



DISRUPTIVE TECHNOLOGY AND CHANGING CUSTOMER BEHAVIOURS

A PERSPECTIVE ON BANKING

MAY 2014

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“Advances in technology and shifts in customer expectations show no signs of abating. They bring in their wake both disruption and opportunity. We need to recognise that banking is a digital business.

To stay relevant to our customers we need to deliver what they need, where and when they need it”

Simon McNamara

Chief Administrative Officer, RBS

Executive Summary

The speed with which technology is disrupting the banking industry is unprecedented. In 2012, we described four clusters of technology-driven trends poised to have a significant impact on the banking industry:

- the emergence of the Digital Society
- the growing importance of Big Insights
- new opportunities created as Everything Joins Up
- the increasing profile of Integrity and Security

These trends have already precipitated major changes for banks and their customers, and their advancement shows no sign of slowing down.

This white paper examines the transformational impact that technology is having on banking, and how it is re-shaping customer expectations. It asserts that banking has become a digital business and the successful banks of the future will exploit technology to better meet evolving customer needs.

Fig 1 : **Four Technology Supertrends**



Digital Society - the bar gets higher

The digital revolution is well advanced. Mobile, social and apps have become widely adopted in relatively short order. They have laid a foundation for the future by driving new behaviours, models of delivery and business.

The digital society continues to evolve, fuelled by advances in technology. Customers increasingly expect their bank to provide the same efficient and seamless experience they receive from leading digital companies such as Amazon and Google. While banks have embraced digital concepts such as mobile, the digital march continues with the emergence of new technologies such as 'wearables'.

The next wave of technology will improve levels of digital engagement, including:

- better interfaces based on speech, video and game techniques
- smart technology incorporated into everyday things
- doing business through social media

Technology itself will become less of an obstacle and digital benefits will become more accessible to all segments of society. This will be at the core of customer interaction and the delivery of banking services. Banking is now a digital business – and banks need to adapt their services to meet the growing expectations of customers, where and when they want it.

Big Insights – a new basis of competition

The prospect of being completely insight-driven is becoming a reality as digital activity relentlessly generates enormous data volumes. Finding enough data is not the problem, but finding the *right* data is a challenge. Data now exists in many different varieties, much of it fast-moving with a limited useful shelf-life.

We are also witnessing a wide range of technology developments to manage and exploit Big Data – combining data sets from disparate sources, providing high speed analytics and facilitating interpretation of the results.

Being custodians of huge amounts of data, banks are sitting on a store of latent value. Some Big Data techniques are already driving internal decisions around risk management, operational efficiencies and reductions in fraud.

However, the financial services industry lags behind others (such as retail) in applying data to customer experience improvements. The first banks to get it right will create a differentiated service that could be extremely hard to copy. This will require a balancing of data privacy and ownership against a transformation in banking customer experience. If banks don't rise to this challenge, there are others who will.

Everything Joins Up - building a collaborative and open world

A vast array of connected sensors is set to bridge the gap between digital and physical worlds. Buildings, transportation and cities are about to get smart, feeding data on events, people and context into powerful analytic engines. This will underpin an increase in predictive services such as personal safety and operational service availability, and herald new business model opportunities based on blending online and offline facilities (for example, within bank branches).

Speed, cost and availability improvements in mobile and fixed line networks have triggered richer online experiences and contributed to a growing adoption of cloud computing.

The cloud model, where standard computing resources and software are accessed remotely on a subscription basis, is maturing in terms of adoption and range of services supported. Developments in highly resilient cloud and software infrastructure mean that on-premise computing requirements could shrink considerably.

Collaborative models, including cloud based partnerships are set to form new operating models and new vehicles for agile and innovative propositions. These will operate at lower costs to the user and offer greater flexibility.

While large banks have the benefits of scale, they often lack the agility and innovative mind-sets of many of the smaller players disrupting the market. To stay relevant to customers, banks need to ensure everything joins up to deliver services that are resilient, simple, efficient and, on occasion, innovative.

Integrity and Security – new threats, new solutions

A growing digital society is attracting a rising tide of increasingly sophisticated attacks from cyber criminals. Significant economic value is at stake if organisations, including banks, are unable to effectively defend themselves against these incidents. Added to the risk of lost business are the growing costs of detection and remedial action.

New immature consumer technologies are vulnerable, for example many are shipped with insecure configurations. New computing models such as cloud also bring increased points of potential exposure.

This contributes to a position where traditional models of monitoring perimeter security are being replaced by active defences in a multi-layered approach. Security intelligence is critical to aggregate and analyse information about potential attacks and strengthen defence systems.

As we use multiple devices and digital services, a proliferation of digital identities and associated passwords is compromising customer experience and security. In response, new models of identity, trust and authentication are gathering pace. In a sector such as banking regulatory and customer forces necessitate the highest levels of security and integrity. Investment in robust and agile defence, staying one step ahead of the cyber criminals, is paramount.

Technology – a force that is redefining customer expectations and disrupting banking

The entire banking ecosystem is extending; new entrants are disrupting the market, new partnerships are forming and new propositions are materialising.

A new type of customer is emerging – one that is confident, better informed and connected. The ways in which people communicate, collaborate and make decisions have changed. These digitally empowered customers expect banks to deliver services on a par with the best experience from other industries.

It is extremely unlikely that we have reached any kind of endpoint. The banking industry is transforming. The rapid growth in technology innovation has reduced the barriers to entry. Relatively small start-ups can now take on large incumbents, cherry-pick pieces of the value chain and shape customer expectations.

To meet the combined challenges that these trends bring, banks need to embrace technology to stay relevant to their customers and deliver a simple, reliable, safe and engaging experience. The banks that achieve this will steal a march on the competition.

Section 1 DIGITAL SOCIETY

THE BAR GETS HIGHER

The next wave of emerging digital technology includes interface design, sensor proliferation, device evolution (such as wearables) and social business.

The digital revolution shows no signs of abating. In recent years, our society has undergone a technology shift with widespread adoption and use of mobile, social media and apps.

These technologies have moved from being the preserve of technophiles to being accepted as part of normal experience in relatively short order. They have laid a foundation for the future by driving new behaviours, models of delivery and business.

Every company is now a digital company and user experiences from leading digital organisations, such as Google and Amazon, are influencing the expectations that customers have of other industries such as banking. Services now need to be clean, simple, instantaneous, intuitive and user-friendly – and the bar is getting higher every day.

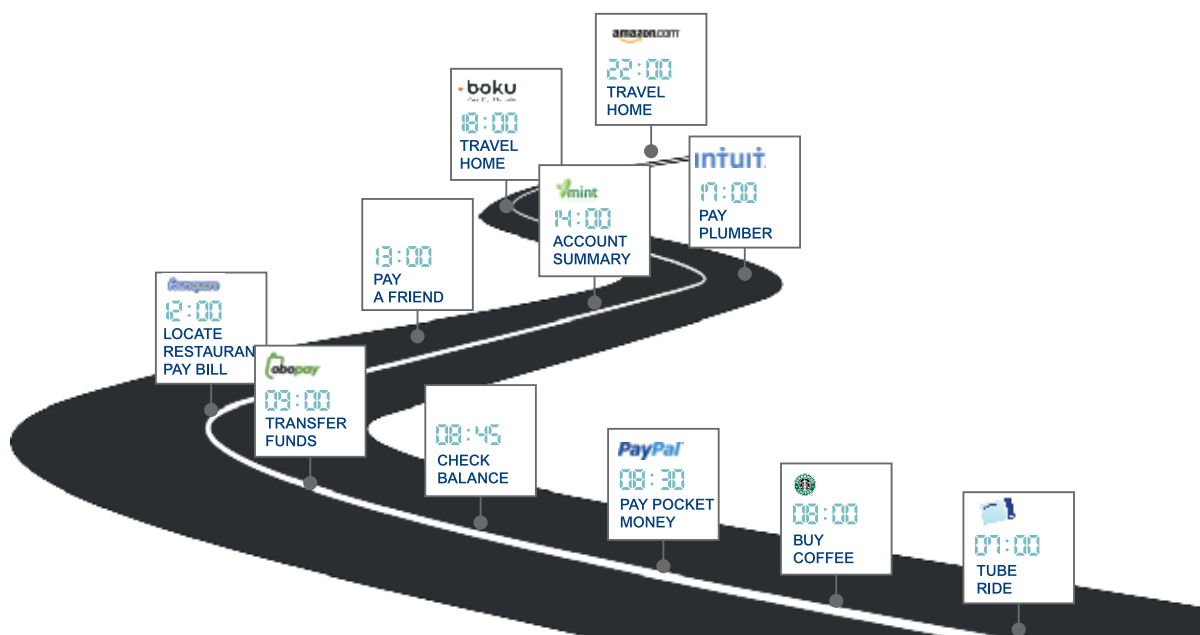
Nothing is static in this environment and having already experienced the latest wave of technology-led transformation, it is clear that further change lies ahead. The next wave of emerging digital technology includes interface design, sensor proliferation, device evolution (such as wearables) and social business.

