Six converging technology trends

Driving a tectonic shift in the Business-Consumer ecosystem

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Foreword

The market dynamics are changing; there is a decisive shift in the economic, demographic and psychographic indicators. While the economic turbulence in the form of financial crisis is very much evident, the drastic changes in demographic and psychographic indicators of consumers are not apparent to a larger audience. However, marketers are increasingly getting cognizant of how these factors which are reshaping the business landscape.

Today’s consumer is a changed consumer; he/she will no longer walk down the street and stand in queues to get a product/service. It is the era of an empowered consumer who has choices and will come with a number of expectations. Since basic products and services are increasingly getting commoditized, in order to sustain, marketers can only differentiate in terms of quality of service, convenience, responsiveness and speed to market. ‘Push strategy’ adopted by erstwhile marketers, where products used to be simply pushed to consumers no longer works, there is a need to have ‘pull strategy’ which creates a pull in the minds of consumers by giving them superior quality of service in least possible time at best possible prices.

Technology, which has witnessed a paradigm shift in business arena, has become a critical enabler to achieve this. Role of technology will have to be looked at from a totally different context as a demand driver and synthesizer. To cater to today’s tech-savvy digital consumers, enterprises will have to redesign their IT delivery mechanism and leverage various disruptive technologies. Different technologies would be required to address different needs of today's consumers:

- Mobility as preferred medium of purchase; social media as preferred communication channel; embedded systems for convenience and self-help services; cloud to be agile, scalable, cost effective, and for faster delivery; big data to understand customer needs better and stay relevant in the marketplace and augmented reality to enhance customer experience.

These technologies are taking the centre stage in some of the leading enterprises of today and are likely to have the maximum impact on the way traditional markets were behaving. Transcending the times when customer used to come to the marketer, the current business scenario requires enterprises be in constant virtual touch with their customers. Therefore, understanding these technologies and the way these are being used by some of the leading enterprises worldwide becomes imperative.

This paper explores the potential opportunity from aforementioned disruptive technologies in various focus sectors comprehensively and suggests ways in which the IT providers and the user community can better capitalize on this opportunity. We hope you find this interesting and useful; we welcome your comments and feedback on this report.
Disruptive technological innovations are transforming the world around us in unpredictable ways. A new era of ‘Digital Consumerism’ is radically changing the way customers shop for products and services which is impacting the business-consumer ecosystem. Technology players have been fairly swift in responding to these changing market dynamics but in most cases they have treated these trends in silos.

A digital consumer does not differentiate between these trends. For a consumer, these trends are just an extension of his experience with the world around him, be it interacting with a retailer, or a bank or a hospital. KPMG in India believes that when the consumer doesn’t differentiate between trends, then it logically follows that both – the industry verticals as well as the IT-BPO vendors must also look at them in an integrated manner.

All these trends need to work together to deliver an outstanding customer experience; just focusing on one technology in isolation of the other will not work. Businesses need to focus at creating a holistic platform which encompasses all these trends. Technology players in turn must come up with integrated solutions that will enable businesses to address the dynamically changing demands of the new-age consumer effectively.
We have identified six trends viz. big data, cloud, social media, mobility, embedded systems and augmented reality which will have a logical maturity that inevitably brings them together.

**Big data**

Every year, companies and individuals generate billions of gigabytes of data. Data, which properly analyzed and used in time, can emerge as an unbeatable competitive advantage. Enterprises need to recognize the prospect big data represents and should adapt their IT strategy to capture such opportunities. Big data can help retailers predict buying decisions of shoppers; it can help banks weed out fraudulent transactions; while governments can use big data to provide services directly to their citizens.

**Could computing**

The undeniable power of cloud computing to foster innovations and improve productivity is now accepted by both IT vendors and their customers. While the financial services and government sectors are mostly moving to a private cloud model due to information security concerns, other industries like healthcare and retail have adopted public cloud. Moreover, their existing infrastructure has helped telecom players to emerge as providers of cloud computing, leading to erosion in boundaries between IT and telecom vendors.

**Social media**

A social media strategy has become a must for all enterprises, be it banks, retailers or the government. With over one billion individuals logged on to various social networks, people are now using social media for advice on what products to buy, where to shop and even regarding what firms they want to work with. While most enterprises use social media for their customer service function only, many firms have now started using social media in tandem with their sales and marketing functions. This in turn enables firms to use data generated by the customers effectively to service their larger pools of customers.

**Mobility**

Mobile devices have changed the way people access digital content. Smartphones and tablets have brought rich, digital content to the fingertips of consumers. Mobile banking has emerged as one of the most innovative products in the financial services industry. Shoppers are increasingly using their mobile devices for everything from browsing to comparing to buying products. Governments are also reaching out to their citizens, using mobile devices as an efficient channel. Enterprises must also jump on to the mobility bandwagon, and ensure that their applications are mobile ready.

**Embedded systems**

The decreasing cost of embedded systems has made their presence ubiquitous across the business landscape. Embedded systems like RFID chips have revolutionized supply chains for retailers. Embedded systems are also having an impact in the healthcare industry, where hospitals attach smart chips to patients to keep track of their entire medical regime.

**Augmented reality**

Over the past 24-36 months, augmented reality has moved from the world of science fiction, to our everyday lives. The spread of smartphones and tablets gave rise to the spread of location-based augmented reality applications, and now everyone from retailers to healthcare providers have embraced augmented reality. Augmented reality enhances the customer experience, and enables enterprises to add a fourth dimension to their products.
Digital consumerism is also impacting the way companies use technology. Increasingly, the core business platform is no longer the only source of information and insights. Additional solutions based on disruptive technologies are being integrated on to the core platform. This has led to a significant increase in the level of insights firms have about their customers. We are already witnessing micro-segmentation of customer, and products and services being tailored at an individual’s level. The coming decade will only see a rapid increase in this transformation.

IT vendors will need to change the way they are structured to deal with these trends. They need to be nimble, and think on their feet. Rather than being bureaucratic organizations, IT vendors will need to create internal startups that will work on adopting these trends. They will also need to look at an inorganic strategy to add to their capabilities in some of these areas. This will also have the added advantage of bringing in talent that will act as a force of disruption in these organizations.

Going forward, IT vendors should seek to work closely with their customers to stay abreast of the latest technological developments, and come up with solutions that can take advantage of the convergence of these technologies. They should seek to use customer input more diligently while innovating / developing solutions and products. The emphasis should be on tapping inputs from various channels, mediums and devices and using these as critical inputs for new solutions and incremental innovations. Industry bodies can also play a vital role in this, and increase awareness about these technological trends.

"We are in an era of technology-led transformation. Technology will become central and critical to everything we do. Every industry, every process, every business paradigm is being re-imagined, re-defined and re-engineered. Mobile, cloud computing, big data, anticipatory computing, Internet of things (IoT), augmented reality, unfettered bandwidth, social computing will make a huge impact and not limited to just the enterprise; they will impact our personal and social lives as well as the communities and societies we live in."

N Chandrasekaran
Chairman NASSCOM and CEO & MD, Tata Consultancy Services
The digital shift

Influence of digital channels across all stages of purchasing

Drivers of convergence

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>13%</td>
<td>Of web traffic comes via mobile – more than double last year</td>
</tr>
<tr>
<td>37%</td>
<td>Growth in the number of global 5G subscribers in the past year</td>
</tr>
<tr>
<td>30%</td>
<td>Of global population which is online</td>
</tr>
<tr>
<td>1.5 billion</td>
<td>Smartphones and tablets will be installed globally by mid 2013 – overtaking laptops and PCs</td>
</tr>
<tr>
<td>35 zettabytes</td>
<td>Amount of data in the world by 2020</td>
</tr>
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</table>

Growing influence of digital channels

- The social commerce market is forecast to reach USD 30 billion by 2015
- Leading global retailers are spending between 20-25 percent of their advertising budget on social media channels
- Mobile technologies can be used to cut the cost of a financial transaction by up to 80 percent
- Nearly 90 percent of top global banks use social networking to achieve customer engagement
The advent of technology has empowered the consumer like never before. The rising presence and reach of the internet, coupled with the prolific growth of smartphones, tablets and related technologies, has provided consumers with unmatched access to information on the go, thereby helping them make informed purchasing decisions.

The adoption of digital media is redefining consumer mindsets, patterns of purchase and decision making. This, in turn, is transforming consumer behavior. The rapid pace at which digital media is being adopted is also expected to propel growth in the use of consumer technology.
Effects of digital channels on purchase decisions

A convergence of various factors — a growing social media user base, the rising presence and reach of smartphones, and the intensifying consumer demand to connect — is increasingly changing the buying behavior.

**Typical consumer buying**

![Typical consumer buying cycle](image)

Source: KPMG in India analysis

Today, digital channels play a pivotal role at each of these stages. A simple expression of interest on a social channel or the analysis of consumption patterns can help businesses understand what a consumer may purchase and when in the near future. Based on such information, targeted marketing programs can be developed and be made available via different digital channels that could help influence consumers’ purchasing decisions.

A simple comparison engine has made the evaluation of alternatives more cut-throat. Customers can evaluate a product on the basis of any feature or metric. Moreover, with the advent of technologies such as augmented reality and artificial intelligence, consumers have the opportunity to virtually experience a product before actually purchasing it.

Channels through which products can be purchased have evolved too. Online transactions, purchases through mobile-optimized websites and smartphone applications (apps) are on the incline.

Consumer feedback on products through comments on forums, social media and review sites has created the need for heightened monitoring; positive feedback can generate immense goodwill, but negative feedback can spiral into a full-blown PR crisis.

**Consumer buying cycle in the digital age**

![Consumer buying cycle in the digital age](image)

Source: KPMG in India analysis

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The next big opportunity

In a short span of time, digital channels have come a long way, from just providing information (websites) to interacting with consumers (blogs, forums, social media) and providing an actual purchase experience (Augmented Reality (AR)). There is no doubt that technology is rapidly reforming the way businesses interact with customers. The rise of digital consumers who shop online, seek recommendations and interact with brands presents a tremendous opportunity for companies.

Thus, an in-depth understanding of customer behavior online and their purchasing preferences has become essential. Customers live in an integrated online-offline world, so companies need to aim for suitable presence on digital channels. New information and communication technologies are constantly emerging, altering purchasing patterns. While it may currently be difficult to predict when and which of these new platforms/technologies will become mainstream, it is essential to analyze their potential impact on consumer behavior.

Several companies are already creating digital strategies for their brands; however, many fail to produce the expected business outcomes and value through such initiatives, as these channels and technologies are being perceived in silos. A holistic and integrated strategy encompassing consumers, the enterprise ecosystem and channels is the need of the hour to cater to evolving demands and behavior. The effective use of such channels can help increase sales by monetizing demand, improve the effectiveness of marketing campaigns, enhance product development, drive multi-channel commerce and, above all, strengthen consumer engagement.

“A Digital Consumer expects a seamless, consistent experience regardless of hardware or software. They also want relatable, intuitive and intelligent technologies enabled on their devices. Going forward, we will see a multitude of devices that will continue to get smarter, more power-efficient and more intuitive. Very soon devices will respond to voice, gestures and moods, and will interact with each other to provide more value and intelligence to the digital consumer.”

Kumud Srinivasan  
President-Intel India

“Digital Media in no longer just a mere spoke in the wheel; but the very axle that can drive the wheels of a marketing campaign. We, as a company, are very clear that Digital Media is here to stay in a huge huge way! Which is why we have complete cross-functional teams support to further the digital momentum of the company.

At Shoppers Stop, we don’t retrofit ‘digital’ into our existing campaigns. Rather, we create specific content for digital media; and sometimes even use offline mediums to supplement these campaigns. Whether it is developing Augmented Reality campaigns, the most Fashionable Facebook Profile picture contest, #SSTweetStore, exclusive mobile apps, and much more; each such element receives its due digital diligence.”

Vinay Bhatia  
(Customer Care Associate & Senior Vice President, Marketing & Loyalty, Shoppers Stop Ltd)
The diagram above shows the interplay between digital consumerism and disruptive technologies. The increasing adoption and usage of technologies by consumers is fueling the growth and maturity of technologies and vice versa. This phenomenon is the key driver for convergence of new age technologies. In the following section, we discuss six technologies that KPMG in India thinks will bring about a tectonic shift in the business-consumer ecosystem.
While technologies such as big data and cloud have been dominating the imagination of enterprises for the past couple of years, new disruptive trends like augmented reality and social media have only now started having a tangible presence. As per their studies, leading analyst firms have estimated that the maturity curve of these technologies is to increase at a rapid pace over the next decade, with big data and cloud estimated to reach a market potential of tens of billions of dollars.
Digitization has made significant strides in recent years — racks of documents and piles of files have been replaced with zettabytes of data stored in the servers of data warehouses. Trends such as the growing use of mobile devices and social media networks are generating considerable amounts of data both structured and unstructured.

Underpinned by both technology and economic disruptions, the cloud will fundamentally change the way technology providers engage with business customers and individual users as it is a key driver for mobility and big data.

As per a 2011 analysis, every day, the world creates 2.5 quintillion bytes of data — so much that 90 percent of the data in the world today has been created in the last two years alone¹, and even this volume would have been surpassed by now.

Analyzing this, big data is likely to become a key basis of competition, underpinning new waves of productivity growth, innovation, and consumer surplus by 2020.

No trend has had as much impact on the world of information technology over the past decade as Cloud computing. Looking past the current industry hype surrounding it, cloud computing is a sustainable, long-term paradigm and the successor to previous mainframe, client/server, and network computing eras.

Global cloud computing market, in USD billion


Social media

Regarded merely as a hub for high school and college students just a few years ago, social media now exerts tremendous influence over the way people around the world — of all ages — get and share information. The implications for business are immense.

Social media accounts & users


Social media usage


¹ “Big data: The next frontier for innovation, competition, and productivity”, May 2011, McKinsey
Dominance of mobility

The surging popularity of smartphones and tablet computers has created ripples across the computing industry. As industry players continue to shift their focus from traditional to mobile computing, a significant change is on the horizon.

