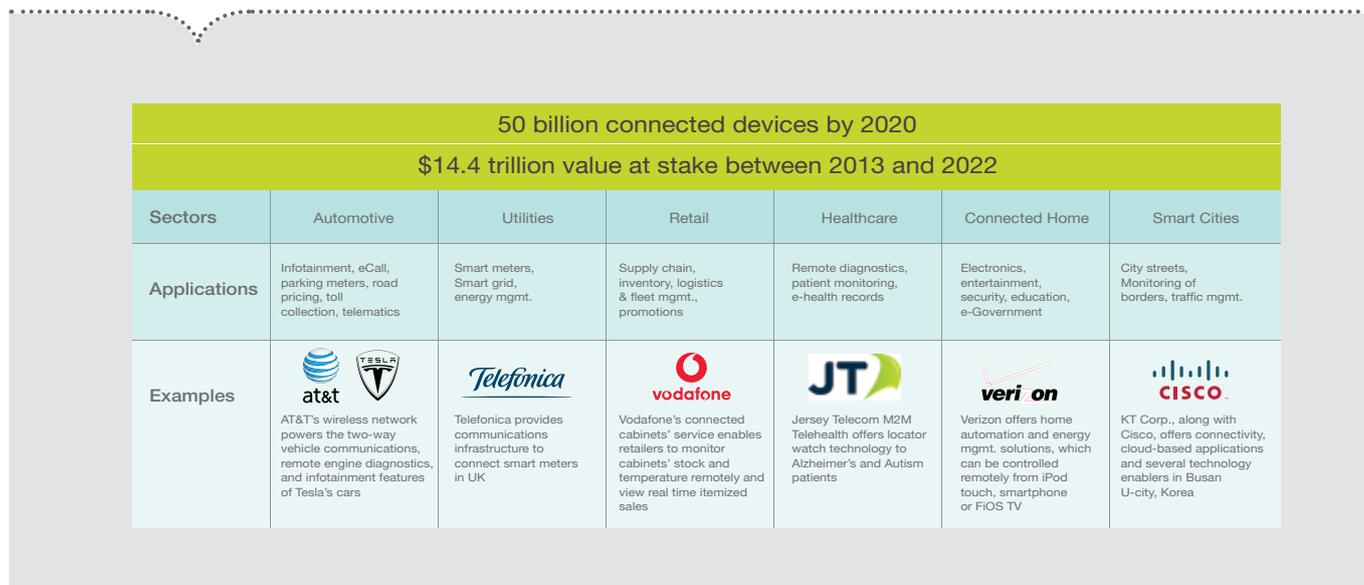
¹⁶ GSMA-Greenwhich Consulting, "The Value of Reach in an IP World"

¹⁷ Ericsson Mobility Report, 2013

¹⁸ Ovum, Neha Dharia, "Social messaging to cost telcos \$54bn by 2016", September 2012

Figure 6

VERTICAL OPPORTUNITIES OF IOT



Source: Capgemini Analysis, Ericsson, Company Websites, Cisco¹⁹

According to Cisco, presently, there are more things connected to the internet than the number of human being and it is expected to grow exponentially. The growth is driven by the convergence of efficient wireless connectivity, sensor advancement, cheaper processors, advent of robotics middleware for complex computing environments, and a number of startups and established companies offering the necessary management and application software.

The growth of IoT is set to disrupt the “established value chains and stable industrial structures” through new players — who are competent enough to innovate and exploit networks and digitization — changing various industries forever. Earlier, the benefits of IoT were restricted to supply-chain & logistics (RFID), material handling & assembly functions (robotic applications) and real-time data transmission in areas such as oil & gas industries (sensors). While these would continue to remain as cornerstones in future, the expanded definition of IoT — from B2B environment to a B2B2C environment — would see more interesting applications across industries. The applications can be understood through the opportunities offered by IoT across verticals such as automotive, retail, utilities etc. (Figure 7).

The uptake of IoT and its impact can only be measured by the “connectivity ecosystem” built across verticals, encompassing universally accepted connectivity standards. In this context, there are technologies such as Bluetooth, Infra-red, ZigBee which offer short distance connectivity. CSPs, in this case are well positioned — with network connectivity, roaming and interoperability credentials, customer care, billing and distribution capabilities — to enable connectivity required for an effective implementation of IoT. Yet, to deal with completely different verticals and to stay relevant in the IoT ecosystem, CSPs need to develop partnerships with the existing stakeholders such as technology and application providers in the IoT value chain²⁰.