The biggest disruptions will redefine traditional ways of doing things or shape completely new opportunities.

Taking digital engagement seriously

Penetration of digital has soared in recent years bringing big shifts in customer experience – the number of networked devices today exceeds the global population, reaching 10 billion in 2013. By 2015 this number is predicted to be double the global population¹. In the UK, people spend an average of 16 hours per week online² and the majority of people search online before making a purchase. People now live digital lives (see Figure 2).

Fig 2 : An example digital day



- 1 Cisco
- 2 Ofcom

Digital capabilities are so firmly embedded in everyday experiences that things which seemed incredible just a few years ago are now commonplace, such as Googling, Skyping and Tweeting. We have already shifted our patterns of communication and entertainment. Ofcom found that 36% of UK adults are internet browsing while watching television³. This pattern of behaviour is referred to as 'media meshing', where we undertake activities on a mobile device directly related to what we are watching on TV, for example using interactive apps or social networks.

Video represents more than 50% of all content flowing across the Internet

While digital has clearly caught on, it is still evolving. The digital experience is very often a straight translation of the conventional real world equivalent - complete with delays, physical inputs and handoffs. The problem is compounded by carrying forward the worst aspects of the human-computer interface – for example the move to mobile often requires typing on tiny screens. Customers are becoming much more discerning about the quality of the digital experience on offer and less tolerant when it doesn't go their way.

Technology has not yet successfully replicated the rich experience customers have when dealing face-to-face, but new developments are making digital interactions more productive and engaging. Ultimately, the digital society will become more inclusive as the technology itself becomes less visible and the experience becomes increasingly accessible and natural.

Video drives new models of customer engagement

One near term shift is the growth in video. Video is now the largest content type on the Internet, whether user-generated (e.g. Youtube), advertising or commercial content such as Netflix. It represents more than 50% of all content flowing across the Internet and is driving new engagement models. Amazon Mayday is an example. It provides instant live video support on Kindle tablet devices, turning customer support into great customer experience.

Video is also starting to impact banking. New ATMs that allow the customer to hold a video chat with a bank representative are being rolled out by banks and credit unions in the US – providing 'face to face' banking services where a branch would not be viable. BBVA Compass is testing a drive-through branch in the US with video conferencing tellers. Nationwide and Santander are incorporating video capability within UK branches to allow customers to benefit from expertise beyond the branch. Expansion of 3G and 4G cellular services also mean that video is increasingly viable on mobile devices. As a result, customer expectations are set to grow quickly.

Beyond video, natural language interfaces, coupled with machine learning and extensive information resources, can approximate a conversation. This is enabling virtual assistants to interact in a human way and deliver consistently high levels of service.

Over 1800 [banking transactions] are now conducted using internet enabled devices every minute, with daily usage having doubled over the last year.

British Bankers Association, March 2014

Gamification grows up

Gamification is another way to help people remain digitally engaged. It builds upon familiar concepts of competition and reward and applies them to unfamiliar contexts to improve user experience and engagement, for example Samsung awarding points and badges to customers using their website.

Gamification can also be deployed inside the workplace. Gartner considers gamification as a “powerful tool to engage employees to develop skills and drive innovation”. It predicts that by 2020, with the emergence of technologies such as gesture control and augmented reality, gamification will become commonplace in our daily lives.

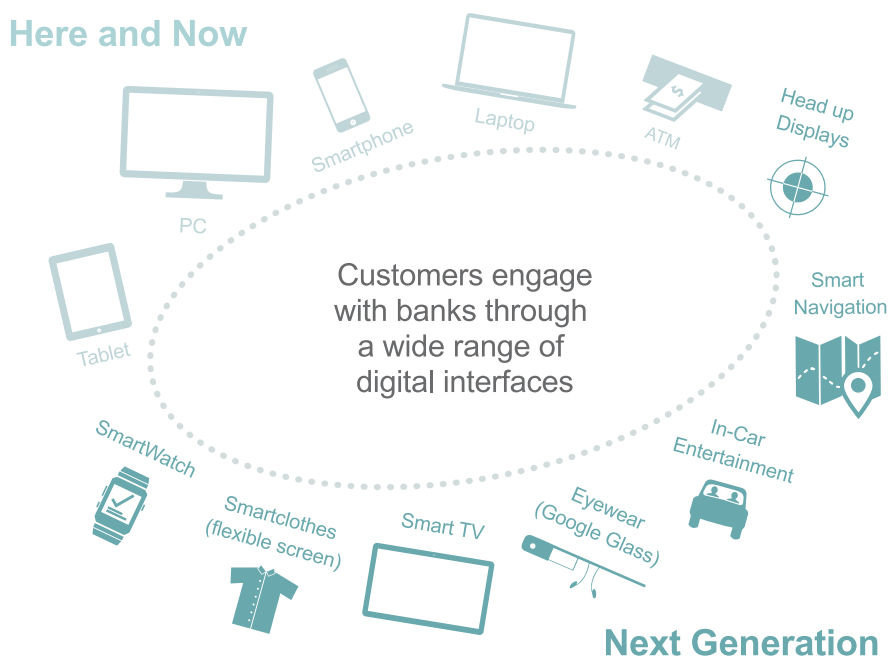
The adoption of gamification in banking is limited but interest is growing for example, it is used to support financial education initiatives. An Infosys study on innovation and gamification in banking concluded that 9% of 160 banks surveyed had implemented some form of gamification, and another 35% said they are planning to do so in the next two years.

The next generation of mobile is wearable

Ongoing device proliferation signals a growing digital society. A new generation of devices (with “wearables” taking centre stage) is building on the rich ecosystem we already have – guaranteeing the ability to capture and communicate information wherever you are (see Figure 3). Wearable computing was the top trend to emerge from the 2014 Consumer Electronics Show in Las Vegas – from t-shirts that track your heartbeat to a smart baby onesie.

Fig 3 : Growing range of digital devices

Customers engage with banks through a wide range of digital interface



A number of technology advancements are driving developments in wearable technology, including:

- new materials and fabrication techniques
- size and cost reductions in sensor technology
- improved battery life

First generation formats, such as the smartwatch and Google Glass, provide relevant information with just a tilt of the wrist or a glance. There is no requirement to unlock a smartphone or open an app – for example a subtle vibration and a glance at your smartwatch confirms a payment has been made and displays an updated balance. In the right context this improves digital interaction and awareness, bringing new meaning to the ‘always-on, always-available’ society.

Wearable devices can also capture data about physical condition and activity, building a picture of the ‘quantified self’- a term which describes the use of technology to acquire and report data on aspects of personal life. For example, the Sony Core SmartBand allows tracking and logging of various aspects of daily life from the information viewed online to the music and videos consumed. This data is used to predict patterns of behaviour and mood. Personal logging activity also develops greater understanding of how time and money is being spent.

The first basic banking applications are beginning to appear for wearable devices. A new banking app for the Pebble Smartwatch allows users to view their bank balance and recent transactions, and will vibrate if the user nears their overdraft limit. Westpac in New Zealand is testing the Google Glass version of its Cash Tank mobile app, which lets customers check balances without having to log into their accounts.

These are simple extensions of existing functionality; the challenge is to blend the innovative capabilities of wearables into banking experiences that customers really value.

The television reinvents itself as a connected device

The notion of a television as a passive receiver for broadcast content is changing as connected Smart TVs gain traction, delivering interactive content on-demand. High-definition large screen formats in group or family settings contrast with the personal use characteristics of tablet devices, improving experiences such as group video conferencing from the home.

A connection means that tailored engagement can be initiated while watching broadcast TV – for example, giving the option to click to connect to a video call with an advisor. Even content creation is influenced by viewers as their preferences are monitored or explicitly canvassed.