Mobile device shipments and mobile penetration

The global market for smart connected devices — a combination of PCs, smartphones, and tablets — reached 267.3 million units shipped in the second quarter of 2012 (2Q12), a 27.4 percent increase y-o-y and a 2.8 percent q-o-q improvement.

Both consumers and business buyers around the world continue to harbor an aggressive appetite for such devices, adding to the already large collection of devices that are still in active use. Rising focus on the mobile web platform is affecting a number of business aspects, including ecommerce spending and online advertising.

Beyond pure-play hardware & software: towards embedded systems

Embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights. Medical equipment is continuing to advance with more embedded systems for vital signs monitoring, electronic stethoscopes for amplifying sounds etc. With technology erasing the boundaries between hardware and software, embedded systems are expected to bring the new wave of change.

Embedded systems market size


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Embedded systems market size

Augmented reality

Augmented Reality (AR) offers a live view of a physical, real-world environment whose elements are enhanced by computer-generated sensory input such as sound, video, graphics or GPS data. The spread of smart mobile devices has led to rapid growth in AR. Against the backdrop of steadily increasing processing power the future holds significant potential for AR, with applications in a wide range of segments, from agriculture and architecture to education and medicine. Several technology firms have also jumped on to the AR bandwagon. For instance, Google has introduced Google Glasses™ to tap the potential of this technology.²

Cloud, Mobility, Social and Big Data will impact all industries, bringing in new products and business models, similar to what Internet did over the last 20 years. Companies are looking at taking advantage of these trends to drive growth and accelerate their innovation agenda – to provide superior customer experience, reduce time to market or drive efficiencies.

Kris Gopalakrishnan
Executive Co-Chairman, Infosys

The level of technology adoption in India has grown immensely. A lot of that has got to do with India’s economic development as a powerhouse of talent, creators of some of the world’s successful business empires, hotbed for new technologies and start-ups, entrepreneurship, heightened growth in social and mobile among enterprises and consumers alike, and a tech-savvy, anxious young population which will enter the workforce. Technology is empowering a whole new wave of innovation and growth that is aiding businesses to gain and sustain a competitive edge. We see this change taking root in industries as diverse as banking, telecom, e-governance, retail, e-commerce, professional services among others. The end-focus of course is on delivering greater value to the customer. Technological advancements around big data and social media analytics are allowing businesses to create and deliver products that are uniquely designed to meet the needs of an individual customer.

Sandeep Mathur
MD, Oracle India

² http://www.nbcnews.com/technology/gadgetbox/google-shows-prototype-augmented-reality-glasses-653835
The growing presence and reach of technologies that span the web, mobility and social media platforms has led to the emergence of digital consumers. Today’s enterprises are marketing to digitally active consumers prepared to adopt new technologies with ease. Gadgets such as laptops, mobile phones, handhelds and personal digital assistants (PDAs) have become common and preferred media for transactions. Consumers tend to stay connected with the internet regularly and seek information online before making any purchases.
As per KPMG in India analysis, the following are common traits that the new-age digital consumer:

- Stays ubiquitously connected (thus, the role of cloud, social media, mobility and the internet)
- Seeks personalization and convenience (thus, the role of cloud, AR, mobility and the internet)
- Needs innovative experiences and entertainment (thus, the role of AR and social media)
- Is influenced by peer reviews and feedback (thus, the role of social media and big data)
- Needs secure and easy purchase procedure (thus, the role of embedded systems, cloud and mobility)
- Needs transparency, accountability and convenient post-purchase services (thus, the role of mobility, big data and embedded systems).

These traits reflect a significant evolution from the traditional consumer profile — the way in which a new-age consumer communicates, transacts and makes purchase decisions has witnessed a paradigm shift. This change induces the need for enterprises to change the way in which they operate and connect with customers. To address this need and tap latent opportunities, industries need to leverage disruptive technologies and place digital consumer at the core of business strategy.

Enterprises need to leverage the opportunities that disruptive technology trends present. However, the extent to which these opportunities are implemented within an organization would depend on their relevance of each disruptive force on the industry to which the organization belongs.

Possible impact on select sectors

KPMG in India has identified a number of select key sectors that account for a significant portion of IT vendors’ revenues and are also among the most promising sectors in terms of growth. These include retail, healthcare, telecom, government and financial services.

Global market size and growth rate of select verticals

The identified verticals collectively account for close to 70 percent of the market. Further, the impact of disruptive technologies — cloud, big data, social media, mobility, AR, and embedded systems — on these verticals will likely be the highest. This report is aimed at gauging this possible impact through the analysis of various qualitative and quantitative aspects of these technologies.
In terms of disruptive technologies Big data, Cloud and Mobility are all very significant. They will disrupt the industry in different and significant ways. So, it would not be wrong to say that among these, cloud can be considered the biggest disruption of our times.

Mobility is expected to be a game changer. New business opportunities and challengers are being brought about by the flood of new mobile technologies and the speed with which this landscape is changing. Customers now expect to have access to products and services from anywhere, via both the web and apps, using the device of their choice to interact and transact. Mobile workers are also looking at mobile solutions to help them be more productive and efficient.

Big data, backed with predictive analysis can help businesses generate actionable business insights. In addition to the aspects of complexity and variability of big data, is the rate of growth or velocity, largely due to the ubiquitous nature of modern on-line, real-time data capture devices, systems, and networks. It is due to this that the rate of growth of big data tools will continue to increase in the foreseeable future.

We believe that in-memory computing is a breakthrough which will not only enable applications and analytics to run up to thousand times faster, it will enable businesses to be faster and nimble. SAP HANA in-memory technology platform is a completely re-imagined modern platform for real-time businesses. SAP HANA Cloud paves the way for developers to build applications in the cloud with embedded analytics and the massive speed of the technology itself.

Together Mobility, Cloud and In-memory computing will transform the businesses to run faster and nimbler than ever before. So, SAP is actively working around all these three technology areas and is using both organic and inorganic growth models to strengthen its presence in these segments.

Avaneesh Dubey
Senior Vice President, Business Suite Test Engineering, SAP Labs India
Following the global economic downturn and a subsequent dip in employment and consumer confidence, the global retail industry has recovered since 2010. Stimulus packages provided by governments, reinforced by strong domestic demand in some developing countries, boosted the global retail industry’s size to an estimated USD 17 trillion in 2012.1 North American and European retailers — with players such as Wal-Mart Stores Inc, Carrefour SA, Metro AG, and UK-based Tesco — continue to dominate the retail industry.2

Global retail industry, annual sales, in USD trillion

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<tr>
<th>Year</th>
<th>Retail Industry Sales (trillion USD)</th>
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<tbody>
<tr>
<td>2006</td>
<td>15.8</td>
</tr>
<tr>
<td>2012</td>
<td>17.1</td>
</tr>
<tr>
<td>2015F</td>
<td>21.6</td>
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</table>

Source: Economist Intelligence Unit, accessed January 2013

With the rise of the digital shopper, shopping has increasingly moved online and to the mobile platform, especially in the US, Western Europe and East Asia. In the US, the online retail outlook for 2012 was encouraging — fueled by the results of the 2011 holiday season. Online sales during the holiday season in the US increased to US$43 billion, reflecting a 17 percent increase over 2011.3 The value of mobile shopping was predicted at more than US$163 billion in sales, or 12 percent of all e-commerce sales, in 2010.4

Key drivers of growth in the retail industry

An expanding population base and a largely urbanized consumer class provide a thriving market for retailers

Entry of large, organized retailer into developing nations like India will also be a big boost

Shift in demographics and purchasing power to the younger section of the population is also driving demand

The rise of omni-channel retailers is also bringing the shop closer to the consumer, and is leading to increased spending.

1 www.alpencapital.com/downloads/GCC%20Retail%20Industry%20Report%202011_1%20November%202011.pdf; GCC retail industry report, Alpen Capital
2 www.stores.org/2012/Top-100-Retailers, January 2012
Change in footprint over the decade

Across the world, the retail industry is at the centre of a major shift in the way consumers shop and interact with their retailers. After almost a century of customers “going to the store,” the store is now coming to the customer. Customers now demand that retailers be wherever they are. E-commerce has also led to a global marketplace and has given rise to new, online retailers who take advantage of this low-cost channel, creating a perfect storm for traditional, brick-and-mortar retailers.

The growing might of online – and now mobile – shopping has led to terms such as “omnichannel”, which attempt to portray how customers use stores and websites in tandem. Retailers find that the more channels their customers use, the more they spend.

Shopping preferences of digital consumers

According to Marks & Spencer’s, people who shop on its website, as well in its stores, spend four times as much as people who shop just in stores. People who additionally use the mobile channel end up spending eight times as much.

Source: http://www.guardian.co.uk/business/2012/sep/02/marks-and-spencer-multichannel-shopping

5 http://www.guardian.co.uk/technology/2012/nov/11/mobile-technology-leap-forward
6 “Meet the Connected Consumer”, Jan 2012, Zmags.com
Thus, with the advent of the internet, and now mobile and social media, the retail landscape has undergone a seismic shift. Channels including the web, mobile and social media have increased their presence in the retail value chain. In the next decade, these new channels are likely to emerge as critical touch points for retailers, and providing an outstanding experience at these touch points can be the difference between winners and laggards.
Enabling technology transformations

Retailers understand that the key to the future of consumer engagement is to meet shoppers where they are. Sophisticated mobile devices, big data and cloud computing currently work in tandem to provide ready access to information, products and services from virtually anywhere at any time. The further integration of the cloud and mobility with social networking creates a powerful, new platform that allows retailers to engage throughout the purchasing cycle. To take advantage of such trends, retailers need to invest in technology resources that can help them stay a step ahead of the competition.

Big data

With large amounts of data being generated from the point-of-sale at stores, online transactions and social media, Big data offers numerous opportunities to retailers to improve marketing, merchandising, operations, supply chain and after-sales service.

Retailers use big data to help them manage inventory levels, and make better decisions about new orders7. The US-based book retailer, Barnes & Noble used a big data analytics solution to enable suppliers to monitor its inventory and take real-time replenishment decisions8. Demographic and purchasing data patterns can be analyzed using big data to help in merchandising related decisions.

Big data can also be used to better understand the target market, gauge consumer behavior, understand their shopping preference and hence do a better positioning of the product.

Tesco – Harnessing big data

Tesco collects vast amounts of data on its customers’ shopping habits that allow it to send precisely targeted coupons. When a household starts buying nappies, signaling the arrival of a new baby, Tesco usually sends discount vouchers for beer, knowing that the new father will have less opportunity to go to the pub.

Cloud

Retailers progressively need to process large amounts of data pertaining to customers and products in real time to provide personalized solutions. The spread of cloud computing has helped retailers to not only have large computing resources at their disposal, it has also allowed them to match their demand with their sales season. Moreover, retailers are looking to move all their platform-based solutions to the cloud.

UK-based fashion retailer Anthropologie’s patterns are rigorously managed in-house. It was integrated with a core e-commerce system provided by on-demand e-commerce provider Venda. The system included a payment mechanism, a product database and a site design accessible on the web and mobile platforms9.

Cloud computing also facilitates the implementation of an omni-channel strategy. It allows for the low-cost and significantly low-risk rollout of software that is needed to support multichannel retailing. This is particularly attractive for small businesses that lack requisite resources. Retailers can gain real-time visibility into their retail operations from anywhere at any time, as well as provide a single view of a customer across channels. Retailers can also keep their information up to date10.

Further, cloud computing helps retailers manage multiple channels and locations, integrate their websites with business, support their Point-of-Sale (PoS) systems, provide a unified real-time view of business, perform automated merchandising and marketing, and gain a 360-degree view of each customer. Recent surveys also reveal that while current cloud adoption rates in western European retail are low, adoption is expected to increase 300 percent by 201411. Additionally, 61 percent of western European retailers plan to invest in cloud computing in 2012, with a slight preference for increased investment from large retail companies (500+ employees), and the budget for cloud being typically less than 5 percent of the overall IT spend23.

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7 “Big Data for Retail is Flying Off the Shelves,” Nov 2012, Forbes
8 “Big Data – The Next Big Thing,” Sep 2012, NASSCOM
9 The Guardian, www.guardian.co.uk/cloud-computing/high-street-stores-turn-to-hosted-services, June 2010

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### Big data applications across different functions of the retail sector

<table>
<thead>
<tr>
<th>Function</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply chain</td>
<td>Optimal stocking decisions; Distribution and logistics optimization; Management supplier negotiations</td>
</tr>
<tr>
<td>Merchandising</td>
<td>Assortment optimization; Placement and price optimization; Store layout planning</td>
</tr>
<tr>
<td>Sales and Marketing</td>
<td>Online and in-store: Cross-selling; location based marketing; Customer micro-segmentation Online: Real-time personalization; Facilitate accurate delivery schedules In-store: Customer behavior analysis; Improve multi-channel experience</td>
</tr>
<tr>
<td>Customer service</td>
<td>Customer behavior analysis</td>
</tr>
</tbody>
</table>

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Source: KPMG in India analysis
Sephora — leveraging social media

Cosmetics retailer Sephora has created an interactive shopping social space launching its online Beauty talk community. It brought its customers together and encouraged them to discuss their enthusiasm for beauty products. Sephora found that by creating a community and by opening itself to its customers it was flooded with people dying to talk to each other. Moreover, a Beauty talk community user spends two-and-a-half times more than the average Sephora customer.

Further, social networks offer retailers the opportunity to connect with millions of customers and reach out to them individually. Retail brands need to devise a social media strategy, one that goes beyond just having a presence on Facebook and Twitter. Strategy should involve connecting with audiences over these social networks and leveraging their urge to talk about and share similar passions.

It also must be considered that even if a retailer decides not to have a presence on the social media, it could still feel its impact. Thousands of consumers write reviews, share feedback on their shopping experiences on social media platforms. Therefore, even if a retailer is not present on a social media platform, it may still be talked about. Therefore, a retailer must have a social media strategy that encompasses not only social media platforms but also listening and monitoring tools.