Further, the IoT environment is characterized by an increasing number of diverse connected device types, connected vertically rather than in a horizontally-integrated way. This necessitates horizontal products and services to improve service delivery, reduce support costs and scale-up the market — thus, creating horizontal opportunities. The importance of horizontal opportunities would further increase with the maturity of the uptake of IoT across verticals. CSPs can leverage this opportunity by offering service platforms

19 Cisco, “How the Next Evolution of the Internet Is Changing Everything”, April 2011

20 David Boswarthick and Omar Elloumi, Olivier Hersent, “M2M Communications: A Systems Approach”

and enablers in areas around developer APIs, device and connectivity management (Eg: to enable Big Data/Analytics), standardization and security. For instance, Deutsche Telekom²¹ offers an application layer on its M2M platform, on which developers are allowed to create M2M apps for diverse vertical customers. This is similar to Apple's 'App Store' model, where developers create apps for the iPhone/iPad and sell those apps to consumers.

While there are tremendous opportunities players across the value chain — CSPs, semiconductor companies, system integrators and application software developers and service providers — but considering the overall IoT proposition is still nascent and its rapid proliferation is inhibited by lack of generally accepted dominant designs, architectures and vendor-independent guidelines on choosing solutions or components. Thus, our view on IoT's growth is contingent on the emergence of standard protocols and interfaces. These are either available or being developed — such as ZigBee Alliance, IPSO Alliance — however, a dominant set of standard protocols, interfaces or platforms is yet to emerge.

3.4 Internet of 'Everything' – The Futuristic View

The initial run of IoT referred to the advent of barcodes and RFID, helping to automate inventory, expedite tracking and basic identification, while the second (ongoing) wave of IoT is witnessing a more evolved interplay of connected sensors, objects, devices, data and applications. The next wave, labeled as "Internet of Everything (IoE)" by Cisco, is expected to leverage hyper-connectivity, interoperability solutions, incorporating intelligence in objects, devices, networks, systems and in the applications for data-based decision making. In other words, IoE is the networked connection of people, processes, data, and things.

The importance of IoE — which is expected to play a decisive role in areas such as urban transformation and public services — reflects in the recently announced "Global IoE Innovation Center" in Barcelona, Spain by Cisco²². The Center would focus on designing new services and solutions for cities that are in the early stages of developing smart urban services (smart parking, smart lighting, location-based analytics, etc.), smart energy management, safety -security and cloud exchange. Along with Cisco, there are others looking at the IoE opportunity. Industrial conglomerate GE believes that it is a US\$10-15 trillion opportunity over the next 20 years; whereas, Intel dedicated majority of its Consumer Electronics Show

(CES) 2014 presence to technologies that aim to leverage the concept of IoE.

IoE would require intelligent network to support performance demands with real-time granular network analytics. Therefore, CSPs — to play a lead role — should look to develop an intelligent network system which predicts and proactively connects devices by understanding the inter-relationships between those devices, including the nature of the data being carried.

3.5 Big Data and Analytics

'Big Data' — the much discussed universal phrase, refers to the field that encompasses the methods and technologies for collecting, managing and analyzing the vast amount of both structured and unstructured data. This massive volume of data is generated with constantly increasing numbers of smart connected devices, sensors in machines, and the continuing spread of information technologies worldwide.

In 2012 alone, for example, estimates are that the world collectively created 2.8 trillion GB of new information; this is projected to reach 40 trillion GB of data by 2020²³. According to various estimates, much of this data remains unanalysed. So, Big Data is no longer simply about size. Putting it to productive use has gone beyond simply storing it. Indeed, to make the most of Big Data the question to ask is no longer, "Where do we put it?" but rather, "How do we use it?"

In case of the telecommunications industry, the topic is even more pronounced. CSPs traditionally have had analytics departments that enabled them to refer to their internal data to improve the efficiency of their networks, understand consumer behaviour, and enhance profitability. However, the advent of big data presents a much larger opportunity, and hence a challenge that hasn't been encountered before. CSPs, in the age of Big Data, have to figure out ways to blend much larger volumes of data to improve revenues and operations across the industry value chain — from network operations to marketing and sales, and from product development to customer retention and servicing.

Of course, CSPs also need to figure out how they can monetise the large volume of information gathered over the years of operations and which keeps growing manifold.