An upcoming high-resolution television format (8K TV), which has definition 16 times greater than current HDTVs, will offer audiences an immersive experience, building higher levels of engagement.

One in ten households has more than one tablet, and two-thirds of tablet owners use their device on a daily basis, with two in five using it multiple times during the day.

Ofcom Communications Report 2013

In just four years, almost half the population of the UK has a tablet. It took fourteen years for mobile phones to become that popular.

*CSS Insights,
January 2014*

Cars get smart

As the Internet of Things emerges (see Section 3) and business models change, even the cars people drive are getting smart. A number of car manufacturers are partnering with major technology firms to embed online services into cars, building on the app ecosystems with which consumers are already familiar.

This is expected to integrate common smartphone capabilities such as voice control to locate a relevant service (e.g. a restaurant) and plotting a route to get there. Future capabilities include self-driving cars which will simply drive you there when instructed. Other in-car facilities are likely to include extended entertainment screens or remote-working facilities – particularly when the driver no longer has to drive!

All these developments contribute to growing customer expectations for services to be delivered in context and on-demand.

Social networks are increasingly an integral part of business life

The value that individuals discern from social media content has matured. A better awareness of provenance and motivation has encouraged evaluation and filtering of content. Social media remains a key consultation point when searching for information.

While social media had its origins in predominantly personal interactions, there are signs that business use is also growing – both within the enterprise and between enterprises (business social networks). Businesses also exploit personal social media, often focused on sentiment analysis for better customer insight and promoting brand presence.

Organisations such as Coca-Cola and Lego are using social media inputs to develop new products and re-design customer experience, benefiting from the zero-cost real-time nature of the network.

Although the regulated nature of the banking industry limits the range of permitted activity, banks are expanding their use of social media. Spanish bank BBVA first experimented with social media in 2011, asking customers to help design propositions and launching its platform for crowd-funding. Outside of the UK, a few pioneers have started offering some banking functions through social media channels, limiting risk by restricting the service offered. This enables them to stay relevant to those customers who spend significant proportions of their time on the network.

AXA Banque launched their mobile-only bank 'SOON.fr' based on making open APIs available and engaging external developers through social media (see Section 3 for further information on APIs). As a result, they have implemented a number of innovative features such as a safe-to-spend balance. Future plans include integrated PayPal transactions and transactions organised by customer preference⁴.

In the US, banks have started to use targeted advertising, leveraging the data and tools Facebook and others provide. Banks are using social media to support their small business customers, and in the process build loyalty and strengthen their

⁴ *The Economist Intelligence Unit, How regulation, client expectations and technology are transforming retail banking, 2014*

relationship. Social CRM is also being used to enrich customer data with social media data. This rich information can be used in many ways such as improving risk assessments and shaping more effective customer interactions. For example Moven Bank in the US utilises social data as part of credit assessment.

German online bank Fidor provides a full range of banking products, with no branches and a community of 250,000 people who exchange opinions and comments. Fidor makes extensive use of social media. Community participants can earn cash by answering questions posed by others, sharing saving tips, and rating financial advisors. Social is designed into new campaigns – in 2013, according to the FT, their current account interest rate rose by 0.1% for every 2000 Facebook likes.

7% of UK consumers had a Smart TV at the end of March 2013. Of those 77% have connected it to the internet.

*Ofcom Communications
Report 2013*

Social on the inside

Social techniques can unlock corporate knowledge and creativity by enabling collaboration on a huge scale inside the organisation. We are beginning to see structured methods and tools that embrace this approach, including ideation and knowledge-sharing applications. A recent development is the emergence of Social BPM, which combines Business Process Management with social software.

Social BPM can help businesses achieve competitive advantage by capturing and broadcasting the knowledge and opinions of many individuals on how things are done or should be done.

Different views can be played out through a social dialogue until a common position emerges, which informs business process improvement. The technique, which builds on the greater propensity people have to contribute their views in a social media context, can be applied to many situations.

Alternative finance models in the Digital Society

Fundamentally, banks have traditionally intermediated between those with excess capital and those who seek capital, but the role of the bank is coming under pressure as a consequence of disruptive technology. High levels of connectedness and information sharing in the digital society have already spawned alternative business models to traditional banking products. These are not insignificant developments.

In the peer to peer (P2P) model, pools of online borrowers and lenders can find each other via heavily automated platforms, assisted by risk mitigation tools, with prices and rates that compare favourably with bank equivalents. The process is designed to execute smoothly, exploiting technology that has become second nature for many people.

In 2013 peer to peer lending volumes grew by 126%, to stand at £287m. Peer to business lending grew by 211% in the same period to £193m⁵. Though still relatively small in absolute terms, this level of growth suggests that the P2P model is poised to take a substantial slice of term lending within the next 5 years.

The Digital Society is a moving target

Many developments are driving the digital society, which has a way to go before reaching maturity. In that time some technologies may fade away having made little impact, and others will take hold.

These developments are fundamentally changing the way customers and banks behave. The advances in technology and shifts in customer expectations show no signs of abating. They bring in their wake both disruption and opportunity. Banking, like almost every other business, is now a digital business.

⁵ Nesta, *The rise of future finance*, December 2013

Section 2 BIG INSIGHTS

A NEW BASIS OF COMPETITION

Big Data, when sensibly integrated with core, channel, and decision support systems, holds the promise for enabling the survival of financial service companies

Celent 2013

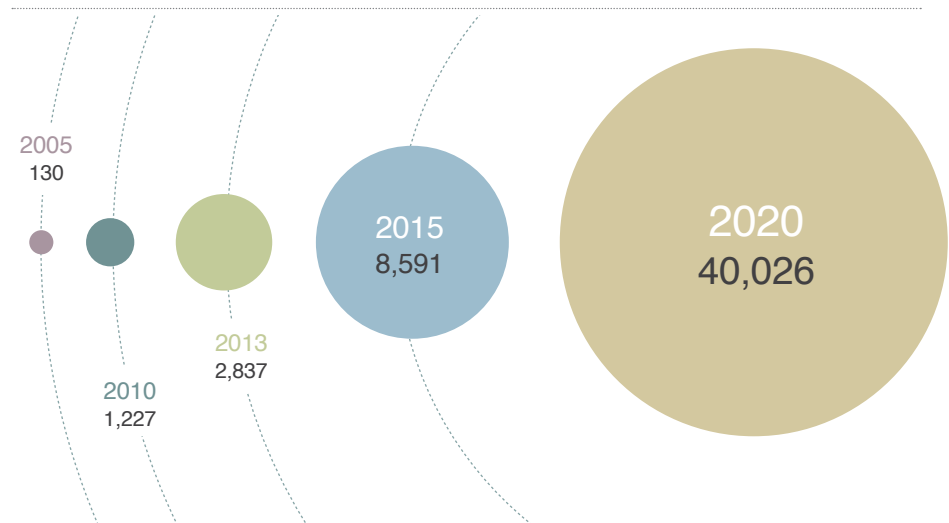
The landscape of data continues to evolve rapidly and the relevance of data to banks and their customers is higher than ever before. Banking operates under increasing regulation which results in commoditised standard products. Innovative use of data will be key to differentiating customer outcomes and competitive advantage. The '3 Vs' of Big Data continue to expand – volume, velocity and variety. Predicted advances in tools and analytic techniques are maturing and new technologies are presenting fresh opportunities.

No let-up in the torrent of data

The volume of data generated today is astonishing, and the rate of increase is exponential. Gartner estimates that the size of the digital universe is doubling every 24 months, and IDC research estimates that there will be 40,000 exabytes of data by 2020 (see Figure 4). To put this in perspective, this is a 300-fold increase between 2005 and 2020 in the volume of digital data in existence.

Fig 4 : The Digital Universe⁶

Every 3 seconds we generate the same volume of data held in the entire British Library



Increasingly, data has a certain velocity or shelf life; some data is only useful for a certain period of time. Examples include geo-spatial updates from mobile devices and machine-generated information such as stock market updates. With increasing automation across society, the age of data needs to be considered to determine if it remains relevant.

Unstructured data is becoming the larger proportion, relative to structured data, and most data today is produced outside the enterprise. The majority is produced by consumer activity, such as videos, photos and social media activity. This contributes to the digital exhaust, an increasingly sizeable trail of digital information left behind by individuals' activities both online and in the physical world. 75% of data is estimated to be produced by consumers, with a fair proportion of the other 25% being about consumers.