According to a recent survey by The Partnering Group, customer use social media primarily for coupons and product information, as well as to read comments from other users. Facebook has emerged as the leading social media platform for such discussions, with an estimated 55 percent of customers using it.

Worldwide social commerce market, annual revenues, in USD billion

Source: Booz and Co

Leading uses of social media by shoppers

Source: The Partnering Group

13 www.guardian.co.uk/media-network/media-network-blog/2012/jul25/social-retailing
14 www.shop.org/c/journal_articles/view_article_content?groupId=1andarticleId=1541andversion=1.0
Mobility

The spread of mobile devices has changed the way in which customers interact with retailers. They have emerged as an integral part of the sales process. Many of the mobile applications available today benefit the traditional brick-and-mortar stores by improving the in-store experience or driving traffic to stores with discounts.

Product identification can take place at any touch point, whenever or wherever a customer sees a product. The interaction may be through an outdoor advertisement, in a magazine or newspaper, via a retailer’s smartphone app, a mobile website, on a social network or even in-store, where an out-of-stock size is required.

A mobile offers the advantage of instant checkout. If the customer’s preferred payment and delivery details are stored securely on their mobile device, they can purchase anything from anywhere, anytime, simply at the touch of a few buttons. More than 60 percent of pre-purchase web searches are initiated on a mobile device. In addition, the majority of people — 67 percent — researches products on smartphones and then purchases them at a physical store.

Embedded systems

Embedded systems are changing every point in a retailer’s business, from sourcing of goods to their distribution to display in stores and finally, checkout. Embedded systems are enabling a connected ecosystem of devices that allow a retailer to have a real-time view of every step in its value chain. Retail firms such as eBay, Amazon and Flipkart, whose business models are built around the long-tail, need to keep track of millions of items. They spend considerable resources on analytics of data, resulting from tracking of these items. As analytics of the long-tail grows in importance, embedded systems become a focal point for retailers that earlier saw only little need for them.

RedBox, a US based retailer of rental DVD’s and video games, offers its customers a touch screen kiosk with information on movies and the entire process is automated. All a customer has to do is touch the item they want, use their credit card, and get the desired video.

The UK-based retailer Sainsbury’s launched a new initiative called Mobile Scan & Go that lets customers scan items as they shop using their iPhone or Android mobile device and pay at the till without unloading their trolley or bags. This makes the shopping experience even more convenient for customers by letting them track how much they’re spending, view savings instantly, and then pay at the till without unloading their trolley, basket or bag.

Carrefour City, the convenience store arm of French retail giant Carrefour, launched ‘Mon Panier’, a mobile app that lets customers order and pay for their grocery shopping with their mobile phone — and then identify themselves via an NFC and QR-code enabled kiosk when they arrive at the store to collect their order. The service is live at Carrefour City outlet at St Lazare, Paris.

Wal-Mart is one of the pioneers in implementing self-checkout stations that use embedded systems to read the bar code on each item, compute the total of the sale, and process the payment.

Source: “How Embedded Systems Are Changing the Way We Shop”, August 2012, bizcloud

Source: “Carrefour uses NFC and QR codes to speed up grocery shopping”, May 2012, NFCWorld

16 www.cisco.com/web/about/ac79/docs/retail/Retail-Mobility-PoV_011312FINAL.pdf
18 “Does the Long Tail create bigger hits or smaller ones?”, Nov 2008, LongTail.com
19 “Communication and Interaction Redesign for Redbox”, 2010, Ideo.com
Another common application of embedded system, used extensively in retail is Radio Frequency Identification (RFID). RFID devices are transforming the retail landscape with their ubiquitous presence in the supply chain. RFID’s enable retailers to keep track of each and every product in their system, integrated into a common repository to have unified and centralized view of information. RFID systems may range from source tagging, barcode labeling systems, hand-held labeling systems and retail merchandising systems and can enable applications such as automatic identification, retail security and pricing and promotional labels.20

Embedded systems are also enabling a new global standard for retail payments designed to help exchange data between payment terminals and POS terminals and support new payment technologies. Use of Near Field Communications (NFC) and mobile payments are common applications in this area. This has the potential to improve customer experience, as well as sales.

Augmented reality

It is no longer enough for retailers to stock their outlets with the latest products; the popularity of smartphones has given genesis to a new mobile shopping culture altogether. Apps such as Blippar, which links smartphone users to extra video and product content on retailers’ websites, have revolutionized the interface between shoppers and products21. Google has launched an augmented reality-based head-mounted display (HMD) called Google Glasses22. This consists of wearable glasses that display information in smartphone-type format, are hands-free, and interact with the internet via natural language voice commands. These glasses seamlessly project information on to the scene in front of the wearer; a customer can access reviews and price comparisons of any product in a store; restaurant menus and reviews can be shared; at a bookstore, a customer can access book reviews and author information.

AR is also used to explore synergies in print and video marketing. Marketing flyers can be designed with ‘trigger’ images that, when scanned by an AR-enabled device using image recognition, activate a video version of the promotional material.

AR technology has made it possible for phones to become barcode scanners that offer extra information and online prices. It is estimated that AR-based apps will generate close to USD 300 million in revenues globally in 2013 as brands and retailers increasingly show appetite for such features23.

20 “RFID Technology In Retail”, Apr 2008, Retail Technology Review
21 www.guardian.co.uk/technology/2012/nov/11/mobile-technology-leap-forward
23 www.juniperresearch.com/viewpressrelease.php?pr=348
Current state and way forward

Retail industry is one of the early adopters of disruptive technologies – be it cloud, mobility, social media, big data, augmented reality or embedded systems – owing to its B2C nature. Till now, mobility, social media and embedded systems (mostly in the form of RFID) have witnessed greatest adoption in the retail sector. With web-enabled smartphones, online shopping is being done using cell phones and customers are using social media to get product reviews and give feedback.

Augmented reality is expected to be the game changer for the retail industry. Increasingly marketers are using augmented reality to enhance virtual shopping experience and therefore, the industry would see significant investments in augmented reality applications in the near future, especially in the western world.

Cloud has been there for quite some time but it is being used as additional layer for niche applications, for example, to host/support a social media platform. The core retail platform is still on-premise software as concerns loom large over replacing the core platform with a cloud-based solution.

A number of companies have also started experimenting with big data tools such as Hadoop and MapReduce to unleash the power of big data analytics. Given the quantum of customer information that retailers have, if utilized in a correct manner, it can help in identifying and targeting the right customer segment and better positioning of the product. However, it will take some time for marketers to develop a business case which can justify the investments made on such tools.

In terms of convergence, retail is a sector which can encompass most disruptive technologies. It is not hard to think of a cloud-based platform providing integrated social media and augmented reality applications on mobile devices. The data generated through such applications can be analyzed using big data tools. There can be several other such applications which can encapsulate multiple disruptive technologies within them. The near future will see many more such applications.

Consumers in modern times expect products and services to cater to their every need, from world over, at times that they dictate and are willing to share information on their experiences across social media. The availability of information for customers has compelled retailers to constantly strive to serve customers above their expectations. Social media, data analytics, advanced CRM etc. have created the ability of one to one relationship between customers and retailers. No longer can retailers operate in the markets by mere segmentation of customers; they have to serve customers based on individual customer needs.

Service providers to retail like IT companies also have to realize that retailers as clients expect the provider to give solutions to their business needs rather than mere pieces of technology. Various functions of retailers including marketing, Human Resource Development, Finance, operations etc. need technologies that definitely help the functional team. However these technologies need to form part of the total solution offered. Retailers also expect to get a clear understanding of the return on investment which the IT services company is expected to calculate based on functional understanding of the business. This also means that IT companies need to understand the core business of their customers and create cross functional value propositions. For example a technology for social media can also cater to loyalty as well as marketing requirements of retailers. This also means that IT providers need to be able to communicate not only with the CTO of companies but also with head of marketing, head of buying and merchandising, the CEO. As convergence increases, and the need for mobility increases, IT companies are well expected to provide state of art solutions and not just technologies and these with best quantifiable benefits.

Kumar Rajagopalan
CEO, Retailers Association of India
Healthcare services, as defined, refer to provisioning of consultation, diagnostic, patient care and medication services to a patient suffering from injury, illness, disease, etc.¹

The global healthcare market is well poised for growth with per capita healthcare expenditure growing in most countries due to changing lifestyle, ageing population, and availability of better healthcare infrastructure. These countries were either significantly underserved and are now witnessing capacity expansion or are actively upgrading their healthcare systems.

Global healthcare spend in USD billion

Although the global healthcare market is witnessing growth, the uptake of healthcare services in both developed and developing economies remains skewed. Developing economies such as India, China, Malaysia and Vietnam continue to lag behind developed countries such as the US, the UK, Japan, Germany and Korea, which have relatively mature healthcare markets². For example, developed economies such as the US and the UK have over 3 hospital beds per 1,000 population²; meanwhile, countries such as India, Indonesia, Vietnam and China have less than 3 hospital beds per 1,000 population. Therefore, in less developed countries, the role of the government is paramount.

Key drivers of growth in the healthcare industry

Changing lifestyle, ageing population and better availability of healthcare facilities is driving the healthcare market.
Rising penetration of health insurance is leading to increased spending on healthcare services.
Increased availability of doctors, medical services, and health portal is leading to an increased adoption, especially in the developing economies.
Increasing awareness of health related issues is also leading to extensive usage of healthcare services.


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Change in footprint over the decade

The healthcare sector stands at the inflection point and is witnessing a transformation due to government regulations and initiatives to bring down the healthcare costs. Regulations such as Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health Act (HITECH Act) are emphasizing on the increasing role of IT in healthcare sector. It is because of this that the dynamics of the entire healthcare industry are increasingly becoming IT driven.

The IT market in healthcare is estimated to be nearly USD 54 billion by 2014, witnessing a CAGR of 16.1 percent between 2009 and 2014. IT is getting interwoven in the industry in the form of electronic medical records, electronic health records, clinical trial management systems, clinical decision support systems, data mining systems, hospital information systems, e-prescribing systems, ambulatory care management systems, patient management system, computerized physician order entry system, and non clinical systems to name a few.

Consumers are increasingly using web, connected devices and innovative health information technologies for self-monitoring, facilitate interactions and information exchange with doctors, and support treatment adherence.

Ease of access is the primary driver to healthcare. In this context, the use of mobile technology is very well suited and hence role of mobility as a technology is paramount. Given the high mobile penetration, it serves as a convenient and acceptable method to communicate with the patients.

Since accessibility is the primary driver, there is an innate need for agility and scalability in IT systems to expand the reach of healthcare. The Cloud is an obvious choice but concerns around security particularly in the context of healthcare privacy standards have inhibited the large scale adoption of Cloud until now. Going forward, as the industry works towards addressing this challenge, sector would witness wider adoption of cloud.

In addition to this, it also must be considered that no technology can deliver effectiveness in isolation. All these disruptive technologies are complementary and when used in the right mix they are bound to bring in efficiency and effectiveness in the delivery of healthcare services. It is also an expectation that the convergence would reduce the cost and help healthcare firms in reaching out to their target audience.

Arvind Sivaramakrishnan
CIO, Apollo Hospitals Enterprise Ltd.
Enabling technology transformations

IT is playing a critical role in changing the face and fate of the modern healthcare sector. Technology trends such as mobility, cloud, augmented reality, social media, etc. are making significant strides and are propelling the sector for incremental growth.

**Big data**

While the healthcare sector is poised for growth, at the same time, it is plagued with challenges. The primitive state of healthcare, especially in developing economies, can still be associated with paper prescription and manual health records. This brings in a challenge of managing large amount of unstructured data coming from various sources. In more developed economies, because of the emergence of electronic health records (EHRs) and patient care devices, patient data is getting digitalized leading to data deluge. In addition, healthcare costs are rising in countries such as US, where healthcare providers suffer the constant financial strain of providing treatments that are often not paid for or paid for only in part. Insurance industry is also facing a similar challenge, wherein, finding genuine claims and compensating providers for high-cost treatments is becoming increasingly challenging. It is because of all this that the healthcare sector is witnessing a three-pronged data challenge in terms of volume (large quantities of data), variety (structure and unstructured), and velocity (rate of data generation). This induces a need for big data analytics platforms to get useful intelligence from tens of thousands of patient records.

For example, a number of US’ largest integrated delivery networks such as Cleveland Clinic, MedStar, University Hospitals, St. Joseph Health System, Catholic Health Partners and Summa Health System use the big data platform for real-time exploration, performance and predictive analytics of clinical data.  

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5 “Big Data – The Next Big Thing,” September 2012, NASSCOM

Source: “IBM eyes vertical applications for big data,” October 2012, ZDnet
Cloud

Despite skepticism due to compliance with regulations such as HIPAA, the healthcare sector is now witnessing the increased adoption of cloud computing. Offering benefits such as lowered costs and reduced clerical effort of maintaining data, cloud computing makes it possible for healthcare organizations to access and retrieve information stored in scattered systems in real time. Thus, personnel can focus increasingly on critical matters cost-effectively and efficiently.

Therefore, solutions such as electronic medical records (EMR), telemedicine, patient management, and medical imaging are gradually shifting to cloud. These cloud services can now also be integrated with special medical hardware (embedded systems) for remote patient monitoring.

Due to benefits like these, cloud market is poised for growth. Healthcare spending on cloud is nearly USD 1.8 billion as of 2011, despite market penetration of merely 4 percent, indicating immense potential for growth.

Social media

Social media tools are gaining popularity, serving as an easy and cost-effective solution for both healthcare providers and patients. The internet, which was once a source of one-way communication only, has transformed into one that facilitates two-way interaction and information sharing. Healthcare providers can now monitor their patients in a virtual environment, thus giving impetus to remote patient care and monitoring. It also transforms the patient-doctor communication from ‘one-to-one’ to ‘one-to-many’; wherein, doctors reach out to a number of online users using the internet.