An area where CSPs can immediately play a role is targeted advertising. Before the dawn of digital age, advertisers and marketers were perennially challenged by the need to identify and reach out to their target segments without wasting

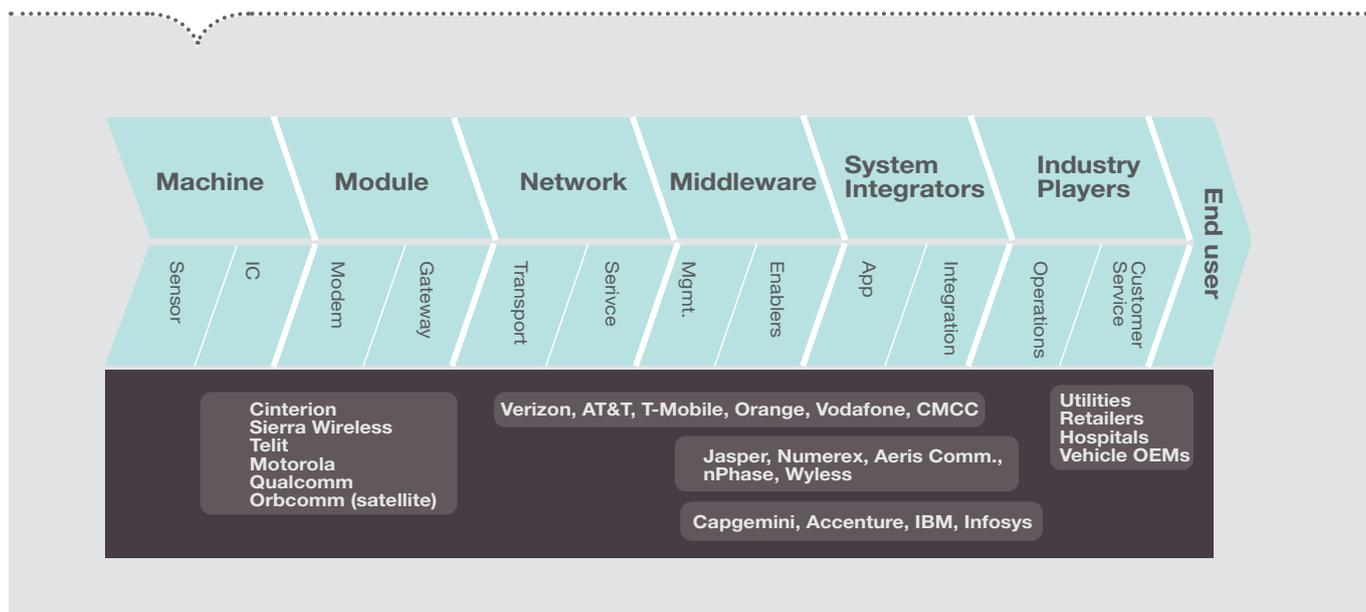
21 M2M Magazine, "Deutsche Telekom to emulate App Store with M2M", November 14, 2013

22 Cisco, "Cisco to establish a Global IoE Innovation Center in Barcelona", July 22, 2014

23 "Study: less than 1% of the world's data is analysed, over 80% is unprotected," The Guardian, 19 December 2012

Figure 7

IOT VALUE CHAIN



advertising dollars on non-responsive consumers. Traditional media such as TV, radio and newspapers, due to their inherent limitation, has no provision for customization of ads for different customer segments. However, content distribution through the internet, mobile or IPTV allow dynamic insertion of ad messages into content units²⁴ based on information about consumer demographics, location, behavior and other parameters. This method, called targeted advertising, allows relevant ads to be delivered to different consumers viewing the same content.

Although targeted devices based advertising has been around for a few years, it is still evolving stage; and it promises to be a large business opportunity with high growth rates. Global mobile advertising spending is expected to reach US\$18 billion by end of 2014. By 2017, mobile advertising is estimated to be worth \$41.9 billion²⁵. Growth over the next few years will be catalysed by measurement standardisation and new targeting technologies.

This demonstrates that targeted advertising represents a significantly large opportunity that should not be ignored by CSPs. Moreover, by the virtue of owning delivery networks, CSPs can play a key role in serving targeted ads and grab a share of the targeted advertising revenue pie.

Again, due to their existing customer relationships and control over network infrastructure, CSPs have inherent strengths in gathering information on demographics, location, network usage and periodic billing of their consumers (Figure 8).