⁶ Figure adapted with permission from IDC

Crucially, data is produced in an ever-wider variety of formats. Part of this involves the increasing range of data sources, as for example governments make public certain very large data sets such as census data. Similarly, consumer devices are evolving to become packed with data-producing sensors, which are predicted to multiply with the rise of wearable computing, leading to a flood of rich data (Section 3 describes growth in sensors in more detail).

Most firms estimate that they are only analysing 12% of the data that they already have, leaving 88% of it on the cutting-room floor.

*Forrester Research,
February 2014*

Handling the torrent of data

Collectively, these changes in volume, velocity and variety result in several challenges in managing Big Data. The data from within the enterprise must be augmented with data from outside, but the difficulty lies not in finding enough data, but in finding the right data – and the ‘right’ data may be different every time. Volumes of data are rising faster than the falling unit costs of storage, so judging which data should be stored is becoming more difficult and may carry a significant price tag.

For some data, the challenge is to match the velocity of data to the window of opportunity. Customers increasingly expect near real-time responses and decisions which demand significant Big Data capabilities. Correctly handling high velocity data will provide fresh insights into customer behaviour with consequent opportunities for timely, accurate and relevant interactions with those customers.

Banks still rely largely on batch processes for core banking data and across the sector the pace of change is slow. The costs to move to real-time platforms are significant, yet competitive pressures are building, with more agile firms already leveraging available Big Data technologies to provide customers with near real-time decisions.

New tools and approaches make sense of the torrent

There are a number of significant technical capabilities shaping how we use and experiment with data.

One of the biggest challenges facing the enterprise is how to store and analyse large volumes of unstructured data. In response to this, ‘NoSQL’ databases have been developed which are non-relational databases that specialise in storing data without a fixed structure, or schema. This is not something that can be done easily using traditional relational databases. In particular, video, audio, photos, documents and other large and varied data types do not fit into the rigid structure of relational databases. NoSQL databases have been developed to be cheap, flexible and highly scalable, taking advantage of commodity hardware and cloud availability, and able to store almost anything.

The challenge of delivering real-time responses is driving developments in processing streams of data, helping to support real-time decisions for customers and improve operational efficiency. Streams supply data in high volume, constantly and at pace, often 24x7 (for example the rapid rise in machine-generated data from sensors and applications being carried and used by customers). It is not feasible to use traditional techniques of storing and analysing a fixed data set, and so stream processing involves capturing and analysing the constant data stream on an ongoing basis and providing actionable real-time conclusions from the data.

Data often sits in silos, making it very difficult to share it across the organisation. Data combined from multiple silos can help your organisation find answers to complex questions that no one has previously dared ask or known how to ask.

*Forrester Research,
February 2014*

Data visualisation tools are also achieving widespread recognition, helping non-specialists to make sense of the data available to them. Data visualisation translates complex data by using easy to understand graphics, which can be manipulated to examine the data in multiple dimensions.

The Cloud opens up Big Data opportunities

Many Big Data technologies are available as cloud-based services. These include storage, warehousing and analytics. With such advanced capabilities available as pay-as-you-go cloud services, Big Data has become yet another area where the cloud has levelled the technology playing field.

There are many external sources which provide data that banks can use to benefit customers. As mobile devices are used more in the payments ecosystem, for example, a great deal of high velocity data will become available. As other types of devices evolve and become 'smart', consideration needs to be given to how this data can help gauge customer context and anticipate customer needs and desires.

Banking faces opportunities in the shape of new data sources, new combinations of data, and applying more data to the problems at hand in order to better serve customers. Evolving technologies assist by enabling the ever-faster acquisition and analysis of data.

Unlocking the Value from Big Data

For banks, the ultimate goal is fresh knowledge and insight with which to compete and better serve customers. In an era of demand for personalisation, effective use of Big Data can help banks create more relevant and compelling customer experiences and enable personalisation on a much greater scale. Better data supports better decision-making for customers and new technologies can enable this in near real-time.

Banks also stand to benefit from better use of data through better risk management, greater operational efficiency, improved compliance and a reduction in fraud.

To unlock the value of the data contained in their huge number of legacy systems, banks essentially face a choice: re-engineering of these systems at great expense and risk, or using contemporary capabilities such as data virtualisation to make the data accessible (data virtualisation is a technology approach which creates a layer between front-end applications and complex sources of data, making it easier to access data, thus reducing costs and increasing flexibility).

Data recognisably has value in two main ways. Firstly, using technologies as described above, it may be analysed to gain insights which may be turned into value. Secondly, it may trade as an asset: bought, sold or exchanged. However, calculating the precise value of data is often difficult, since it will depend on the context for both buyer and seller.

There are also significant legal and regulatory concerns to be observed about selling customer data. However, initial steps have been taken by some organisations to explore this option, for example some banks are selling reports based on anonymised and aggregated customer data.

Data management questions are still to be resolved

Data ownership is migrating back to customers and individuals. Recent events concerning state security agencies monitoring of internet data have led to lengthy debates at the highest levels of governments around the world. New laws and tighter regulatory regimes are expected which will increase the rights of individuals in the privacy and security of their data. Banks have traditionally been viewed as highly competent with respect to data security and privacy, and so there may be an opportunity for banking to play a leading role in the stewardship of customer data.

There remain ongoing data management questions. How do we measure data quality, assure it, and communicate it to customers and regulators? How do we assess data provenance? How do we measure the gaps in our data, and how much data is not enough, or too much? As customers become increasingly data-savvy and regulators take ever closer interest in data management, it will be essential for banks to ensure that they hold accurate, up-to-date data from reliable sources, in the correct quantities, and use it transparently for appropriate purposes. This is vital for generating customer trust.

New entrants in financial services are creating innovative services by leveraging the widespread accessibility of Big Data capabilities, combined with data from new sources. Banks have the advantage of having a lot of data, although it is often under exploited. Where new entrants create new services, banks are at risk of losing sight of valuable customer data. With that in mind, banks may prefer to consider partnerships with smaller companies that specialise in data, to ensure that all possible courses of activity are explored.

Where new entrants create new services, banks are at risk of losing sight of valuable customer data.

What should the banking industry focus on?

To get value from data, banks need firstly to be aware of its existence and know the permissions for its use. Even taking into account legal and regulatory guidance, banks will have to start asking more detailed questions about customers' permission to use their data in a range of circumstances.

The availability of many data services through the cloud means that banks and large enterprises do not have a monopoly on these capabilities. A wide range of cloud-based Big Data services are now available to individuals and companies of every size, limited only by ability to pay and to understand what they are doing. Smaller, agile companies are likely to already be using data to identify profitable parts of the banking and customer ecosystem and make a data-driven play for them.

Data continues to change and grow in all dimensions and the tools for handling and analysing it are evolving. The key opportunities for the immediate future are effective use of unstructured data, *real-time* data and *contextual* use of data to create value.

The rapid pace of data technology is creating skills shortages. Banks may be able to avoid the worst of the shortages by developing data science skills internally and by recruiting relevant graduate skills. Failure to develop and maintain access to the required skill sets will place organisations at a competitive disadvantage.

Data has the power to generate big insights, and big insights can make banks smarter, safer and better for customers.

Gaining tangible value from data is apparent in many sectors such as retail and healthcare, but banking continues to lag behind due to issues of legacy systems, heavy regulation and more recently, customer trust. Banks must tackle these issues and actively use data to focus on customer outcomes. Many aspects of banking have become commoditised. One key differentiator is the data banks hold and the way that they use it. Data has the power to generate big insights, and big insights can make banks smarter, safer and better for customers.

Section 3 EVERYTHING JOINS UP

BUILDING A COLLABORATIVE
AND OPEN WORLD

Globally, the number of people with Internet access has reached 2.7 billion.

Sensors are found in cars, consumer goods and appliances, buildings, and potentially anywhere that might supply useful data.

Boundaries are blurring between online and offline worlds of activity. This change is fuelled by the relentless proliferation of internet-connected devices, the data they generate and the online services they facilitate. Consumer technology is providing a wealth of engagement opportunities through an expanding range of interfaces from smartphones, to cars, to wearable computing. Advances in cloud computing and virtualisation continue to change technology delivery models from infrastructure through to software. This in turn is lowering technological barriers to entry, fuelling a trend for services to move online and increasing convenience for customers.