Healthcare Magic, started in 2008, is a healthcare portal which helps patients find doctors by specialty in India, the UK and the US. The portal provides information on diseases and conditions and facilitates online communication between patients and doctors. It gets funding from sponsorships and advertisements and also sells different membership plans to patients for interaction with doctors.

Source: “Increasing Importance of Social Media in Healthcare,” Issues Monitor, October 2011, KPMG International

A May 2011 Pew Research Center’s Internet study showed that, of 3,001 US adults surveyed, approximately 80 percent of the internet users use online media for healthcare information. The same study also revealed that 15 percent of US adults use their cell phone to access healthcare information.

Source: “Increasing importance of social media in healthcare,” October 2011, KPMG

Mobility

Increasing integration of mobility with healthcare is giving rise to ‘mHealth’. From a physician’s perspective, a physician no longer has to rely solely on bedside terminal to retrieve patient health or medical information, while from a patient’s perspective; a patient can seek medical advice more often and have flexibility in terms of point of care. mHealth can be useful in serving a variety of purposes, ranging from results viewing, to ordering, to e-prescribing, to reference data access, and to remote monitoring.

Mobility can play an instrumental role in efficient patient management and quicker handling of emergency situations which in turn can save treatment costs and early cure. Blurring lines and convergence of wireless communications, embedded systems, social networks and enabling technology of cloud computing will further propel the adoption of mobile health technologies. It is because of this that the market for mobile healthcare applications and devices is on a rise.

6 Techtarget, “HIPAA cloud computing advice: Ensuring cloud computing compliance”, 2012
7 KPMG in India analysis
Apollo Hospitals Group provides health information services via contact centres staffed by doctors and specialists using an IT platform with structured query database to give appropriate health response. The service is being offered in collaboration with leading telecom companies. It is also running a diabetes management program called SUGAR, where patients may upload their blood sugar count to the clinician through SMS and mobile applications. An SMS text is delivered back to the patient explaining the readings and advising whether further action is required.

Source: “Apollo plans 100 Sugar Clinics in 90 days,” November 2011, Business Standard

WelTel provides SMS-based messaging to monitor and support antiretroviral (ARV) therapy in Kenya. WelTel’s SMS communications are estimated to have raised ARV patients adherence to their treatment regimens by a quarter. This increased adherence and associated viral load suppression lowered health system costs by 1-7 percent (as reported by WelTel in 2011).

Source: “Mobile Applications for the Health Sector,” December 2011, World Bank

Global revenue for mobile healthcare applications

Source: Research2Guidance
Embedded systems and M2M

Embedded systems and M2M technology have made automated medical devices that focus on disease prevention and healthy living a reality. As a result, doctor and hospital visits have also reduced significantly. Applications in the field of remote monitoring and telehealth, being used for early detection and health warnings, are changing the face of healthcare sector.

A number of embedded software companies and telecom operators are developing technologies to improve patient care. The market is increasingly becoming crowded with a number of start-ups in Silicon Valley, application developers, carriers such as Vodafone, Deutsche Telekom, AT&T, Verizon, China Mobile, and France Telecom and giants such as IBM, General Electric and Philips. Applications such as a heart monitoring program, call emergency services device installed in cars, etc. are now a common play in this area. Think of a chip that can be inserted into a pill dispenser in a patient’s home. The machine would then read the data stored in the chip and automatically dispense the required prescription. That can be the power of embedded systems in Healthcare.

Augmented reality

In the field of academics, augmented reality can be used by medical students to practice surgery in a controlled environment. With 3D imagery and interactive display, complex medical conditions can be explained to patients using visualization aids. It can also provide improved sensory perception to the surgeon and reduce the risk of an operation. It can also be combined with MRI or X-ray systems and bring everything into a single view for the surgeon. Augmented Reality can play an instrumental role in the field of neurosurgery, wherein, augmented reality can be used to image the brain in 3D on top of the patient’s actual anatomy.

Augmented reality applications have immense potential in general wellness and care. One such example is of DoctorMole, a free Android app that uses augmented reality to analyze suspicious moles using the standard ABCDE approach in order to determine risk. The risk feedback is given on the basis of Asymmetry, Border, Color, Diameter and Risk (ABCDE). It also allows users to save photos taken to compare for evolution changes at a later stage.

Outsourcing as an industry has evolved and has moved far beyond just cost arbitrage. Given the shift towards digital consumerism driven by proliferation of disruptive technology trends like Social media, Mobility, Cloud, Big Data, Augmented Reality, Embedded Systems the dynamics that drive the industry are undergoing significant change. This is leading to the outsourcing players to explore hybrid models or vertical specific business platforms aided by technology.

Susir Kumar
CEO and MD, Intelenet Global Services

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9 KPMG in India Analysis
10 "The healthcare case for big data," November 2012, ZDNet
Current state and way forward

The adoption of disruptive technologies in the healthcare sector is inconsistent. While technologies such as cloud, mobility and big data are witnessing rapid adoption in developed nations, social media, AR and embedded systems are yet to take significant strides. Most developing economies have yet to experience widespread digitization and are lagging in terms of the adoption of most technologies. Other than mobility and, to some extent, cloud, developing economies continue to maintain a ‘wait-and-watch’ approach till they see a clear return on investments from these investments.

In future, the industry is expected to witness a convergence of such technologies, leading to an increased demand for consolidated platforms. However, it is expected to take at least 24–36 months before this trend starts becoming evident in the industry. While players have already started heading in this direction through the introduction of converged platforms in areas such as SOMOCLO (social media, mobility and cloud), the trend is yet to gather momentum on a large scale.

In the healthcare sector, the convergence is likely to be more in the areas of cloud, mobility, social media and big data as there is a clear upcoming trend of Tele-health and Web-health. Embedded systems can have a myriad of applications in healthcare as digitization picks up steam; embedded systems may find convergence with technologies such as cloud, mobility and big data to give access auto-generated patient information. Augmented reality would also have applications, however, lesser in comparison to other disruptive technologies. AR applications would be more focused in medical education rather than actual patient treatment and care.

**IT Trends in healthcare**

Emerging solutions in healthcare
- m-Health
- Tele-Health
- Web-Health

Key disruptive technologies that shall shape the healthcare sector
- Big Data
- Cloud
- Mobility
- Embedded systems

Futuristic trends to invest in
- Social Media
- Augmented reality

Source: KPMG in India analysis
The dynamics of the telecommunications industry have changed rapidly over the years. From being mere carriers providing voice services; telecom players have evolved into becoming an interface, a window and a platform through which consumers interact and transact with the virtual world. Convergence between physical devices and online services is fuelling the growth of new applications. These applications can take personal data and turn it into useful, personal, social and visual representations using the disruptive technologies mentioned earlier.

Other industries like BFSI, Healthcare, and Government are also increasingly adopting digital technologies which have made Telecom players an integral part of their digital strategies. Telecom players themselves also leverage these technologies to reach out to their end consumers and interact with them.

“With per unit processing cost of data going up and the need for faster processing time, big data is going to be a crucial technology for the telecom sector. It is expected to have wide utility in transaction-intensive domains such as CDR (Customer Data Records) processing, BI and Data warehouse. Social media is another important domain which is being seen from both employee and customer perspective. The drivers are primarily enhancement of customer satisfaction and better employee engagement. Other than this, Cloud can be an important technology considering the infrastructure-intensive nature of telecom business. However, there is need to address a few challenges such as flawless data migration from legacy systems and ensuring information security and data privacy to have wide adoption of cloud platforms.

Convergence is more likely to be in the areas of Social Media, Cloud and Big data. However, depending on the magnitude of impact, companies will decide whether to go for stand-alone or collaborative platforms. The current scenario is more in a proof-of-concept stage.”

Vinod Kamat
Vice President, IT, at Vodafone Essar
This distinct nature of this industry throws open a multitude of options for IT-BPO vendors as telecom players need to integrate themselves into technology value chains of other industries as well as utilize these technologies for their own business.

As shown in the figure above, telecom acts as a medium and an enabler for the various industries to interact with their end-customers. These end customers have access to a number of mediums, channels and devices to interact within themselves and with the industries. While social media, cloud, big data, augmented reality, embedded systems and mobility are touted as the game changers currently and over the next few years; the role of telecom is vital in the successful adoption of these technologies.

Thus while reviewing the effect of these disruptive technologies on telecom as an industry, we also cannot neglect the role of telecom as an enabler.

Isolating the effect and looking at it from an IT demand perspective, telecom sector is poised for growth. Global mobile subscribers reached 6.2 billion as of March 2012, with growth mainly stemming from developing economies such as China, India, Brazil, Indonesia and Bangladesh.12

Global wireless subscriber base and net additions (Q1 2012)

Source: Gigaom, “Ericsson: 85% of the world will see 3G/4G in 2017”, June 2012

Change in footprint over the decade

The telecommunication sector has witnessed a seismic shift in the past decade. The decade that started with wire-line services dominating the sector both in terms of subscriber and revenue share, has progressed to the era of smartphones, tablets and other handhelds. Ever since 2007, when wireless revenues surpassed wire-line revenues, the state and implications of the sector changed for good.

Today IT and telecom are getting interwoven; telecom providers have sufficiently matured in terms of availability of network bandwidth and IT infrastructure to provide IT services. Similarly, IT vendors are entering erstwhile telecom territory as they take their solution offerings to a mobile platform.

In addition to this, from a customer perspective, telecom operators are increasingly facilitating new web-enabled channels through which customers can interact/transact with them or among themselves. It is being done with the aim of aligning operations with the trends in changing lifestyles of customers. It is due to this that of late, Web has emerged as a key subscriber service channel for telecom operators, especially for younger generation. As per a survey conducted by Oracle in 2011, subscribers, irrespective of the age-group they belong, have shown the desire for their telecom operator provider to offer live help options on their Website.

The survey also highlights that subscribers of different age-groups prefer different methods of interaction with their mobile provider. While older subscribers prefer in-person or over-the-phone interactions, their younger counterparts prefer online or self-service options.

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13 Oracle, Mobile Trends: Consumer Views of Mobile Shopping and Mobile Service Providers, April 2011

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Moreover, subscribers have started to demand personalized online experience and improved ways to research mobile products. As different age-groups favor different ways of interacting, leading to convergence of traditional and online channels, telecom operators have started to create a cohesive cross-channel customer experience.

Source: KPMG in India analysis

- **Very high**
- **High**
- **Medium**
- **Low**
- **Absent**

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Enabling technology transformations

The role that telecom/mobility plays in the enablement of disruptive technologies has far reaching implications than the role that disruptive technologies have to play in telecom. From a B2B perspective, telecom/mobility plays an important role in the uptake of these technologies:

**Cloud**: one of the key characteristics of cloud is the mobility that it provides to enterprises. The data/applications on cloud can be accessed from anywhere, any device.

**Big data**: big data is becoming more pertinent because of volume, velocity and variety of data generated from increasing number of mobile devices.

**Social media and augmented reality**: potential of social media and augmented reality cannot be explored to the fullest if they are not delivered over mobile devices.

**Embedded systems**: most embedded systems now come as mobile devices.

However, from a B2C perspective, these technologies are indeed enabling a transformation in the telecom sector.

**Big data**

Telecommunication, as a business, involves trillion of small transactions on a daily basis. Add to this, with adoption of social media and analysis of real-time consumer behavior gaining pace, flow and variety of data on networks has increased manifold.

Telecom operators are increasingly leveraging big data tools to convert all the data into actionable information. Globally, operators are deploying predictive analytics and big data tools to make proactive use of the data. This has helped operators to improve quality of service (QoS), increasing customer satisfaction, and thereby making business more profitable. Big data tools can be used to measure and analyze customer activities, customer churn, reasons for churn, call handling and management time at customer care call centres, among number of other things. Moreover, the emergence of cloud-based open source platforms, coupled with big data has resulted in faster processing and analysis of data.

**Cloud**

Telecom, by its very nature, is an infrastructure intensive sector. Network infrastructure is the key component and forms the backbone of any telecom business. A significant portion of telecom businesses’ expenses can be accounted to network and infrastructure management. Other than the cost angle, scalability is another challenge that telecom operators face. For example, it is somewhat like a manufacturing plant concept. In order to manufacture 100 additional cars, a manufacturer will have to install a machine which would have production capacity of 1,000 cars. Capacity of 900 cars would remain idle until the manufacturer gets demand for those 900 units. Similarly, while scaling up to cater to demand from additional subscribers, a telecom firm often needs to undertake heavy network deployment which is both cost and time consuming.

To address challenges like these, telecom operators are now increasingly migrating to cloud environments to achieve cost efficiency, scalability and agility.

**SingTel launched cloud platform for ISVs**

SingTel, one of the largest telecom operators in Asia, in partnership with Progress Software launched a cloud-based infrastructure for ISVs to build, test, manage and deploy their applications for businesses.

Source: TelecomAsia, “SingTel, Progress launch cloud platform for ISVs”, August 2012.

Telecom operators are also fast embracing cloud to open new revenue streams. This new revenue stream can be in the form of telecom operators offering cloud services to enterprises. Because of the availability of network infrastructure, telecom operators are well equipped to offer cloud orchestration services, including automated arrangement, coordination, and management of applications, middleware, and services over the cloud.

Moreover, telecom operators are also collaborating with independent software vendors (ISVs), which due to their smaller sizes look out for infrastructure without committing significant capital investments. Operators, globally, are leveraging this opportunity by offering their network backbone to ISVs who can offer cloud services.

**Bharti Airtel – Using analytics to deliver campaigns**

Bharti Airtel, the largest operator in India, uses analytics to enable marketing department to deliver campaigns to targeted customers on a daily basis. The analytics function processes more than five billion transactions daily, contributing to the top line.

Source: InformationWeek, “Analytics enables marketing to deliver campaigns to targeted customers on a daily basis”, November 2012.

**Touch Cloud – a Backend as a service solution for app developers**

Touch, a Lebanese telecom operator, in collaboration with Element N launched Touch Cloud which serves as building blocks for HTML5 and mobile developers. Touch Cloud enables the applications to connect with 3rd party services, such as Twitter or Facebook.