After several attempts to thwart OTT provision of content and communication services, CSPs are finally moving to embrace OTT as a key digital service of the future.

²⁴ Content units include programs on digital TV and web pages rendered over the fixed-line or mobile Internet

²⁵ Techcrunch, Mobile Ad Market Spending To Hit \$18BN In 2014, Rising To ~\$42BN By 2017, Says Gartner

CUSTOMER INFORMATION AVAILABLE TO CSPS

Customer Information	
Demographic	Qualified demographic information at the time of service activation and during customer lifecycles
Location	Address Information IP address Tagging to Base Transceiver Stations (BTS)
Usage	Current and past usage patterns Uptake of various value-added services Time spent consuming various types of content
Billing	Tariff plan Payment method and frequency Credit history

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CSPs' success in offering targeted advertising would depend on their ability to address the rising expectations of advertisers in delivering highly effective, ROI-enhancing ads. To achieve this, CSPs need to deploy extensive processes and systems to capture and analyze advanced customer intelligence on an ongoing basis, form customer sub-segments and deliver targeted ads. They need to collate information from multiple data sources as well as databases, such as CRM, billing and network monitoring systems. The information may then be used to accurately profile consumers, understand their roles as well as interactions with the larger community and obtain holistic views.

As mentioned in the introduction of this paper, Big Data is a even broader topic for CSPs than what is described above and therefore we plan to cover it in greater detail in another paper in this series.

4 What's next for the CSPs' Digital Services Strategy?

CSPs are not the only players in the market trying to tap the huge potential of the Digital Services segment. The market is already crowded with businesses that have built a huge presence in this area, and are drawing up more innovative and aggressive strategies to expand their market share across their traditional and emerging services. Most of these businesses capitalized on the rapid growth in internet penetration and consumers' ready uptake of web-based content, online shopping and socializing to provide services such as emails, social sharing, online shopping, online trading and video streaming, resulting in the roll-out of many first generation Digital Services. From digital media to online stores, brands such as Napster, Netflix, Instagram, YouTube, Skype, E-Bay, Amazon, Pay-Pal and Facebook have become household names and are serving millions of customers worldwide. Retailers and banks have also opened their own digital portals where customers conduct various counter transactions from the comfort of their homes.

CSPs around the world have been investing in their own Digital Services like mobile apps and other online services. However, incremental revenues from such new streams have been

small and likely to be so in the short to medium term, but introduction of such services may help defend their privileged network gatekeeper status.

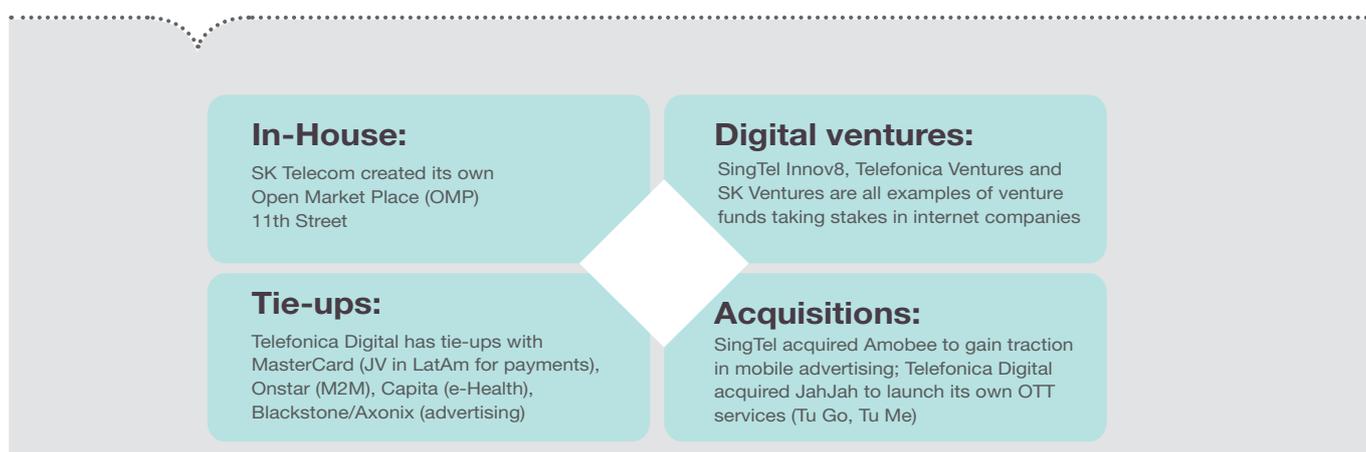
In that context, it is imperative that CSPs identify their specific assets, their differentiators and carve out clear strategies for their digital service businesses, outlining the core services that they should target in the near term, upon which complementary services can be built on in the longer term, creating the CSP's own unique Digital Services ecosystem.