The next generation of connectivity

As outlined in Section 1, the online world continues to expand with an increasing trend for consumers to behave 'mobile first'. Enormous smart device application ecosystems provide customers with access to a bewildering array of online services and entertainment.

Internet infrastructure is the vital physical service which underpins voice and data telecommunications and is continually becoming faster, more reliable and cheaper. Globally, the number of people with Internet access has reached 2.7 billion, and is rising steadily as undersea cables and long-distance fibre optics reach more countries and cities. 99% of Internet traffic is carried by undersea cables and capacity is scheduled to more than double between 2013 and 2015.⁷

In the UK, the population benefits from compact geography which facilitates relatively high levels of connectivity. Large scale 'local loop' improvements facilitate high-speed internet access to the home. 80% of UK households now have internet access and 72% of households have broadband.⁸

Over half of UK adults have internet access from a mobile device. 4G services are rolling out nationally, 4.5G is piloting and 5G services are expected around 2020. These developments offer faster connections than ever before (goodbye buffering) and the ability to use lots more data (hello video and rich content).

The Internet of Things emerges

The predicted Internet of Things (or Internet of Everything) envisions a huge rise in machine-to-machine communication as sensor-laden devices become connected to the Internet, enabled by short-range, low energy technologies such as RFID⁹, NFC¹⁰ and Bluetooth Low-Energy¹¹.

These sensors are found in cars, consumer goods and appliances, buildings, and potentially anywhere that might supply useful data. Much of this communication is real-time and machine- to-machine, creating smart networks which synthesise information.

⁷ TeleGeography Research, *Submarine Cable Networks & 'Seacable Map 2013'*.

⁸ Office for National Statistics, *'Internet Access - Households and Individuals 2013'*.

⁹ RFID (radio frequency identification) is a system used to track objects, people, or animals using tiny tags that respond to radio waves

¹⁰ NFC (near field communications) is a set of standards for smartphones and similar devices to establish radio communication with each other by touching them together or bringing them into proximity, usually no more than a few inches

¹¹ Bluetooth Low-Energy Bluetooth low energy wireless technology consumes only a fraction of the power of Classic Bluetooth and extends the use of Bluetooth wireless technology to a range of devices - in many cases making it possible to operate these devices for more than a year without recharging.

This technology can bridge physical environments and the personal devices we carry, triggering interventions and offers.

One early example is the Apple iBeacon, which uses low-energy Bluetooth connections to transmit messages or prompts directly to a smartphone or tablet within a 100m range. It is now being trialled by a number of retail outlets such as Apple stores to facilitate payments and provide customer offers. Sensor technology is poised to transform how we behave as customers and suppliers at physical locations such as shops, bank branches or ATMs (see Figure 5 for a branch banking illustration).

In the US, Macy's was the first to install iBeacons transmitters to track shoppers' movements throughout the stores, serving up different offers based on the department the customer is in¹².

In the US, Macy's was the first to install iBeacons transmitters to track shoppers' movements throughout the stores, serving up different offers based on the department the customer is in.

Internet-connected devices are predicted to increase from 10 billion in 2013 to 50 billion devices by 2020.

Fig 5 : iBeacon in branch banking



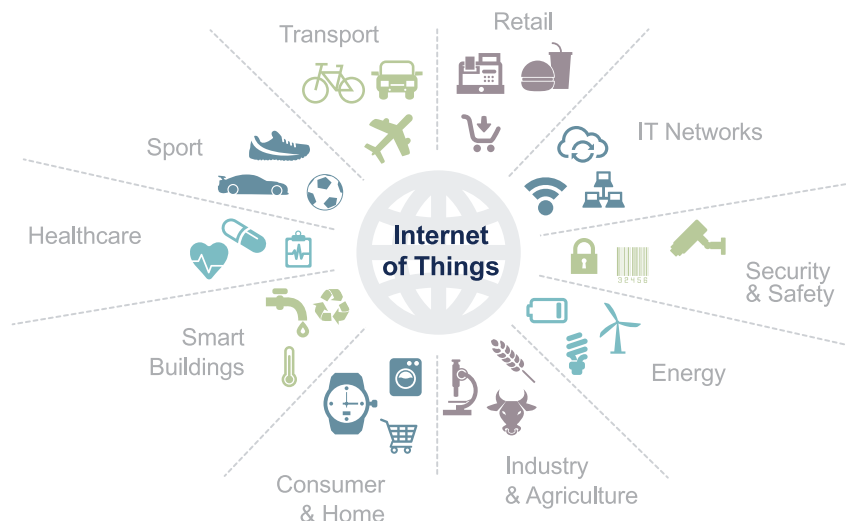
Internet-connected devices are predicted to increase from 10 billion in 2013 to 50 billion devices by 2020¹³. This will drive the move to the next version of the IP network protocol used by the Internet, IPv6, so that there are sufficient IP addresses for the predicted explosion in connected devices.

The Internet of Things affects many markets (see Figure 6) with sensors feeding powerful analytic engines. The resulting data has an enormous range of predictive uses such as personal safety, operational service availability, transport reliability, health monitoring and device failure prediction. In particular, the Internet of Things will underpin increased automation of many everyday tasks and activities.

¹² Apple Insider, November 2013

¹³ Cisco, "The Internet of Things", July 2013

Fig 6 : Internet of Things



An example of this change is the management of vehicle insurance risks. Sensors will detect locations, times, levels of acceleration, cornering forces, fuel consumption, overall speed and maintenance tasks, which will contribute to a picture of how a vehicle is both owned and driven. This allows appropriate pricing for risk, not just for insurance, but for other services such as breakdown cover. Such offerings already exist on an opt-in basis for insurance and are likely to expand in the near future.

The nexus of connectivity, smart devices, and the Internet of Things is prompting technology companies to place bets outside their traditional areas. For example, Bosch has created a 'Connected Devices and Solutions' subsidiary intended to make devices and objects 'intelligent and web-enabled'. Google has recently purchased the intelligent home thermostat company NEST, the artificial intelligence company DeepMind and robotics firm Boston Dynamics. Connected consumer markets are evolving based around the home, health, and transport, which will have multi-interface significance for how customers access banking services.

Next generation web interfaces arrive

The proliferation of devices available to customers means that it is becoming too expensive to design services based on specific device interfaces. Banks will have to embrace technologies which are intelligent and adaptive enough to automatically account for the interface that the customer happens to be using at any given time and place. Technologies with this design goal include HTML5, the next-generation language of the Web, which effectively reduces the functionality gap between mobile websites and the rich mobile experience people enjoy with native apps. It also facilitates a build once, deploy everywhere model, which reduces costs and increases agility.

The potential for cognitive computing

Cognitive computing seeks to harness a range of underlying technologies from powerful hardware to data analytic techniques, combined with rapid advances in natural language processing capabilities. It aims to process data of all sizes and types by mimicking the ways that a human might do so, finding relationships, insight and answers in the data and delivering them in an engaging manner.

IBM Watson, made famous by winning the American game show 'Jeopardy', combines natural language processing, machine learning and hypothesis generation and evaluation to give direct, confidence-based responses to questions. It is finding success in the health sector, with some experimentation also underway in the financial services sector.

While these services have not yet experienced their touted levels of success, capabilities are improving fast and are predicted to have an important role in the future, particularly where other input methods are constrained for instance due to small size or situational context. Banks have an opportunity to unify and simplify 'voice' capabilities from legacy systems and in conjunction with other interface advances, to provide customers with context aware and highly personalised services. In the future it is likely that the performance of virtual assistants will be difficult to distinguish from human advisors.

Cloud gets serious

Virtualised capabilities and cloud-based service models are simply a new set of capabilities in the architecture toolbox, but they have the power to radically change the flexibility and agility of businesses.

There is a continuing trend for day-to-day services to move online. Services such as banking and insurance, utilities, education and government services are offering greatly increased convenience for customers, and reduced costs to serve for organisations. This pace of change is especially quick in areas such as online and mobile payments. In large part, this trend has been facilitated by the coming-of-age of cloud computing. The cloud has provided, as VISA Europe puts it, an "ever increasing abundance, availability and affordability of compute power", to every company regardless of size, powering innovative start-ups, enterprises and governments alike.