Social media

With customer conversations over social media growing at an exponential rate, it is imperative for the telecom operators to prepare for a social revolution of sorts. Social media applications have now become a standard; device manufacturers are embedding them in devices as built-in applications and service providers are providing them through proprietary/3rd party applications stores.

Other than demand-side push, availability of high-bandwidth networks, enabled with technologies such as Long-term Evolution (LTE) and Worldwide Interoperability for Microwave Access (WiMAX), has created an environment conducive for provisioning of social media services.

In addition to this, major telecom operators, globally, not only look at Web 2.0 as a communication and collaboration tool but also as a strategic marketing tool. Service providers worldwide are using social media to learn more about their customers and explore new revenue opportunities.

Augmented reality

Adoption of smart devices has increased to a point where they rival the power of PCs, ensuing the need for content-rich media applications such as Augmented Reality (AR). As the adoption of AR rises, the implications are clear for stakeholders at each level in the value chain. From a device manufacturer’s perspective, augmented reality is something that they just cannot ignore. The devices of today need to be augmented reality-enabled in order to stay relevant in the market. Telecom operator needs to have sufficient network bandwidth to give room to such rich-content applications and application developers will have to find new ways in which augmented reality can be used across different categories of applications.

Augmented reality today has utility in location-based service apps, entertainment and gaming apps, videos, utility related apps and many more. Stakeholders in various segments of telecom sector need to be prepared of these market developments.

Loop mobile – Measuring ROI based on subscriber responsiveness

Loop, a regional Indian telecom operator, is leveraging the social media to create buzz for the brand. In addition to increase in fans, response or conversations and likeability, it also looks at other factors such as contest participation, generation of leads, lead conversions, clicks on videos or posts and conversations to measure the success of this strategy.

Source: InformationWeek, “In today’s marketing scenario, interactivity in terms of ROI is measured with subscriber responsiveness”, November 2012.

Nokia – City Lens

Nokia’s ‘City Lens’ is a location-based application that provides an AR overlay view of buildings and instantly highlights places of interest. The company is now pre-installing the ‘City Lens’ application on the range of its new Windows Phone 8-based smartphones, Lumia 820 and Lumia 920.


Vodafone – Leveraging mining and listening tools to manage customer support over social channels

Large volumes of social media chatter about Vodafone were untracked and unattended, entailing the need for a system to scan social media to gather conversations about Vodafone. In response, the company developed a social media listening and mining tool based on Java and MySQL hosted on Enterprise Linux Servers. The tool analyzes Twitter feeds, Twitter trends, Facebook posts, RSS feeds from various blogs and articles, and ties into feeds for third party sites like forums. The tools also classify the conversations as queries, complaints and request.


Bouygues Telecom – Extending AR experience to sales brochure

Bouygues Telecom, a French telecom operator, added an AR feature to the smartphone purchasing guide available at its points of sale. This feature allows customers to test and discover the functions of new smartphones by placing the printed page of the 3D guide in front of a webcam. The chosen smartphone is viewed in 3D as if it were coming out of the page.

Social Media, Mobility, Augmented Reality, Big Data and Cloud Computing are the key disruptive technologies that have redefined the global business environment in the past few years. Looking at the changes from a BPO point-of-view, the service offerings and business models in the industry have changed drastically. It is no longer about providing back-office and voice-based processes. Today leading BPO service providers are managing far more complex and end-to-end processes for clients. Most C-level executives and Business Unit heads across all industries are increasingly looking at solutions that:

• Address the challenges of meaningful engagement with the consumer on digital media
• Help meet regulatory demands and address risk and compliance needs
• Yield enhanced business outcomes in terms of gaining competitive advantage, leading to customer satisfaction and improved ROI

As these changes continue to shape the business landscape, companies will have to work closely with clients to create solutions that yield enhanced business outcomes.

Keshav Murugesh
CEO, WNS Global Services
Current state and way forward

Telecom sector is considered to be an infrastructure intensive industry and therefore role of technologies such as Cloud Computing and Embedded Systems is paramount. Because of huge volumes of data generated, both at the OSS (Operational Support System) and BSS (Business Support System) layers, big data also holds immense importance for this sector.

Technologies such as social media and augmented reality are used more at the customer interface level and hence have limited utility in the sector. The utility of social media and augmented reality is mostly around the customer applications, which are developed by application developers and mobile network operators to some extent. Other stakeholders in the telecom ecosystem, which includes network equipment manufacturers, resellers, etc., do not find much utility of social media and augmented reality in routine operations.

However, going forward, both these technologies will find much greater use. Social media is increasingly being used to connect telecom companies to their employees. Demand for augmented reality applications is also expected to grow as it finds its way in more utility/productivity related applications.

Telecom is an interesting segment as it acts as a horizontal enabler which cuts across multiple other verticals. ‘Mobility’, which acts as an enabling technology for advancements in other verticals, comes as an integral part of the telecom vertical. Therefore, beyond the uptake of disruptive technologies in telecom sector itself, telecom sector would still witness huge investments flowing into these technologies as stakeholders in the ecosystem will have to cater to demand from other sectors. Be it a device manufacturer, a network operator, a content publisher, a technology provider, an app developer or a reseller, all of them will have to fulfill changed demand pattern from other verticals which is increasingly being driven by disruptive technologies.

Going forward, the industry would also witness significant convergence of these technology trends. Technologies such as cloud, embedded systems, big data are expected to come together to build cost effective solutions for back-end. Firms may also use cloud platforms to build and host social media and augmented reality apps for customers. It is due to this that demand for converged platforms is expected to rise in the near future.
Government cannot be called an industry vertical per se, however, considering that it is the largest spender in any economy, it becomes one of the important consumer segments from an IT perspective. From a spending perspective in an overall economy, two broad heads that every vertical may have are private spending and public spending and hence the role of government in catalyzing the growth of an economy cannot be ignored.

Government is coming up as one of the major spenders on IT systems to modernize its processes and extend its reach to the masses across the world. There is an increasing need for digitization in government processes to make the operations more effective and transparent. It is due to this that Governments across the world are spending billions of dollars every year on IT.

### Key growth drivers for the government spending

- **Growing GDP is leading to higher government expenditure every year.**
- **Sectoral reforms and revolutionary projects are driving investments by government on IT and select sectors.**
- **Need to streamline process, expedite operations and bring in greater transparency induces a need for system overhaul and increased spending on IT.**
- **Growing population coupled with government’s motto of social welfare drives spending on critical projects which need a scale-up.**

**Worldwide Government spend on IT services and BPO**

![Bar chart showing government spending on IT services and BPO from 2009 to 2011.]

**Source:** NASSCOM

Sectoral reforms and e-Governance programs worldwide are creating greater demand for IT systems. Governments worldwide are also looking at uplifting the rural and underserved population by working on themes such as financial inclusion and catering to the bottom of the pyramid. IT technologies can play an instrumental role in servicing the bottom tier in a cost effective manner. For example, in India, reforms such as APDRP (Accelerated Power Development and Reforms Programme), and transportation reforms, and revolutionary projects such as MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) and JnNURM (Jawaharlal Nehru National Urban Renewal Mission), Aadhaar (a Unique Identification initiative), IT-enabled Passport Seva Kendra, CCTNS (Crime and Criminal Tracking Network & Systems), among a number of others, are creating greater demand for IT systems.  

In addition to this, to overcome the challenges of increasing urbanization, governments across the world are also making significant investments in creating IT-enabled smart cities such as Amsterdam (Netherlands), Yokohama (Japan), and Masdar (Abu Dhabi).  

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Change in footprint over the decade

Governments are heightening their focus on transparency in processes and are striving to reduce administrative and commercial losses due to lack of centralized and consolidated systems. While the vertical has remained low on IT maturity, governments are adopting measures to break information silos and lower administrative hurdles.

The government sector is among the largest spenders on IT and is witnessing rapid growth. Key areas for civilians — including health and human services, home and security services, treasury, transportation and justice — are becoming focus areas for IT enablement. e-Filing, automated tax/fee calculation, and interconnectivity to have unified view of data are some of the potential areas where service providers are witnessing growth, specifically in developing economies.15 Government’s mandate to provide better citizen services with the help of IT is driving significant investments in e-Governance and projects. For example, the Indian government plans to invest INR 340 billion15 over the next five years to provide better citizen services and technology would be the key enabler for efficient delivery of these services.

Key components of Government services in the past

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<thead>
<tr>
<th>Customer Touch Points</th>
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Source: KPMG in India analysis

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Enabling technology transformations

Governments are leveraging disruptive technology tools to promote openness and improve engagement with their citizens. Governments across the globe are adopting a number of initiatives to improve accountability and transparency and thereby, the quality of public services.

Big data

With the increased digitization of information, nations are facing pressing challenges in the wake of significant volumes and disparate varieties of data. Be it digital records of citizens, their activities, or service delivery, data is being generated, accessed and retrieved across government activities. The sheer volume, variety and velocity of data make data management an arduous task. Most governments spend more time collecting and organizing the data than analyzing it. Considering the kind of data governments hold, if analyzed correctly, such data has the potential to take fact-based decisions and, thus, address some of the biggest challenges that prevail.

To make the most of this data deluge, governments across the world are now building a big data roadmap. Big data tools and technologies have a significant role to play in the areas of delivery of public services, defense & security, managing transportation and logistics, science and R&D. For example, Indian government is making extensive use of big data tools to power its Aadhaar project. To capture and process such significant volumes of data, UIDAI (the UID Authority) runs three duplication servers powered by MySQL and Hadoop. The open source architecture of Hadoop ensures fast processing of large volumes of unstructured data, high scalability, and enables adding interfaces based on APIs. Hadoop also enables UIDAI to provide real time information about enrollment data across states.

Cloud

Cloud computing provides service oriented architecture to users which is cost-effective and scalable, making it a suitable platform to host e-Governance services. While security was considered to be a concern in the past, many governments are now building their own private cloud/community cloud to maintain minimum security standards.

Two essentials for success of any e-Governance initiative are reach and availability. Cloud enables service delivery over internet making it accessible to all and service level agreements ensure that the services are available at nearly all times. Therefore, use of cloud for collaboration and communication between departments and with citizens hold the maximum potential, followed by use of cloud to facilitate information management (such as record-keeping).

New Jersey Transit Authority uses a hosted CRM system from Salesforce.com which provides workflow rules that route incoming customer questions to the subject area experts. The system’s applications are linked to a data warehouse, employee information, an e-mail management system, and a data quality system. During its use, and without an increase in staff, the average response time to inquiries dropped by more than 35 percent and productivity increased by 31 percent.

Social media

In the era of digital citizens who are all over social media, governments need to have a presence on social media to connect with them. Governments world over are now using social media to ensure effective citizen engagement and communication with all stakeholders in real-time. Social media can not only enhance the outreach of government but can also help in managing the perception of the users to avoid propagation of unverified facts and rumors with respect to government policies.

Government agencies are using Facebook, Twitter, and other platforms to inform and interact with the public. Governments are using social media for everything from handling 911 service requests to hosting real-time interviews with public officials to crowd-sourcing ideas around public policies. Governments also monitor social channels for threats to national security.

Source: “State of New Jersey (New Jersey Transit Authority),” Info.Apps. Gov

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16 “Aadhaar is India’s app store: Nilekani,” May 2011, CIOL


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Mobility

Mobility is coming as a channel or a medium for effective delivery of government services. From giving mobile devices to government officials, to advanced data collection using mobile devices to wireless networks and unified communication, mobility is touching every aspect of government operations.

Mobility plays a pivotal role in making e-Governance initiatives successful as rural and tier-II/III cities lack the infrastructure necessary for every citizen to have Web access. In such a situation, mobility plays a critical role as it enables e-mobility with e-governance for the uninterrupted data sharing process, making information available on a real-time basis. Mobility can also play a role in materializing financial inclusion and reaching the unbanked population using applications such as mobile banking, mobile money, etc. Moreover, since the delivery of services get mobile-enabled, instances of bribery and leakage gets reduced.

For this reason, often governments create m-Governance framework a part of their national e-Governance plan to utilize the massive reach of mobile phones and harness the potential of mobile applications to enable easy and effective public service delivery especially in the rural areas. Government of countries such as US have also launched their own mobile application store for effective delivery of various public services through mobile phones and are undertaking initiatives to make sites of all government departments and agencies mobile-compliant using ‘one-web approach’.

Embedded systems

Embedded systems are witnessing fast growth in the Government sector. The last decade has seen a major shift in the way embedded systems are being used by governments. Initially, embedded systems used to find their way in safety-critical applications such as rocket & satellite control, energy production control, telephone switches and air traffic control. However, in the current scenario, demand for embedded systems is much more broad-based. Be it railways, roadways, mobile communications, or electronic payment solutions, the use of embedded systems in various government departments is only increasing. Embedded systems are being used extensively in following areas:

- Establishing process controls in areas such as energy production and distribution, factory automation and optimization
- In satellites, mobile phones and telecom networks
- For better energy management by establishing control over production and distribution, and for optimum usage of energy
- For secured e-commerce transactions
- In identity and access management through use of smart cards
- In healthcare through embedded systems enabled hospital equipment, and mobile monitoring.

Madhya Pradesh government in India launched a pilot project using SCO Mobile Server that enables electronic provisioning of services and access to government information using a cell phone over the cell carrier network.

Mars Rover sent by NASA (an agency of US Government) uses embedded system as one of its sub-block. This system determines the distance travelled by rover, obstacles in the path, voltage and charge across battery terminals, and speed of the motors.
Augmented reality

Though the adoption of augmented reality has not been much in government vertical till now, there is an increasing uptr eat. Augmented reality applications can offer a number of opportunities for the delivery of important information for citizens in an interactive manner. One of the most basic examples of usage of augmented reality can be citizens pointing their cameras installed in mobile phones towards a particular building and get information about that building (such as name, location, opening time, etc.) and near-by places.