4.1 CSP Initiatives

With increasing pressure on traditional revenues, telecom groups expanded their focus on Digital Services by creating dedicated business units over the last three years — notable examples are Telefonica Digital, SingTel Digital Life and SK Planet, which have addressed a wide variety of service areas including content/OTT, advertising/ analytics, payments/e-commerce and M2M. CSPs have tried four basic execution models:

Figure 9

CSPS' EXPANSION INTO DIGITAL SERVICES



Industry response to OTT services

How CSPs are responding to the disruption brought by various OTT services? CSPs all over the world are coming out with various strategies and services to encounter OTT services and to prevent any further revenue erosion. Some of which are outlined below:

Rich Communication Services

The Rich Communication Services (RCS) program is an initiative backed by the GSM Association (GSMA) to deploy inter-operator services within an industry ecosystem. According to GSMA, these services are designed to offer richer yet simpler communication services supported by a 'strong ecosystem' and a variety of 'architecture implementation options.'

The services are marketed by the GSMA under the brand name *joyn*. GSMA terms RCS as an upgrade that marks the transition of messaging and voice capabilities from circuit switching to an all-IP ecosystem. The project essentially aims to leverage GSMA resources and influence to ensure success and global interoperability of RCS. For instance, RCS and Voice over Long Term Evolution (VoLTE) share the same IP Multimedia Subsystem (IMS) deployment and leverages the same IMS capabilities.

Telefonica and Vodafone in Spain, were the first operators to launch RCS under the *joyn* brand in mid-2012. Similar RCS offerings have been launched in the US, Germany, South Korea and other countries since then. RCS has gained momentum in South Korea, where SK Telecom attracted more than 1 million RCS users in a few weeks.

CSP acquiring/partnering OTT services

Apart from this industry led initiative, global CSPs have intensified their own OTT initiatives. Telefonica has invested in a music streaming service called Rhapsody's Napster²⁶. Through this investment, which includes a deal to bundle and resell Rhapsody's music service and its catalogue of 20 million songs to its mobile/broadband customers, Telefonica intends to build more traction with its subscribers. This service also intends to replace Telefonica's Sonora music service with a more robust offering from Rhapsody's Napster.

In future, Telefonica also intends to bundle Napster on its Firefox phones to encourage greater take-up of the new devices.

Napster, also works with other CSPs around the world. For example, they have partnered with Vodafone in Spain, the Netherlands and Greece, with E-Plus in Germany, with SFR

in France and with MetroPCS in the U.S. They have different agreements with these CSPs. For example, in some case the service is bundled with data usage, while in some others it is just an add-on to other packages.

Similarly, China Unicom collaborated with Tencent, that owns WeChat, to offer a customized co-branded SIM card called "Weixin Wo Ka". The SIM bundles a data plan for Tencent's WeChat and related services.

More recently, Singapore's two largest CSPs announced similar partnerships with different OTT messaging players in order to retain customers and respond to competition.

In November 2013, StarHub announced its tie-up with China's WeChat service. Through this partnership it will offer prepaid customers unlimited use of the WeChat app for S\$0.40 (US\$0.32) a day or S\$6 (US\$4.80) per month. Through this arrangement, Starhub had responded to a similar deal announced in August 2013 by SingTel, which offered WhatsApp services at S\$0.50 (US\$0.40) a day or S\$6 (US\$4.80) per month²⁷. Both CSPs had capped the data usage to 1GB per day.

New Ecosystem

Telefonica has also made attempts to create a separate ecosystem of an entirely new mobile OS. Called Firefox OS²⁸ it is an 'open web device' platform based on HTML5, and is targeted at the feature phone users. In addition to Telefonica, this platform is also backed by Adobe, Qualcomm and Deutsche Telekom's Innovation Labs. Both Telefonica and DT have launched Firefox OS based devices in some countries.

The Firefox OS has found support from many other CSPs and hardware vendors. Mobile handset manufacturers, LG and Huawei are expected to offer Firefox OS-running smartphones through 18 CSP partners around the world, including Sprint in the USA.