Cloud computing is moving into a new phase. The key question in large enterprises has changed from "should we use cloud?" to "how can we use cloud?". This change has come about through a number of factors:

- successful enterprise experimentation with cloud services
- observation of how innovative smaller companies are making use of the cloud
- recognition of fundamental changes in the technological ecosystems which are underpinned by the cloud – changes in the internet itself which are here to stay
- increasing confidence that there are workable answers to long-time issues such as security and privacy

Cloud computing is an umbrella term which covers a range of capabilities from infrastructure to software delivered over the internet'. Regulators of financial services are becoming proactive in articulating how use of the cloud will affect banks' obligations towards their customers. Specifically the location, transfer, and security of customer data are top concerns. The Dutch regulator in particular has adopted a forward-looking stance by authorising Dutch banks to deal with an approved list of cloud vendors.

Accenture estimates that by 2016, enterprises will devote 14% of their overall IT products and services spending to cloud and 46% of their new spending will be on cloud-enabled technologies. Initially influenced by the economic and political climate, banks primarily focussed on cost reduction as the main benefit of cloud computing. This has now started to change as banks begin to recognise that increased business agility is a larger long term advantage provided by the cloud.

Accenture estimates that by 2016, enterprises will devote 14% of their overall IT products and services spending to cloud and 46% of their new spending will be on cloud-enabled technologies.

Consumers... will demand a consistent and contextual way to control all of the products, devices, and services they use — an interface that factors in where they are, what they are doing, their preferences, and their immediate situation.

*Forrester Research,
January 2014*

Opening the doors to new service opportunities

The social networking revolution has been a driving factor in breathing new life into the collaboration trend, encouraging consumers and businesses to share information for the benefit of the wider group. The trend towards collaborative models for service delivery, including partnering with third parties to deliver specialised services in the cloud, is proving increasingly beneficial for businesses and customers alike.

In the future, banking capabilities will increasingly be exposed to third parties through platforms delivered as services, and banks will in future aggregate, integrate and customise cloud services for themselves and for customers. Outdated and complex legacy technology infrastructures will adversely impact competitiveness, but there is an opportunity for banks to gain significant advantage over their peers if they invest in transforming their core technology while simplifying processes and removing inefficient practices.

Operating models will emerge where partnerships and outsourcing will be key to providing strong customer propositions. Monolithic technology platforms which attempt to 'do it all' are unlikely to be best-of-breed and will be less agile. Banks will naturally find that using cloud services drives partnerships, and potentially pooling of capabilities within the industry. An example of this might be a community cloud which provides a shared function such as payments.

These trends are now evolving – businesses are exposing functionality and data, enhancing opportunities for service integration and enabling others to build and manage valuable services for customers and banks.

Banks must embrace disruptive business models

To take advantage of the benefits of the evolving collaboration landscape, advanced organisations are shifting emphasis away from building complete solutions to becoming a broker of services. These organisations are providing the capabilities and opportunities for others to integrate with their products and services for mutual competitive advantage. Organisations are increasingly willing to expose their services and data over the internet through open Application Programming Interfaces (APIs).

Open APIs expose the data within applications, allowing other applications and services to make use of that data. This allows the creation of new and enhanced propositions on top of existing data sets.

This model enables anyone with the skills to develop innovative solutions that exploit or enhance the capabilities of the organisation. It is expected that the use of this type of collaborative development model will accelerate, enhancing the services available to customers and providing value-add propositions for the organisations themselves.

Device platform owners are increasingly providing full eco-systems, open to anyone wishing to contribute, enabling the rapid development and publication of services.

The increasingly open technology landscape means that the main hurdle to providing excellent customer propositions is no longer the ability to integrate innovative technologies and services into bank systems, but the understanding and insight of the opportunities they provide and the willingness to collaborate to exploit them.

This emerging landscape of openness and collaboration will result in significant opportunities around the periphery of the banking industry. Financial Services start-ups and entrants who are able to leverage this emerging environment have the opportunity to thrive, deliver valuable infrastructure and services, and generate significant value for customers.

The Internet of Things enables solutions that are optimized for the customer and enables new innovative business models. This will allow companies to move away from blanket pricing to more tailored solutions which benefit both company and customers

Gartner, November 2013

Towards the joined-up bank

Large banks have the benefits of scale but the disadvantages of complex and ageing legacy systems. Advances in technology are showing no signs of abating and are fuelling new competition from challenger banks and disruptive start-ups. This is bringing levels of agility and customer centricity that are difficult for large banks to match. To survive in the future, banks need to ensure that everything joins up to provide a seamless experience for customers. Getting the right balance between modernising core systems, exploiting APIs, embracing cloud technologies and developing once, deploying widely is now critical.

The joined up bank will be a resilient and safe bank. It will be simple and consistent, whenever and however customers interact with it. It will have leading digital and self-service capabilities. It will be efficient and agile – able to respond quickly and at low cost. It will be innovative – connected to a rich ecosystem of partners to provide great solutions for customers.



Section 4 **INTEGRITY AND SECURITY**

NEW THREATS, NEW SOLUTIONS

Trust remains at the core of any successful banking relationship. A loss of trust – by customers, regulators or society in general – can directly impact the prosperity and sustainability of an individual bank, and the wider financial services industry.

Technology continues to evolve, bringing benefits for banks and their customers. However, emerging technologies can also bring weaknesses that can be manipulated for malicious or fraudulent intent.

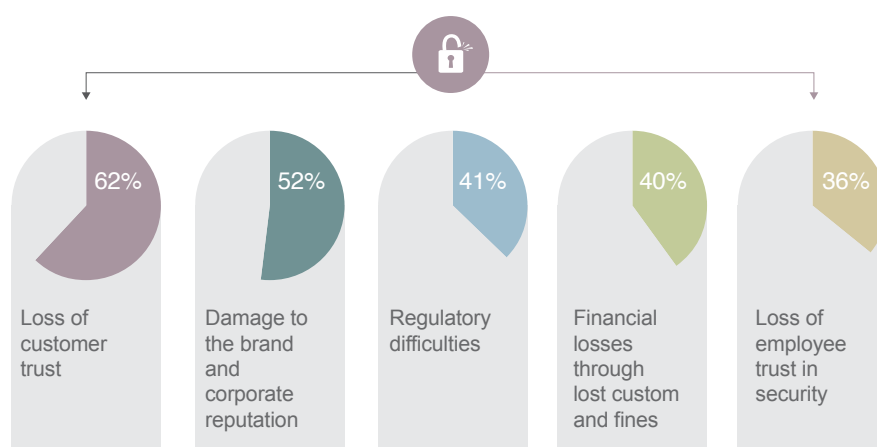
Banks must understand the risks associated with the evolving technology landscape. They need to manage the impact on the security and integrity of their business and protect their relationships with customers, which are built on trust.

Evolving threats and new digital risks in the connected world

The threats associated with operating in today's connected world are increasing (see Figure 7). Cyber attacks targeting banks continue to rise, resulting in escalating costs of remedial action and lost business associated with security incidents. An analysis by Dell SecureWorks identified more than 900 financial institutions in over 65 countries that had been targeted by financial Trojans in 2013¹⁴, with Ponemon/ HP finding that the average annual cost of cyber crime to financial services companies in the UK more than doubled¹⁵. Banks are investing significant sums to defend against the increasing tide of attacks targeting them and their customers.

Fig 7 : Consequences of security breaches for organisations¹⁶

Organisations are more likely to feel the effects of security breaches by less quantifiable consequences - loss of customer trust and damage to brand were highly ranked as a consequence of failing to analyse a security breach. 1994 – 1996.



¹⁴ Dell SecureWorks: Top Banking Botnets of 2013, March 2014

¹⁵ Ponemon Institute: 2013 Cost of Cyber Crime Study, October 2013

¹⁶ McAfee: Welcome to the Age of 'Big Security Data' (Extract), June 2013

Although banks will no longer be in full control of their own data security, they will remain fully accountable.

Threat sophistication and volume is increasing

Escalating cyber attacks have become a systemic risk to the financial system. Attackers, whether financially or politically motivated, are becoming increasingly creative, uncovering new vulnerabilities and techniques to exploit weaknesses. The sophistication and scale of known cyber threats continues to grow, with cyber criminals innovating new techniques to cause greater disruption to businesses and their customers.

The growth in malware continues unabated, with around 200 million known samples now recorded by McAfee Labs – and over 25 million new samples discovered in the last quarter of 2013 alone¹⁷. Attackers are continuing to find innovative methods of denial of service attacks, enabling them to flood targeted online services with record volumes of traffic (peak recorded traffic volume for a single attack rose 300% in 2013¹⁸). This is causing increasing levels of disruption to online services.