However, this is not all that augmented reality has to offer. Some of the key application areas where augmented reality can be used in government domain include sectors such as defense, R&D, education, tourism, among others. Promising immense potential, defense is one of the key focus areas for augmented reality applications. From the times when augmented reality was used in heads-up displays in military aircrafts, augmented reality has come a long way and is now being used to create augmented reality contact lenses for defense use. The US department of defense is working on a system, called iOptik, that gives humans the ability to focus on the near foreground and distant background at the same time. Augmented reality also has significant potential in military training exercise systems which may have features such as friend/enemy identification, multiple sensory interfaces, location intelligence and interactive battlefield medical support.


European Union funded project called ARTHUR (Augmented Round Table for Architecture and Urban Planning), allows architects and customers to review designs before they are built. It created computer-generated models on augmented-reality, head-mounted displays that enabled participants to view 3D virtual models on a planning table, tweaking their size and scale in real-time.


Google is working on developing a pair of augmented reality glasses that seek to provide users real-time information right in front of their eyes. It will give a complete new dimension to concept of mobility in augmented reality where the technology would be worn as a wearable.

Source: “Google Project Glass,” April 2012, TechCrunch

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18 “US military developing multi-focus augmented reality contact lenses,” April 2012, Extreme Tech
Current state and the way forward

Considering the sheer size of government sector, the potential for growth of emerging technologies is immense. Since government interacts with almost all the stakeholders in an economy – be it a citizen, a community, or a corporate – all the disruptive technologies find utility in some government segment in one or the other way. However, in our opinion, technologies which can help in reaching out to the masses in a better way will have the highest impact on the sector. Therefore, Mobility, Social Media, Big data and embedded systems will have the highest impact for citizen services in the government sector.

Cloud can be a significant enabler to power all the systems; however, the adoption rates may remain lukewarm as concerns around data security continue to loom large. Nonetheless, KPMG in India predicts, that the sector is likely to witness more and more cloud deployments in the near future, especially in the community cloud model.

Augmented reality is another breakthrough application area that will find majority of its use in sectors such as Defense, Tourism and Academia. However, it is still early for the technology to find significant scale, till then it will continue to flourish in a few niche areas.

Going forward, the sector is also likely to witness convergence of various technologies for a better service delivery to citizens. Convergence is likely to be seen in areas including embedded systems, mobility, social media, and cloud from a service delivery perspective.
Five years since the outbreak of the global economic crisis, the financial services industry has yet to recover. While the banking sector has risen from the depths of 2009, it is still buffeted by long-term frailties that still remain unaddressed. Banks in the United States and Europe remain on a weak footing, and are still weighed down by a large volume of bad debts, regulatory pressure on their business model, and a decrease in consumer confidence in the functioning of the banking industry. The huge losses brought about by the financial crisis and ensuing bank failures and tax-payer bailouts shook public confidence in the banking sector.

The huge losses brought about by the financial crisis and ensuing bank failures and tax-payer bailouts shook public confidence in the banking sector.

Economic profit generated by banks in Asia-Pacific, Europe and the United States, 2007-11, in USD billion

Key growth drivers for the financial services industry

A relatively strong economic growth in China and other developing nations is driving demand for credit and other financial products.

Emerging markets are still showing strong demand for financial services.

Drive towards financial inclusion of the unbanked strata of the population.

As per a Boston Consulting Group analysis of leading global banks across geographies shows that cumulative profits have decreased from USD 107 billion in 2007 to a loss of USD 189 billion by 2011, with banks in the Asia-Pacific region being the only ones to make a profit over the period.

However, in the faster growing developing nations, there are selective opportunities for the banking industry. Rising income levels and a growing middle class with more disposable income will create increased demand for banking products to support both individual and corporate customers. Moreover, multi-national firms will be focusing more attention and investment capital on these markets and more local and regional firms will begin to emerge as global players.

Over the next 2-3 years, the financial services industry will be faced with challenges as it tries to implement key programs to essentially redesign the business and redefine the target operating model.

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Change in footprint over the decade

The last few years have witnessed a rapid increase of Information Technology (IT)-based programs which have transformed the banking sector of the country. Technology infrastructure has played a vital role in enabling timely availability and giving access to vital information in a quickly changing economy. What began as a mere automation of some everyday work processes in banks in the mid 80’s has moved on to become business process re-engineering which has resulted in making banking services branchless, anytime and anywhere; facilitated new product development and; enabled near real-time service delivery. Technology has helped banks to reach the doorsteps of the customer by overcoming the limitations on physical reach in branch banking and easing the resource constraints posed by the brick and mortar model[23].

There has been a phased and gradual penetration of IT in the banks. In the first phase, banks computerized their labour intensive back office operations to trim down costs. In the second phase, banks focused on improving customer experience to gain competitive advantage. In the third phase, banks have implemented Core Banking Solutions (CBS) combining both front office and back office. This phase marked a paradigm shift and branch customers are now bank customers as they can access their accounts from any branch.

Retail banking customer channel evolution

<table>
<thead>
<tr>
<th>Customer channels</th>
<th>Bank branch</th>
<th>ATM</th>
<th>Phone</th>
<th>Internet</th>
<th>Mobile</th>
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</thead>
<tbody>
<tr>
<td>Internal drivers</td>
<td>• Sales and transaction channel to customers</td>
<td>• Reduce load on customer service staff</td>
<td>• Convenience and differentiation</td>
<td>• Lowers cost of servicing customers</td>
<td>• Extension of internet banking</td>
</tr>
<tr>
<td>External drivers</td>
<td>• A point of contact</td>
<td>• Speed</td>
<td>• Convenience</td>
<td>• Customers are internet savvy</td>
<td>• Necessity for today’s world</td>
</tr>
<tr>
<td></td>
<td>• Personalized, face-to-face needs</td>
<td>• Reluctance to queue for simple transactions</td>
<td></td>
<td></td>
<td>• Anytime, anywhere access</td>
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The spread of the internet and mobile technology has also had a transformational impact on the financial services industry. These technologies have not only increased the quality of service provided to existing customers, but also enabled the inclusion of economically weaker sections of the society into the organized banking sector. At the same time, they have reduced the cost of service delivery, contributing to the bottom line of the industry. It is estimated that the cost to the bank of a financial transaction carried out at a bank branch was approximately USD 2.50 while the cost of the same transaction, if undertaken from a mobile phone, would only be USD 0.50[24].

Key components of financial services

<table>
<thead>
<tr>
<th>Customer Touch Points</th>
<th>Customer acquisition</th>
<th>Customer on-boarding</th>
<th>Customer activities</th>
<th>Fund management</th>
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</tbody>
</table>

Source: KPMG in India analysis

Enabling technology transformations

Always connected, omni-channel customers are driving the erosion of boundaries in the financial services industry. These customers demand an engaging customer experience.

For the industry, where products are becoming commoditized, the customer experience has evolved as a differentiator. Banks are increasingly focusing on adopting measures to develop stronger relationships with their customers with the primary objective of gaining trust, building engagement and creating value to give customers an enhanced user experience. Banks are looking to differentiate themselves based on customer experience with online, social media, mobile and cross-channel initiatives. The crux of the strategy revolves around engaging customers at their convenience and through their preferred channels.

Big data

The financial services industry is amongst the most data driven industries. The regulatory environment that financial services firms operate within requires them to store and analyze several years of transaction data. The pervasiveness of electronic trading has meant that capital markets firms both generate billions of messages every day. Moreover, the increasing proliferation of social media is driving banks to keep track of their customers on these platforms to generate additional insights. This would require intensive analytics of volumes and velocity of data. In addition, as data driven as banks are, it is estimated that 80-90 percent of the data that they have is unstructured, i.e., in documents and in text form.

Banks are also discovering uses for big data outside of fraud detection. One way of using them is to try to sell customers more products. Santander Bank in Spain sends out weekly lists of customers who it thinks may be attracted to particular offers from the bank, such as insurance, to its branches. In Singapore Citigroup keeps an eye on customers’ credit card transactions for opportunities to recommend them discounts in restaurants. If a customer who has signed up for this service swipes a credit card, the system can look at the time of day, the location and the customer’s previous shopping or eating habits. If it finds that he enjoys Japanese food, it is almost lunchtime and there is a nearby sushi joint, it can send a text message offering a discount at the restaurant. That may give the bank a second transaction and a share of the extra spending.

By using big data on huge volumes of complex business data directly in the data warehouse, the Chinese bank CITIC was able to uncover useful information & predictions. It was also able to use data fully & collaboratively across a dedicated credit card centre setup especially for leveraging customer insights across the other bank departments. As a result, CITIC is accelerating its growth, and is now planning to leverage big data across its other functions as well.

Source: Alpine Data Labs, “CHINA CITIC Bank Case Study”

27 www.economist.com/node/21554743
Cloud computing

A financial services firm can benefit from cloud computing in numerous ways. Perceived cost savings, ease of scaling-up and scaling-down, faster time-to-market for deploying systems, virtualization of enterprise-wide data-as-a-service, enterprise technology standardization, and the ability to access data and applications on the move are all critical factors that can drive financial services firms to adopt cloud computing.

Newer banks, unburdened by legacy costs have already started using cloud to support core banking applications. However, for most banks, public cloud and cloud-based shared services will dominate non-core activities, from workforce collaboration to document management due to information security and data privacy concerns.

Banks are required to comply with regulations and laws which restrict the movement of client data outside their geographies. The lack of standard security practices, concerns about the implications on compliance frameworks and operational risk worries have led many users in the financial services industry to adopt a hybrid public-private cloud strategy.

Cloud computing can also play an important role in customer service delivery. Private cloud-based solutions can be deployed across the entire range of key banking functions. KPMG in India estimates that cloud computing could prove very attractive to banks and other financial institutions, mainly due the fact that it provides the next generation value in IT with innovative and flexible business models.

Optimal cloud solutions for key banking functions

<table>
<thead>
<tr>
<th>Banking function</th>
<th>Optimal cloud offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM, Customer service centre</td>
<td>Private Cloud delivering services across the enterprise</td>
</tr>
<tr>
<td>Branch and internet banking</td>
<td>Private cloud supporting standard functional suite</td>
</tr>
<tr>
<td>Mobile banking</td>
<td>Private cloud supporting standard functional suite</td>
</tr>
<tr>
<td>Content management</td>
<td>Private cloud delivering enterprise wide services</td>
</tr>
</tbody>
</table>


In 2008, as part of a massive core banking modernization program, the Commonwealth Bank of Australia (CBA) realized its existing IT infrastructure spend wasn’t delivering enough business value — half of the money spent went to basic infrastructure maintenance and provided no measurable strategic advantage. Confronted with these issues, CBA launched a massive transformation project to change the fundamental nature of its IT infrastructure from a cost center to a driver of value through business innovation. To accomplish this, CBA built a large-scale private cloud architecture on which IT now delivers everything-as-a-service. This meant virtualizing existing resources, developing a standard set of well-defined IT services based on those resources, and then making services portable.

In a landmark deal for the banking industry, the Spanish bank BBVA adopted Google Apps for 110,000 employees spread across 26 countries. As part of the deal, all customer data would remain on the bank’s servers with the move to Google services only applying to communication among staff.

Source: "Google persuades Spanish bank BBVA to use the cloud"; BBC News; 11 Jan 2012

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Social media

Social media has emerged as the platform that will decide many of the winners of tomorrow’s connected enterprise. In the area of financial services, initial initiatives saw banks seeking to understand customer opinions about bank products and service experiences. Later it evolved to a more proactive role of responding to customer feedback quickly. Today the needs and uses are clearly left to the imagination of the most fertile minds as banks world over work overtime to develop a connected customer strategy.

The emerging BRIC nations, which are going to be the next growth engines for the financial services industry, are also some of the fastest adopters of social media. With a strong base of more than 517 million social media users in the BRIC nations, it is clearly a segment that in many ways represents the customer of the future. Banks will have to develop a channel and interaction strategy that is able to address the needs of a diverse set of customers, each of them with their own set of preferences and demands. By understanding the forces underlying social networking interaction, banks will be able to craft their interaction strategy with both their current and future customers.

Mobility

Mobile is increasingly becoming the focal point of the channel strategy for banks, not only for its own adoption but also for its role as a gateway for other channels like telephony, internet or Near Field Communication (NFC). Early adoption of mobile banking was slow due to technological challenges, limited standardization, fragmented commercial efforts, and most importantly, and the lack of a sustainable business model. Even though some of these challenges still remain, a rise in commercial m-Banking initiatives across the world is a leading marker for the sustained interest of the channel’s potential. Mobile financial services are experiencing a global surge, especially in emerging markets. Global total transaction volume is expected to reach approximately USD 280 billion by 2015.

Turkey’s Akbank established a Facebook fan base of over 508,000, making it one of the “most liked” financial institutions in the world. Akbank, which has 913 branches and 15,300 employees serving over eight million customers, is effectively reaching 6.35 per cent of its base through its Facebook page, far outpacing the industry average of 0.14 per cent.

A recent survey of 35 global banks showed almost two-thirds believe that the adoption will grow to ‘medium adoption in a fairly structured way’ in the next 2 to 3 years. Also, nearly 90 percent of respondents used social networking to achieve customer engagement, with the promotion of products/services and the coverage of events coming not far behind. The opportunities for social communication, a mechanism to obtain feedback and the promotion of corporate social responsibility (CSR) strategy follow further down the pecking order.

Social media adoption in 2-3 years time

Purpose of using a social networking platform

29 “Social media in financial services”, Apr 2012, KPMG in India
30 “More than 80% of internet users in Russia accessed social media in February 2012”, Feb 2012, NewMedia TrendWatch
31 GlueReplay, Company Website
32 Capgemini: How Mobile banks can seize the opportunity
Globally, while banks in emerging nations have been early adopters in m-Banking alerts, actual transactions on the mobile are rare. Most banks have not gained a foothold in this arena because of a lack of marketing and sales effort, security concerns, as well as the failure so far to utilize channels beyond their bank branches to acquire consumers. Banks, however, have a competitive advantage over non-banks because they can capitalize on the cross-selling potential via micro-loans and can offer both disbursement notification and options to repay via mobile. Therefore, non-banks face an uphill task in monetizing their cost of consumer acquisition.