Play a greater role in the IoT value chain

Following are some options for CSPs to gain importance in the IoT value chain:

1. Greater repositioning as end-to-end managed service provider. Take advantage of convergence to become an ecosystem provider of Digital Services creating a marketplace for the new digital age.
2. Capitalize upon vertical and horizontal opportunities like analytics, cloud based services. With the development of IoT, both the real and virtual worlds are set to intermingle and the amount of data flow is expected to

²⁶ TechCrunch, "Telefonica Takes A Strategic Stake In Rhapsody, Will Bring Napster Into Latin America, Deeper Into Europe", October 2013

²⁷ ZDNet, "StarHub partners WeChat, taking on SingTel-WhatsApp hookup", November 19, 2013

²⁸ TechWeek Europe, "Telefonica, Deutsche Telekom Launch First Firefox OS Smartphones", July 2013

Figure 10

CSP STRATEGIES FOR PLAY IN THE IOT LANDSCAPE



rise exponentially. CSPs, which are already active in this market, can increasingly embrace this era of Big Data and monetise it

- Invest in R&D and collaborating better with the hardware/software vendor eco-system to develop in-house platforms/system integrators or through partnerships, as areas such as IoT are in early stage of evolution and characterized by bespoke solutions offered by large no. of relatively small players. Decision regarding the deployment of resources towards the development of IoT solutions would be crucial and depends upon how does the CSP perceives IoT opportunity. For instance, Telecom Italia assumes that an in-house IoT solution development would be good for commercial reasons, as the company feels it is not favorable to share revenues and is confident about the prospects of IoT. Few large CSPs prefer multiple approaches (Figure 10) as the availability of with funds is not an issue. However, majority of CSPs across the world, prefer outsourcing it to a partner or specialized global provider such as Jasper Wireless or Ericsson. One advantage of outsourcing to a global provider is that a similar user experience can be offered across geographies.
- Work with the industry eco-system for standardization of hardware/connectivity protocols:
CSPs need to come together unanimously to build standardization and which also allows in collaborating for the new product development. (Eg: global M2M Association, M2M World Alliance)

CSPs, which aim to build their presence across the IoT value chain, need to partner with the key players which lead to the integration of technical capabilities of key players. Various types of partnerships are created by CSPs to reduce costs and improve the value proposition. There are CSPs which have partnership across the IoT value chain. Few CSPs have joined hands with device manufacturers, others have partnered with system integrators and application developers.

Way Forward for Mobile Money Transactions

CSPs and banks share a symbiotic relationship when it comes to MMT. For CSPs, at minimum, a bank must hold the deposits which back the electronic value stored in customers' and agents' wallets. Conversely, for a bank, CSPs at minimum offer a channel for distribution of services which allows customers and agents to initiate transactions using their handsets.

Also, being a highly regulated sector means that both CSPs and banks depend on supportive regulations to offer services beyond basic money transfer services as is currently offered by most CSPs.

In such an environment, CSPs should work with the banks and other vendors to leverage its large customer base, control over data channels through SIM cards, rapid service deployment capabilities, strong brand presence and their distribution network to offer advanced MMT services to their customers.

CSPs need to closely work with banks and other third party vendors to allow their customers to move money into and out of mobile wallets from and to their bank accounts. For example, Airtel Africa (formerly Zain), helps banks to integrate securely with proprietary platform called Zap in order to offer this functionality to customers. In effect, these institutions are helping to create enlarged MMT value chain that offers consumers variety of services other than simple payments.

How CSPs should respond to the shift in CSP-Consumers equation

Even though the telecommunications industry is taking initiatives to figure OTT services in their business models, there is a strong case for the industry to have a greater play in the OTT services value chain.

With the OTT trend and the emergence of smartphones, CSPs have already lost a lot of their relevance for end users. Moving over mere connectivity, consumers, enterprises, and information workers are looking for solutions, services, content and applications that meet their needs. These consumers of connectivity services take it for granted that reliable connectivity is built into the devices and services they choose.

This shift in consumer behavior makes any adjustment to CSPs' traditional carrier business model all the more challenging, as CSPs do not seem to be in a position to exert influence over changing consumer behavior.

There is a real opportunity for CSPs is to bring offerings that empower end users to access services that they prefer, via the devices they prefer, at any given point in time. CSPs must look to ensure the superior customer experience by taking into consideration individual end user behavior.