Mobile platforms are becoming embedded in the everyday lives of customers, and are increasingly used for banking transactions. However, there is an associated acceleration in attacks against mobile channels, such as smartphones and tablets, with an explosion in malware targeting these types of devices. McAfee Labs recorded that mobile malware samples doubled in 2013 (increasing the total number of known samples to 3.73 million)¹⁹.

Online 'dark markets' continue to provide a readily available supply of cyber attack tools and techniques for sale, driving down the cost of undertaking cyber crime. The availability and ease of access to such tools is enabling criminals to undertake sophisticated multi-vector attacks, blending together several different attack strategies to achieve their goal.

Fraudsters can also exploit security weaknesses in immature consumer technologies, such as wearable devices and connected home appliances (for example many will be shipped to customers with insecure default settings). An example of this is gathering information from in-built sensors to facilitate identity theft. With the growing trend to 'bring-your-own-device' to the workplace, these threats will also spill into the corporate world.

New computing models increase points of exposure

Adoption of new models such as cloud computing and open APIs (see section 3), increases the number of potential points of exposure banks must manage.

Cloud computing models, including Software-as-a-Service, mean customer and employee data will be stored in non-bank owned data centres and shared with an increasing number of partners to perform critical business functions. Further proliferation will occur through data being made available to third parties, either through open APIs to provide value-add services, or sold in an anonymised form as a means of income generation.

Any deficiencies in the security of their partners' infrastructure, or the ethical utilisation of the provided data, will result in reputational impact and potential regulatory penalties.

Although banks will no longer be in full control of their own data security, they will remain fully accountable.

¹⁷ McAfee Labs Threat Report: Fourth Quarter 2013

¹⁸ Arbor Networks, 9th Annual Worldwide Infrastructure Security Report, January 2014

¹⁹ McAfee: Welcome to the Age of 'Big Security Data' (Extract), June 2013

As partnerships increase and data is shared with global service providers, the risk of non-compliance with existing and emerging regulations will also increase. Emerging data encryption and tokenisation solutions for the cloud, including Cloud Encryption Gateways (that obscure data as it leaves the enterprise perimeter), will be utilised by banks to minimise these risks. Banks need to ensure that sensitive data leaving the organisation is protected and handled in compliance with residency regulations.

There is nowhere to hide

Banks are under greater scrutiny than ever before – from regulators, customers and wider society.

Successful digitisation has resulted in banking services becoming an intrinsic part of the daily activities of consumers and businesses alike. Customers are increasingly demanding access to services on their terms – expecting that services are available when and where they want to use them. Failure to meet this expectation can have significant impact, damaging the reputation of, and trust in, banks.

The growing risks to system stability and availability are also necessitating investment in technology resilience and security, driven by aging systems that are struggling to cope with today's 24x7 world.

To address historical behaviour and emerging technology challenges, regulators are arming themselves with increasing powers to establish policy, and detect and punish non-compliance. Maintaining compliance across the evolving regulatory landscape is a significant emerging risk for banks, especially those burdened with inflexible legacy estates.

The hyper-connected nature of the digital technologies means that damaging information, whether legitimate or malicious in nature, can quickly spread across the internet through social media. These 'digital wildfires' represent an emerging risk to banks, amplifying the consequences of service unavailability and unethical, non-compliant or illegal behaviour.

Drive towards proactive intelligent security

The evolving technology landscape, and the emerging threats that accompany it, have resulted in an acceptance that traditional approaches to security are no longer viable.

Banks can no longer depend on a secure perimeter defence to combat the onslaught of sophisticated attacks. Customer demands for better, more convenient and faster services, coupled with business demands for greater agility and cost-effectiveness, have resulted in the traditional organisation perimeter breaking down as new computing models and partnerships are adopted. The explosion in consumer devices also makes it increasingly difficult to secure all the end-points through which customers choose to interact with their bank.

"Several cyber-security threats could result in systemic impact to the financial industry" DTCC (Depository Trust & Clearing Corporation), August 2013

DTCC: Beyond the Horizon – A Whitepaper to the Industry on Systemic Risk, August 2013

“The development of cloud computing puts a great strain on data security”
Cisco TechWatch, 2013

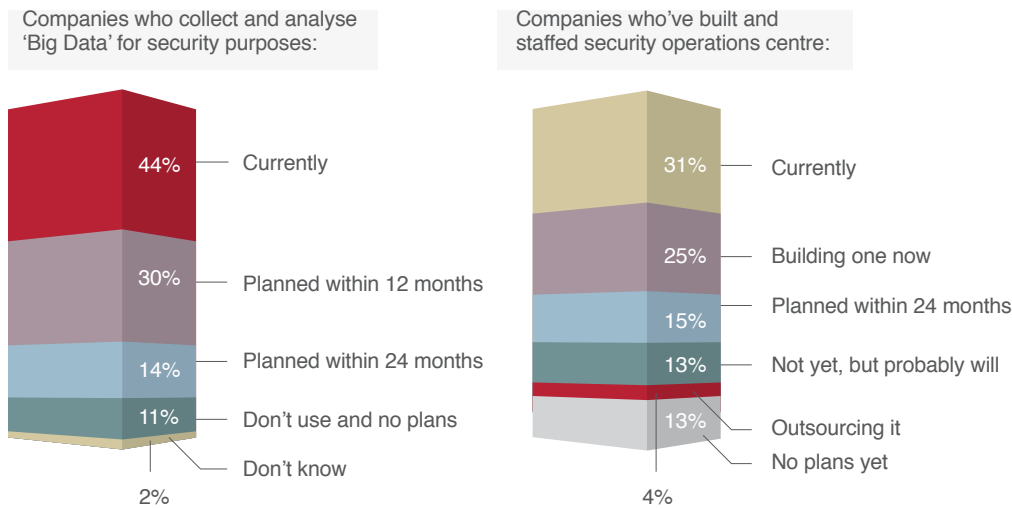
Cisco: Cisco TechWatch,
March 2013

Banks must adopt a **multi-layered** proactive security model to address these challenges, moving from a position of monitoring towards understanding and action. Active defence combines risk-based security management, analytics and fast incident response in a comprehensive approach to security.

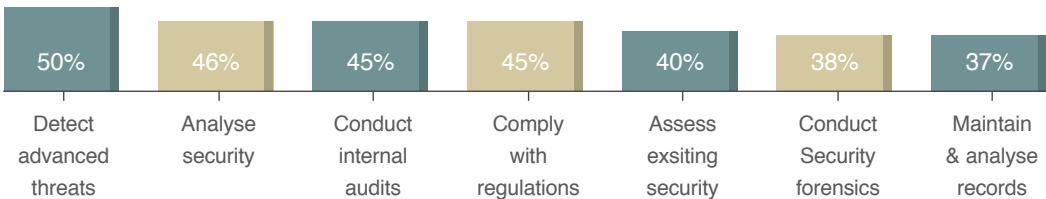
Security intelligence will become a key tool in the battle against the ever evolving threats that banks face. These technologies will enable banks to gain real-time actionable insight on threats, adopting innovative techniques to analyse security data, visualise user behaviour and detect anomalies. Rather than simply looking for known threat patterns, security intelligence will facilitate the visualisation and identification of new and potential threat patterns – collecting, correlating and analysing application logs, network traffic and external threat intelligence (see Figure 8).

Fig 8 : **Big Data techniques are becoming increasingly valuable for security intelligence** ²⁰

Security Analytics Leveraging Big Data is Becoming The Security Gold Standard
More companies are using BIG DATA for security purposes:



How Big Data Transforms Security Analytics
Companies use Big Data to:



20 RSA Infographics: Is Big Data Worth Its Weight In Security Gold?
(Extract), May 2013

According to Ponemon / HP, organisations which have already invested in security intelligence are reaping the benefits, with significant reductions in the overall cost of cybercrime (including a 51% reduction in recovery costs and a 73% reduction in incident management costs)²¹. Banks must embrace active defence strategies to help mitigate the spiralling costs of cyber threats.

Organisations which have already invested in security intelligence are reaping the benefits.

New identity and trust models are emerging

The number and usage of online services is accelerating, driven by the increasing number of connected devices people employ in their daily lives. Most of these devices and services will require that the user enters some unique identification information prior to use. The rising number of digital identities individuals must manage, including a mixture of social, private and business identities, is in itself a security threat. Individuals struggle to keep track of login and password details, often using (and re-using) weak passwords or choosing to store them in plain text.