State Bank of India offers mobile banking service over application as well as WAP (Wireless Application Protocol) with GPRS connection. Using mobile banking, a user can transfer funds, make inter-bank mobile payments, make balance enquiries, request cheque books, pay bills, recharge mobile phone, and do all other m-Commerce activities.

Source: SBI Website

Augmented reality

The use of tablet devices creates new possibilities as product presentation becomes more interactive and transparent. Banks will be able to demonstrate and explain complex products without face-to-face contact. As a result, customers will become more independent of branches and their employees, of limited hours and physical locations.

Several banks in the United States already use augmented reality capabilities to power certain services. PNC Bank and U.S. Bank offer iPhone apps that find bank branches and ATMs. When the user points their iPhone in a certain direction the app displays the actual environment and a graphic that points to a branch or ATM in that general direction.

The Commonwealth Bank of Australia (CBA) has continued its efforts to put a digital spin on its brand with the bank utilizing an augmented reality app integrated with content in local papers. Readers can use the ‘News Alive’ app for the iPhone and iPad to experience a fully animated 3D masthead for each title and watch the bank’s new TV advertisement directly on the pages of the newspaper. ‘News Alive’ also showcases the featured property of the week as a 3D interactive display embedded with a downloadable CBA property guide app.

Source: ‘CBA’s ‘Can’ relaunch taps augmented reality ‘; Technology Spectator; May 2012

Current state and way forward

The financial services sector has traditionally been one of the fastest adopters of new technological trends. Over the decades, banks have continuously launched new products, from ATM’s to smart cards to internet banking; products which were possible due to the adoption of cutting-edge technology of the day. While most financial services institutions are under stress due to the prevailing global economic turmoil, they have continued to invest in technology. KPMG predicts that analytics and big data will see widespread adoption in the industry, with banks combining data from disparate sources to generate customer insights and reduce fraud. However, cloud computing will see slow adoption, with focus on implementing a private cloud model to asset rationalization. Regulatory factors and data privacy fears have restricted the widespread adoption of public and hybrid cloud models in the industry.

With financial inclusion being an increasingly important objective for banks globally, mobile devices will emerge as the next growth driver, especially in Asia, Africa and other developing regions. Reducing the cost of providing banking services is just one of the uses of mobility; mobile devices are also being increasingly used as wallets to process financial transactions. Customer will be able to use their mobile device as a substitute for a multitude of credit and debit cards that they currently carry. When it comes to social media, its use has been restricted to mainly customer service functions, with banks being hesitant to use it across other functions.

KPMG in India predicts that the Core Banking Platform is unlikely to be impacted by these new disruptive technologies, with most of these new technologies being kept separate from the core platform. This not only makes for quicker adoption of these technologies, but also reduces integration headaches and keeps the core platform focused on its critical tasks.

Over the next 24-36 months, financial service institutions will need to adapt to the convergence of these disruptive technologies. With cloud, mobility, social media and big data increasingly coming closer, and many of their uses stretching across the traditional technological boundaries, implementing solutions that take advantage of this union will emerge as a competitive advantage.
Organization level decision drivers

Every organization, however big or small is driven primarily by a set of business goals with technology as an enabler to achieve them.

The key concerns for all organizations is access to authentic customer information, 24x7 connectivity between customer and industry, an enhanced customer experience and dependence on analytics. This has led to a change in the way platforms and technology solutions are offered. Disruptive technologies such as big data, mobility, social media, Cloud, augmented reality and embedded systems have proved to be game-changers for the industry. While in the past, process automation was core for technology platforms and solutions, the need today is based more on customer expectations and experiences.
Interlinked business and technology goals

Today we find ourselves in an environment where everything we need is available at our finger tips, especially information. The consumer decision making and purchase process has been completely revamped due to advent of technologies like cloud, mobility and social media.

Delivering the digital experience of the future will call for new skills, technological capabilities such as cloud, analytics and mobility backed by new organizational approaches. The investment to ensure relevance and availability coupled with creativity will be justified by the returns organizations will reap over the next few years.

Avinash Vashistha
Chairman and GU Managing Director- India, Accenture
Shift in decision making from CIO to CMO/business heads

While CIO’s in the past led various technology initiatives and solutions with automation being the primary focus, the scenario today is very different. Today, when a technology solution is being designed for an industry, input is gathered not just from the CIO’s desk, but also from various business heads. There is a greater emphasis on business and functions providing key requirements based on demand of the hour. This new ability to turn capital IT spending into a predictably paced operational expenditure line in the budget has certainly made a difference.34 Forward-looking CIOs are witnessing a shift in their roles from being infrastructure providers to being service providers and strategists. The role of a CIO has undergone major change, wherein they now supervise operating expenditures, not capital expenditures. This has led to the CIO being perceived and valued as a strategist at the board level rather than just a technology enabler. Similarly, role of business heads has also undergone a paradigm shift. From being a leader of their business unit, they now act as partner, having major say in IT solution selection & implementations.

In this era where disruptive technologies play a major role in shaping customer expectations and experiences, it is the responsibility of the CIO to make business heads aware of the options (solutions / platforms) that are available. Businesses need to define their requirements clearly and their expectations from the solutions / platforms and provide the same to the vendors.

Role of CIO and Business Heads in solution selection

The technology solution purchase decision process shown above, illustrates the role of CIO and business heads in the same and how the impact of influencing channels on the process is critical.

34 “How the Cloud Changes the CIO-CFO Conversation,” (Maryfran Johnson, June 14, 2011)
Shift in priorities

Global businesses in this age of digital marketing and multiple web channels perceive information technology as the differentiators for success. IT plays an even more pivotal role as business begins to adapt to what is being coined “the new normal” as it refers to customer experience management and evolution of the social customer. The challenges that business faces in the new competitive landscape of the millennium are diverse and CIOs need to adapt to these changes fast to ensure that the organization doesn’t lose its place in the race for survival.35

Cloud, big data, analytics, social media and other disruptive technologies can offer huge opportunities for business heads and CIOs to help their organizations collaborate to work better, smarter and faster. Growing market dynamism coupled with continuous new technology upgrades has also led to a shift in decision making from the CIO to the business heads, especially CMO, considering that marketing function is one of the largest spenders on IT.36

The figure above illustrates the key business and technology goals for a firm and how the decision making has witnessed a significant shift with time from the CIO to the business heads’ desk. While earlier the technology vendors looked up to the CIO’s as the final authority; today, the final decision making lies with the business heads, while CIO acts as a key decision maker and strategy enabler for the firm.

The changing demand of the consumers and the attempt of industries in satisfying the same have increased pressures on IT vendors. Platforms and solution offerings are evolving not just from a technology standpoint but also from an offering and outreach perspective. While earlier the solutions and platforms were developed mainly with automation as the agenda, today it is imperative for the industry to cover all the consumer touch points, gather data from multiple channels, process the same and analyze the findings in a format that can add provide value to the industry stakeholders; going forward, the exponential rise in data volume sizes shall strengthen the case for greater adoption of cloud. Every industry needs to be connected with its customers while they are on the go. This need shall witness the rise of mobility as a result of the smart-phone and tablet boom worldwide.
As technology becomes more central in people’s lives, consumer technologies have been steadily entering the workplace and increasingly blurring the lines between home and work. This “Consumerization of IT” is increasingly playing an important role in enhancing productivity, agility, job satisfaction and workforce retention in the enterprise. With the proliferation of employee-owned devices, ubiquitous information access and the growing influence of CXOs in technology decisions, CIOs need to strike a balance between user expectations and enterprise requirements & institutionalize governance to secure business information while enhancing efficiencies. I believe there are five focus areas every business must evaluate:

- Establish policies for security and manageability of these devices, including minimum qualifying criteria to become a part of the corporate network. Policies need to be aligned to the ‘user’ or the ‘role’ rather than to the device.
- Encourage technologies that have a defined roadmap and backward compatibility to improve supportability.
- Embrace the cloud: Your employees are already using it as ‘consumers’. It’s time you enable your applications as services rendered from the cloud.
- Educate and empower business decision makers on incorporating technology requirements in their initiatives to derive maximum business value.
- Build a unified application development and delivery strategy that makes it easy to design and develop applications that secure data being shared, yet deliver it in a way that respects device form-factors and purpose.

The consumerization of IT is an important transformational force, and organizations should embrace it for the benefit of both the users and the enterprise.

Bhaskar Pramanik
Chairman, Microsoft India
Shift in offerings by vendors

It is critical for IT vendors to bring about changes in their offerings and solutions to cater to this dynamic marketplace. The key focus needs to be on better customer experience and 24x7 connectivity with the customer through channels and touch points. Businesses worldwide have moved to the online business models. IT vendors need to build strong business models with focus at the end state. There needs to be a supportive ecosystem for the new platforms and solutions incorporating the disruptive technologies in a seamless manner. Evolution needs to take place and vendors need to think ahead of the current times to ensure that their solutions support industry players to be ahead of the curve at all times.

Implication for Indian IT-BPO services providers

Digital Consumerism as a trend is playing with the consumer mindsets, patterns of purchase and decision making. To claim the larger wallet share of the customer in the future, organizations need to cater to this new buying pattern. IT-ITeS vendors need to re-examine their business goals and strategy and ensure customer touch-points and disruptive technologies form the key inputs for solution and platform development.

Digital consumers have major impact on organizations business processes. This compels organizations to re-look at company processes, delivery mechanisms and mediums of marketing and communication. While in the past, the traditional means of communication and channels were unable to capture how the customer thought, decided and acted upon his decision; the newer technologies such a Big Data, social media, mobility and augmented reality help the customer take a more informed decision and allow organizations to capture the customer feedback. This forms a vital input for future development strategies and paves the path for growth.

Going forward, the demand forecasts predict high demand for leveraging structured and unstructured analytics, facilitating an active interface between enterprises and their consumers and by formulating new innovation platforms. To cater to the ever-changing demands and expectations of the digital consumers, IT-ITeS vendors need to provide appropriate and bespoke solutions and platforms to the client organizations.

Vendors need to identify the budget allocation at an organization level on core platforms and disruptive technologies in silos and in tandem. Based on the analysis of the need of the industry for a certain disruptive technologies, the IT players need to take a call on whether they would like to bridge the gap by providing an all inclusive solution platform that caters to the end to end need of the customer or would they look at alliances/partnerships and mergers as the way forward. Based on the propensity to spend and willingness to alter their bouquet of service offerings, the vendors need to decide on the next steps.

Digital Consumerism is here to stay and it is not possible for any vendor to be oblivious of the same. The next decade brings with it a plethora of opportunities aiming at customer retention and low IT solution cost for an all-embracing platform addressing the industry as a whole. To enjoy the first mover advantage, vendors need to work towards a long term horizon wherein their strategies and solutions are not limited by the myopic challenges faced by the client industry today, but a more long-term, futuristic solution catering to the demands that might rise going forward.

Zensar has been a leader in enabling clients to adopt Cloud Social Media and Mobility into their enterprise IT architecture. The move towards cloud is inexorable and we are there in the middle of the action with many of our clients. Mobility extensions are also happening at every touch point within and outside the enterprise and many of our clients, particularly retailers are implementing a multi-channel strategy and incorporating social media into their marketing programs.

Ganesh Natarajan
Vice Chairman and CEO, Zensar Technologies

37  “Digital Consumerism”, Infosys (Sept. 2011)
The brisk pace of technology advancements, innovations and an even faster adaptation of digitization, has catapulted the industry in an era led by convergence and connectivity. Industries are making big bets on social media, cloud, big data, mobility, embedded systems and augmented reality. Focus is shifting from providing support services to strategic services, from offering business improvements to offering differentiation through innovation.

Companies across the globe are looking at ways to leverage these technologies to – introduce change, build competitive structure and propel the industry in new phases of growth. Coca Cola, for example, spent 20 percent of its annual advertising budget on social media in 2011. On the other hand, banks increasingly are seeing cloud computing as ways to bring in new capabilities to market quickly with a variable cost structure. There is a paradigm shift in company’s strategies to stay relevant and efficient to the end consumer.
Transformation in the buyer and end consumer landscape

<table>
<thead>
<tr>
<th>2006 - 2011</th>
<th>2012 - 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retail</strong></td>
<td>Customer going to shops; property and product as the differentiators, dominated by the brick and mortar system</td>
</tr>
<tr>
<td><strong>Healthcare</strong></td>
<td>Traditional model of delivering care, servicing policy holders and managing revenues</td>
</tr>
<tr>
<td><strong>Banking</strong></td>
<td>Branch banking and exhaustive use of available technology channel like ATMs</td>
</tr>
<tr>
<td><strong>Telecom</strong></td>
<td>Consumer of IT services with focus on providing voice, SMS and VAS services</td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td>Projects roll out around e-Governance, building infrastructure, integrating schemes and transferring knowledge</td>
</tr>
</tbody>
</table>

Source: KPMG in India Analysis

IT-BPO firms are deploying structured approach to gauge the implication of these new developments on customers and market through various channels:

**Leadership Team:** Firms interact with multilateral bodies to get a perspective on this

**Business Units:** Industry/domain forums; through various ‘Customer Meets’ across geographies

**Corporate Technology Organization:** R&D connects with academic research, emerging technology companies and innovation network

**Marketing Sources:** Consumer studies on emerging technologies and inputs from analysts
What is driving the transformation in the technology buyer landscape

- Community based development
- Improved literacy rates
- Influx of upper middle class with good purchasing power
- Emerging geographies

Source: KPMG in India Analysis

IT-BPO firms are focusing on reviewing their own capabilities against changing client needs and adding new capabilities either through organic or inorganic investments. Firms are successfully combining various strategies to drive rapid transformation in – implementation, service delivery and support.

Roadmap for the IT-BPO firms to tap the new growth opportunities

Organic capability enhancement

IT-BPO firms are constantly looking at avenues for building capabilities. As a part of the strategy, firms identify the gaps in the portfolio across business units. Based on the optimal fit in the strategy, firms build – platforms and extended modules around verticals, horizontals or products.