4.2 Net Neutrality — how it should be redefined in the coming years

Net-Neutrality — prescribes that all the data has to move at equal speed across the internet — has been, for several years, on the top of the agenda of Telecom Regulators across the world. OTT players such as Google, Facebook, Netflix and many others have captured the attention of regulators by blurring the lines of providing voice, data and video. As a result, CSPs' core voice revenue is declining while operating margins are under pressure due to disproportionate use of some OTT services that are straining CSP's network infrastructure. Despite this fact, Governments are demanding more network investments from CSPs, who point to lack of economic benefits from the same.

CSPs argue for the need to leverage their network and IT infrastructure to provide differentiated services to OTT players, which would incentivize them to further invest in their networks. Contrary to this, EU's April 2014 net-neutrality law barred CSPs from charging extra for delivering faster services.

CSPs also highlight that restricting them to offer differentiated quality-based pricing would negatively impact deployment of high speed networks, as nearly a million minutes of video content is expected to cross global internet every second by 2018²⁹. They further highlight that nobody wins in such a scenario, as CSPs are prevented from leveraging partnership with OTT players, while OTT players have to settle for common denominator service and as end-users would not see benefits from Telco-OTT collaboration delivering innovative services, enhanced Quality of Service and price plans.

Acknowledging this problem of net-neutrality, as a step forward, the Federal Communications Commission (FCC)³⁰ in the US, in May 2014, decided to allow CSPs to charge OTT players for higher quality of service, while banning CSPs from blocking or slowing down access to any website. As a result, Netflix signed paid peering deal with AT&T, Verizon and Comcast to improve the quality of streaming and reduce buffering for its subscribers³¹.

In our view, in line with the FCC ruling, regulators around the world will likely decide and settle access levels while giving CSPs freedom to partner with whoever is willing to pay for a differentiated service. Such a makeover to the Net-Neutrality law will accommodate interests of OTT players; CSPs' quest to sustain revenues in the digitized ecosystem; and ultimately protect consumers from discriminatory practices and benefit them with improved transparency on accessible internet.

CSPs are not the only players in the market trying to tap the huge potential of the Digital Services segment.

29 Cisco VNI, June 2014

30 Reuters, "Amid protests, U.S. FCC proposes new 'net neutrality' rules", May 15, 2014

31 Time, "Netflix Is Paying AT&T To Make Movies Stream Faster", July 30, 2014

5 Technology services eco-system

As discussed earlier, the technology eco-system has evolved — to drive the age of Digital Services — with cloud computing, mobility, big data, sensor advancement, in-memory computing, and internet technologies such as IPv6.

The Information Technology service providers' landscape have also scaled up and evolved rapidly to adapt to the demands of next generation of digital service providers. This has led to rapid adoption of technologies by CSPs. This, in turn has been fueling the growth and maturity of technology service providers and system integrators, resulting into convergence of new age technologies. For example, the advent of cloud computing is changing the way technology services engage with CSPs and its customers, as it drives both the mobility and Big Data.

The evolution of the technology ecosystem is also leading to partnerships between CSPs and key technology players such as application developers and device manufacturers. Such partnerships are aimed at improving the value propositions of Digital Services from CSPs, as sectors like Automobiles, Healthcare and Public Services have made CSPs an integral part of their digital strategies.