Several IT-BPO firms are investing in building a comprehensive, integrated platform of services to capture the entire value chain of IT-BPO requirements and also incorporate extended capabilities around the disruptive trends. This provision the firms to present a compelling value proposition for enterprises/clients across verticals, making them a one-stop shop for many key clients, significantly deepening the relationship and boosting the wallet share.

Advantages of organic capability building:
- Leverage internal expertise and sustained level of operational excellence
- Stickiness in the business through cross-sell and up-sell
- Enable collaboration across various enterprise functions through cross-pollination
- Reduce the risk of lack of integration
- Innovation and Intellectual Property linked growth

Source: KPMG in India Analysis
Industry examples for organic capability enhancement

**TCS - iON, TCS Small and Medium Business Solutions**

*Disruptive Technology*: Cloud

*Description*: iON - a next generation “IT-as-a-Service” business model that uses emerging technologies like cloud computing and virtualization to create a holistic, fit-for-purpose solution stack for Small and Medium Businesses (SMB) integrating hardware, network, software and services. iON services verticals, common business applications, common office applications and niche verticals.

*Pricing*: iON pricing is structured on a pay-per-user basis depending on industry vertical

*Value Proposition*: Pre-integrated platform with standard capabilities; Embedded business process; On-demand model; Compliance and Cost efficiency

**Oracle**

*Disruptive Technology*: Social Media, Cloud, Big Data and Embedded Systems

*Description*: Oracle has built Social Relationship Management Solution. It is a cloud-based enterprise social media offering. These solutions enable companies to leverage social interactions that help build stronger relationships with customers, deliver consistent and relevant brand experiences across touch points, and better engage and connect employees and partners.

*Pricing*: Oracle offers its product on a license based model

*Value Proposition*: Provide superior Total Cost of Ownership; deliver next generation cloud applications; help clients innovate faster as they adapt to a world of mobile devices, cloud computing and huge amounts of data

**Infosys - Cloud Ecosystem Hub**

*Disruptive Technology*: Cloud

*Description*: To unify the complex Cloud environment and bring to life the set of offerings from strategy through sustenance, Infosys has developed a solution called Cloud Ecosystem Hub. The Infosys Cloud Ecosystem Hub helps enterprises build and manage a unified hybrid cloud environment. It helps clients to rapidly create, adopt, and govern cloud services across their ecosystem through offerings such as Professional services for cloud and Industry leading business platforms for cloud.

*Pricing*: It is available in conjunction with the service offerings. The solution is priced and licensed either based on the IP or by transaction outcomes.

*Value Proposition*: Cost saving, accelerated time to market, improved productivity and end to end solution integrating platform, application and infrastructure.

**TechMahindra**

*Disruptive Technology*: Mobility

*Description*: Saral Rozgar is a mobile service seamlessly connecting Blue Collared Workers (like drivers, Masons, etc) to jobs of their choice. Saral Rozgar addresses the gap that exists today – creation of an organized market place for the blue-collar segment. It provides multi-language support and is a scalable platform.

*Pricing*: The service is marginally priced for Job Seekers at Rs/-1 per day.

*Value Proposition*: Rural masses can connect to the relevant job opportunities directly through their mobile phones from their villages itself. Saral Rozgar helps them bypass their literacy and awareness barrier and get employment without being exploited by the touts.
Inorganic capability enhancement

Alliances

To meet the needs of fast evolving customer landscape it is imminent for IT-BPO firms to accelerate the process of transforming the solution offerings. Firms are forging alliances across geographies/verticals/horizontals to speed up the process of deployment of new capabilities around – social media, cloud, big data and mobility. Several large IT-BPO firms on an average have 100-150 alliances to provide their clients specialized skills and tailored solutions.\(^4^4\)

Alliances are a flexible alternative to building organically, and bring synergy and decades of industry expertise together. The joint solutions offered leverage the best software, hardware and services. It provides quick and measurable return on investment by improving productivity and reducing costs.

Advantages of alliances:
- Decrease time to market
- Optimize IT efficiency and offer the best in class service/solution
- Decrease operational and management costs
- Drive business growth
- Extend ROI on existing IT investment

Source: KPMG in India Analysis

Industry examples

Cognizant Technology Solution - Monetise\(^4^5\)

Solution: Mobile Money

How it works: The alliance combines Cognizant’s financial services and mobility expertise with Monetise’s mobile money platform. This helps the clients leverage an interoperable platform instead of solutions from disparate products and mobile operating systems.

Value Proposition: Lower TCO and newer revenue streams for the clients

Microsoft - EMC\(^4^6\)

Solution: Cloud, Storage and Big data

How it works: Microsoft software including Microsoft Office, Microsoft Unified Communication & Exchange Server, and Windows Desktop and Server are optimized on EMC storage systems. This helps the clients leverage the power of Cloud and Big data.

Value Proposition: Business process, core, and application platform information optimization.

Accenture – Salesforce.com\(^4^7\)

Solution: CRM and Cloud

How it works: Accenture and Salesforce.com synergy provides a novel approach for CRM that helps organizations offer timely identification and support of service issues, whether customers choose to interact via phone, email, the Web or even via popular social networking platforms such as Twitter and Facebook.

Value Proposition: Improved customer satisfaction; simplified implementation; swift project delivery.

Adding capabilities through alliance or partnerships

Source: KPMG in India Analysis

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\(^{44}\) Source: KPMG Analysis based on the number of alliances of Top 5 Technology companies Globally

\(^{45}\) Cognizant Company Website; “Cognizant and Monetise Form Mobile Money Alliance to Help Global Financial Institutions Capitalize on the Mobile Money Opportunity,” Oct 2012, Cognizant

\(^{46}\) Microsoft website; Alliance brochure

\(^{47}\) “Service Alliance – Salesforce.com”
**Acquisitions**

Through acquisitions, IT-BPO firms seek to strengthen their product offerings, accelerate innovation, meet customer demand more rapidly, and expand partner opportunities. In an attempt to achieve financial return objectives and create value; focus on innovation, non-linear and disruptive technology has now become an integral part of firm’s philosophies.

Based on the trends and drivers fuelling acquisitions, it can be segmented in three categories: market acceleration, market expansion and new market entry.

The nature of the acquisitions over the last decade indicates the way industry has evolved. Companies are defining trends, ready to bear the risk and transforming the business model.

**Advantages of acquisitions:**
- Attain Critical mass
- Faster on-boarding of customers
- Retain existing clients with innovative solutions & compelling portfolio
- Capture the delta opportunity created by convergence of disruptive technologies
- Get “seat on a table” for end to end deals which demand a complete functional portfolio

Source: KPMG in India Analysis

**Evolution of acquisitions over the last decade**

![Graph showing the evolution of acquisitions over the last decade.]

Source: KPMG in India Analysis
Industry examples

**SAP - SuccessFactors**

*Capability: Cloud*

*Target firm portfolio: SuccessFactors is a cloud-based Business Execution Software company. It offers solution around Human Capital Management (HCM) like - business alignment, team execution, people performance and learning management solutions. The solutions are scalable and support 60 countries.*

*SAP's gain: Cloud capability; Large customer base; Application suite in 35 languages.*

**Accenture - avVenta Worldwide**

*Capability: Digital Marketing*

*Target firm portfolio: avVenta Worldwide offers digital production services to leading brands and agencies across multiple industries. It strengthened Accenture’s services/solutions for the CMO. The joint solution helps the client manage content from its initial creation to distribution.*

*Accenture's gain: Full range of services (Interactive marketing); Cost effective & quick solutions for the CMOs.*

**HP - Palm**

*Capability: Mobility*

*Target firm portfolio: Palm webOS platform and Palm Synergy provides intuitive and powerful mobile experiences. This enables the consumers and businesses to connect to their information in more useful and usable ways. The combination of HP’s with Palm’s webOS platform has enhanced HP’s ability to participate more aggressively in the fast-growing, highly profitable Smartphone and connected mobile device markets.*

*HP's gain: Expansion of HP’s mobile strategy; IP assets.*

**IBM-Vivisimo**

*Capability: Big Data*

*Target firm portfolio: Vivisimo provides software to capture and deliver quality information across the broadest range of data sources. The software automatizes the discovery of data and helps employees navigate it with a single view across the enterprise thus providing valuable insight. IBM is leveraging Vivisimo capabilities to offer a solution, with ability to explore big data stored in - internal, external and Internet-based sources.*

*IBM's gain: Accelerate big data and smart analytics initiatives; Capability in – data navigation and visualization.*

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49 “Accenture Strengthens Digital Marketing Capabilities With Acquisition of avVenta Worldwide”, Oct 2012, Accenture

50 HP website

51 “IBM Makes Big Deal for Vivisimo and Supports Cloudera Hadoop”, Apr 2012, Ventana Research; “IBM Advances Big Data Analytics with Acquisition of Vivisimo”, Apr 2012, IBM
Marketing to consumers has undergone a significant change. Consumer demographics have changed and so have the psychographics. Last couple of decades has witnessed an explosion of the ‘new middle class’ in emerging markets which is expected to mirror the consumption pattern of developed markets which are technologically more advanced. Many developing markets are witnessing a growth in birth rate and decline in death rate leading to growth of young population, while developed markets are witnessing declining births and aging population. With these changes in the demographics, the psychographics and spending pattern of consumer is also changing. Today the consumers are active, informed and assertive of the choices they make. Consumer mind-sets, their patterns of purchase and their decision making is being redefined by this new digital wave.

Conclusion
Digitally active consumers have embraced the Internet, telecommunication, media, and social spaces, changing the way consumers communicate, transact, and make purchase decisions. This is leading to the birth of an era of digital consumerism. There is a major shift in consumerism wherein the consumer today demands solutions that are unique and customized and are created taking their participation and inputs into account.52

With such significant changes taking place in the marketplace, enterprises need to update themselves in order to stay relevant. Giving digital channels to consumers, providing opportunities to network within the consumer community, enhancing their buying experience, offering personalized services & products, enabling self-service mechanisms, and engaging consumers in the co-creation innovation process are no more value added services but have become the need of the hour. Enterprises will have to go wherever the customer is going. Today’s customer is using a number of touch-points, be it mobile, web, or a social media platform. Enterprises will have to follow their customers on every media and ensure that they have a positive experience at every point. Organizations must realize the potential of this trend, broaden their outlook, and institute necessary cultural and organizational changes to become truly digital consumer-centric.

As the enterprise landscape changes, IT-ITeS vendors and service providers will also have to adapt to this new wave of consumers to stay ahead. IT vendors will have to enable their enterprise customers to stay prepared for these changing consumer dynamics. There is a need for IT vendors to work around technologies such as cloud, big data, mobility, embedded systems, social media and augmented reality to provide the new-age solutions to their enterprise customers.

Going forward, organizations need to leverage structured and unstructured analytics, ensure active enterprise-consumer interfaces, and decide on innovative platforms to reach out to the Digital Consumer. KPMG in India estimates that the future of IT-ITeS players in India and globally is dependent on how fast they adapt to these changes in customer demand. There needs to be a strategic shift in solution offerings and supportive ecosystem going forward wherein vendors provide not just the standard core industry platforms, but also think ahead of the curve. The need to bridge the gap between solutions available and the customer expectations is greater than ever before. ‘Co-created bespoke solutions’ are the way forward for vendors in this market for survival. These solutions build not just on technology but on inputs from consumers and are backed by the disruptive technologies of today and the future.

Through this report, we have tried to research and analyze the key disruptive technologies such as Big Data, Mobility, Social Media, Embedded Systems, Cloud and Augmented Reality; and their effect on key industry verticals such as Financial Services, Retail, Healthcare, Public Sector / Government and Telecommunication. The table below illustrates the level of disruption that we perceive these technologies may have on the respective sectors.

**Key disruptive technologies & their effect on industries**

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<thead>
<tr>
<th>Industry Vertical</th>
<th>Effect of Disruptive Technologies in the future</th>
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<tr>
<td></td>
<td>Big Data</td>
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<td>Financial services</td>
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<td>Telecommunication</td>
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Source: KPMG in India analysis

KPMG in India interviewed with over 20 leading IT-ITeS vendor organizations and CIO’s and other C-level executives at client organizations. Through our discussion we have witnessed a significant shift in the requirement generation for solution creation, from the CIO’s desk to the business heads (including CMO’s and CFO’s desk). This change in requirement generation is felt significantly by vendors. A number of leading vendors predicted a change in their strategies and solution development methodologies going forward in the near future. While some vendors felt that developing capabilities organically, to cater to the changing demands of the customers due to exposure to disruptive technologies, was the best way forward; there was a parallel opinion wherein vendors favored partnerships/ alliances or mergers as the way forward. While both the options are viable; it is based on the vendor’s appetite to spend on solutions and platform development and their strategies for growth.

The future holds a plethora of opportunities for IT-ITeS vendors. They need to realize the potential that the future will be across verticals and work towards creating solutions that service the digital consumer optimally and cater to the disruptive technologies that have the potential to reshape the industry going forward.
About KPMG in India

KPMG is a global network of professional firms providing Audit, Tax and Advisory services. We operate in 156 countries and have 152,000 people working in member firms around the world. The independent member firms of the KPMG network are affiliated with KPMG International, a Swiss cooperative. Each KPMG firm is a legally distinct and separate entity and describes itself as such.

KPMG in India was established in September 1993. The firms in India have access to more than 4500 Indian and expatriate professionals, many of whom are internationally trained. As members of a cohesive business unit they respond to a client service environment by leveraging the resources of a global network of firms, providing detailed knowledge of local laws, regulations, markets and competition. KPMG has offices in India in Mumbai, Delhi, Bangalore, Chennai, Chandigarh, Hyderabad, Kolkata, Pune and Kochi. We strive to provide rapid, performance-based, industry-focused and technology-enabled services, which reflect a shared knowledge of global and local industries and our experience of the Indian business environment.
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