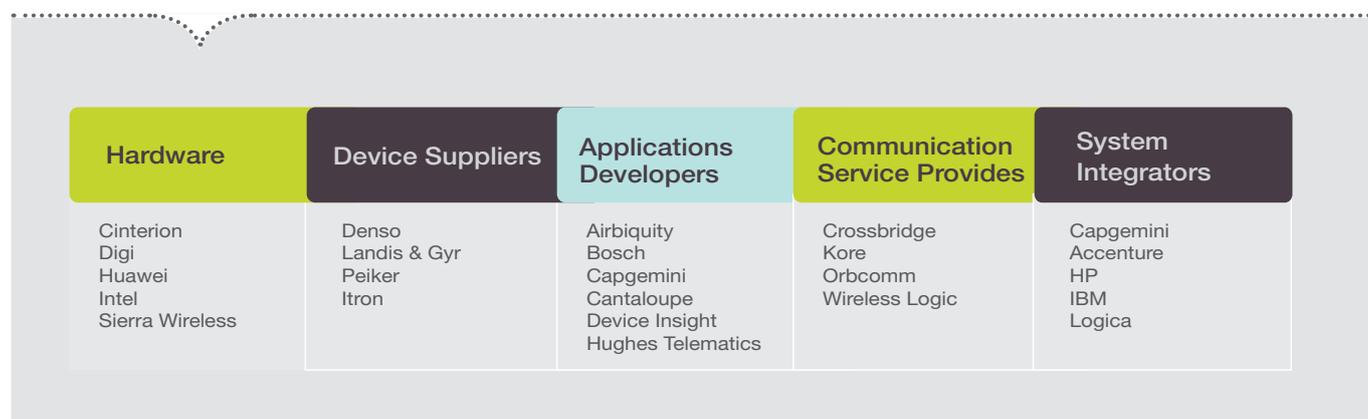
This is, therefore, a great opportunity for all players in the Technology Services eco-system, including Consulting firms and Systems Integrators. Vodafone's (Figure 11) partner ecosystem for M2M offerings exemplifies a formal partner program to develop and launch new Digital Services.

Another evolution, from the perspective of Independent Software Vendors' (ISVs), especially those which are small in size are collaborating with CSPs for infrastructure (without committing on capital investments) to offer cloud services. For example, Touch — the Lebanese operator has collaborated with a developer called Element N to build and offer cloud service (called Touch Cloud), which will enable applications to connect with third party services, such as Twitter or Facebook, and offer functionalities such as operator billing³³.

Thus, it is evident that the technology service providers and system integrators — who work in tandem with hardware manufacturers and suppliers, and application developers — is ready to support the transition of CSPs to full-fledged Digital Service Providers.

Figure 11

VODAFONE'S M2M PARTNER ECOSYSTEM



Source: GSMA M2M report³²

³² GSMA, "From Concept to Delivery: TheM2M Market Today", February 2014

³³ Arabnet, "Lebanese Telecom Operator Touch Introduces Touch Cloud: a Backend as a Service Solution for App Developers", December 2012



The technology eco-system has evolved — to drive the age of Digital Services — with cloud computing, mobility, big data, sensor advancement, in-memory computing, and internet technologies.

6 Conclusion

CSPs continue to build, maintain and retain communications infrastructure which cannot be easily replicated by other non-industry players and they are likely to maintain their position in the digital ecosystem in the foreseeable future. However, CSPs need to focus on bringing about a fundamental transformation that touches all areas of their business — right from their internal systems to networking assets, and from their human resources to their customers. In order to maintain their relevance and viability in the digital age, it is vital for CSPs to develop a compelling portfolio of Digital Services, which is built around Mobile Money Transactions, OTT Services, IoT and Big Data.

While venturing into new Digital Services offerings, CSPs will be faced with lower incremental revenues and lower operating margins, which is a challenge for their cultures as well as their financial models. The high cost of capital for infrastructure improvements will make it difficult to invest in completely new initiatives/products and compete with other industry players who have different costs and capital structures. This has been less of a challenge for new internet entrants who are global in operations, not overly regulated, and are well-funded.

Further, foray into the Digital Services business model would mean that the CSPs will need to partner with other players in the value chain. Then, there is also the risk that is associated with new initiatives — of diverting scarce resources and thus jeopardizing existing businesses, or worse, of cannibalising existing, well-developed revenue streams.

Players such as Google, Amazon and PayPal have made huge inroads in the mobile payments business; OTT players are always improvising on their already popular apps, making them leaner and more complex, while content producers are churning newer and better ideas to engage and retain their users. Ecommerce stores have matured both in the B2B and

B2B2C segments and are likely to stay ahead in providing the ideal platforms for trading and purchasing a wide array of merchandises.

On one end, CSPs may choose to maintain a steady but minimal presence in all of these segments, delivering only select services on their network but on the other, may choose to go all the way to establish a whole suite of Digital Services with extensive partnerships with various other players in the ecosystem. Their choices will reflect their entrepreneurial vision, will have a bearing on capex requirements and will result in operational complexities that invariably arise while venturing into a new paradigm of communications service delivery.

In the past, CSPs have overcome formidable barriers for growth and launch of new services and there is no reason why they cannot overcome any challenges now.

In conclusion, the Digital Services segment remains a vast white space, way beyond the realm of examples mentioned in this paper that will drive CSPs into the digital future with new business models, and completely overhauled and differentiated brand positioning.

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