The availability and continued growth of federated login capabilities from major internet players, such as Google, Facebook and Amazon, is simplifying the service login experience in the social space, allowing users to access multiple services from a single digital identity.

New identity and trust models are emerging in the enterprise arena to provide a similar level of convenience, while providing the necessary levels of trust in the stated identity. Governments are helping to drive forward trusted identity ecosystems – such as the UK Government's Identity Assurance Programme and the United States' National Strategy for Trusted Identity in Cyberspace initiative – defining models that allow third party providers to assert citizens' identities to online national services.

As these capabilities become more prevalent, and customers expect to be able to own their own identity, banks must consider the threats and opportunities from these new models. Providing identity services to their customers could be a value-add service or income opportunity.

Alternative authentication solutions are gathering pace

Acceptance of alternative (non-password) authentication methods continues to gather pace.

Customer acceptance of biometrics is growing, with the inclusion of fingerprint biometric authentication solutions by leading device manufacturers along with facial recognition in some mobile operating systems. Banks are now beginning to utilise these technologies to provide convenient alternative authentication experiences for customers, including voice authentication solutions for telephone and mobile banking.

Authentication solutions are also becoming context and risk aware, applying appropriate controls within the context of the transaction being executed and the normal behaviour of the person undertaking it. Banks are starting to make simple non-transactional capabilities, such as balance enquiries, available to customers requiring device authentication only.

²¹ Ponemon Institute: 2013 Cost of Cyber Crime Study, October 2013

49% of UK adults are now less willing to share personal information with companies.

33% of adults have not completed an online transaction due to concerns over the privacy policy or terms of use.

Regulators will also try to put people back in control of their own data

Demands for privacy and transparency

Consumers are becoming more aware of, and concerned about, their data privacy, and are increasingly selective regarding who they choose to do business with. A YouGov survey for Ernst & Young revealed that 49% of UK adults are now less willing to share personal information with companies²², a pattern repeated in the US, where a Forrester survey revealed that 33% of adults have not completed an online transaction due to concerns over the privacy policy or terms of use.²³

Customers expect all organisations, including banks, to ensure that data about their lives is used in an ethical way, providing value for them and not simply for the business itself. They expect transparency regarding what, when and where data is collected.

In a bid to protect customers' data privacy, regulation will continue to evolve and attempt to keep pace with the rate of technology change, posing significant compliance risks for banks. New legislation is expected to impose restrictions on how data is collected and used. Organisations will need to prove that information is held and processed in accordance with the explicit consent of the customer.

Regulators will also try to put people back in control of their own data and allow them to migrate their information to alternative service providers. People will have greater rights to view, challenge and remove information that companies hold about them. Banks must invest in systems and controls to meet these challenges, ensuring they understand what customer data they collect, who it is shared with and how it is used. This level of understanding will allow banks to assess risks, take appropriate counter actions and respond to regulators.

The evolving data regulation landscape will bring additional compliance risks for banks and their technology systems. Banks must carefully consider the benefits of Big Data against the cost and risks of collecting large amounts of customer information. With regulators arming themselves with greater powers, and increasing expectations for privacy and ethical treatment in wider society, the consequences of getting this balance wrong will be significant. Taking a 'no surprises' approach to customer data – ensuring that data is collected in a manner the customer is comfortable with and used in a way they have agreed to – will provide an opportunity for banks to differentiate themselves and enhance customer trust.

²² Ernst & Young: *The Big Data Backlash*, November 2013

²³ Forrester Research: *The New Privacy*, December 2013

Technology and Trust – an uneasy relationship

As technology continues to evolve, banks need to balance the drive to innovate (to stay relevant to customers and keep pace with competition), with the risks and threats that new technologies bring. Customers have a fundamental expectation that banks will keep their money and data safe and that the banking systems are resilient and secure.

While technology advances can help address these challenges, they also expose new risks that need to be managed.

Banks must adopt comprehensive, proactive strategies to ensure they have adequate and agile defences in place from the increasing security & integrity challenges. Failure to do so will have significant consequences for the trust based relationships that banking is built on.

“Massive amounts of information are available about potential attacks – both from external intelligence sources and from an institution's own technology environment... companies will need to develop capabilities to aggregate and analyse relevant information, and use it to appropriately tune defence systems”

World Economic Forum,
January 2014

*World Economic Forum:
Risk and Responsibility in
a Hyperconnected World,
January 2014*



Cloud

Section 5 CONCLUSION

TECHNOLOGY REDEFINES
CUSTOMER EXPECTATIONS

The customer relationship with banks is changing as they become more technology savvy. Expectations are set by experiences from other industries.

The four trends explored in this paper are continuing to disrupt banking and change customer expectations.

The **Digital Society** is re-defining the accessibility of banking and the levels of service customers expect, across all channels.

This heightens the criticality of the **Integrity and Security** of these banking services, wherever and however they are accessed. The banking paradigm is changing – with increased transparency of customer information, changing attitudes to privacy and the drive for better methods of identity.

The torrent of available data continues and, with the right tools and skill sets, Big Data can generate **Big Insights**. Some banks have taken pre-emptive steps on their big insights journey, amending terms and conditions to permit future exploitation of customer data. But there are ongoing debates on appropriate data use and the real value to both customers and banks.

Underpinning all of this, banks must ensure that **Everything Joins Up**. As the world becomes more collaborative, open and connected banks need to find ways to exploit the potential of technologies such as cloud computing (bringing flexibility and agility at low cost) and cognitive computing (combining Big Data techniques and machine learning with natural language interfaces to provide a new breed of virtual advisors).

Most organisations have an explicitly declared commitment to serving customers. That commitment has been renewed and reinforced across the banking industry in a bid to rebuild trust. If banks truly want to fulfil their customer commitment it is important that they recognise that customers' expectations are changing over time.

Technology places the customer in control

Customers are now adept at dealing with powerful technologies – using them to maintain comprehensive and up-to-date knowledge of their world. Even customers who would not consider themselves to be particularly technology literate are joining the digital society as technology becomes more intuitive and engaging (and frankly hard to avoid).

Across industries, confident and knowledgeable customers, empowered by digital technologies, are driving organisations to respond (see Figure 9). The best experiences are translated from one industry to another.

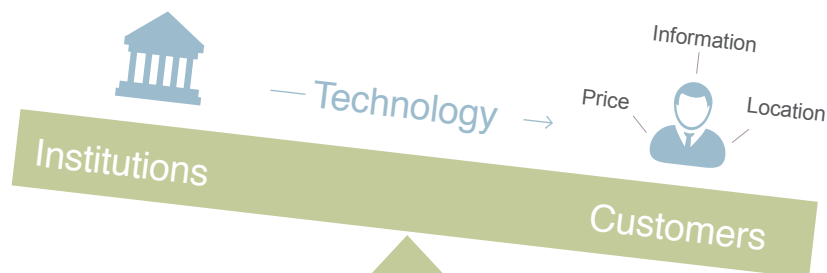
Neither the customer, nor customer centricity, are static concepts. The rate of change is not always apparent, but it is real and tomorrow's customer will likely have different needs and expectations driven, at least in part, by technology.

Crowd-influenced customers take comfort from the recommendations and actions of others

Baby Boomers will take unprecedented levels of technology familiarity into retirement.

Fig 9 : Technology empowers customers²⁴

Empowered customers have given rise to a new era



Ultimately, the choices open to customers are more visible than they have ever been. Discerning, self-directed customers are basing decisions on the increasing level of information available to them. Crowd-influenced customers take comfort from the recommendations and actions of others. The digital revolution is re-shaping customer expectations and disrupting entire industries. Failure to respond can spell disaster (as high profile businesses such as HMV, Jessops, Borders and Blockbuster found to their cost).

A perspective on the banking customer of tomorrow

There is evidence of increasing levels of digital activity across all demographic groupings, but the passage of time also changes the profile of the future customer base. As Generations X and Y age, the vast majority of the working population will become digitally literate. Baby Boomers will take unprecedented levels of technology familiarity into retirement. Generation Z, of course, have little concept of a world without digital and are very receptive to innovation²⁵.

The basic tenets of good customer service remain unaltered in the digital society, but there are some new considerations prompted by, and addressed by, the technology trends described in this paper. For example, how the banks assemble and apply knowledge of the customer and their context, including their technology capability.

As customers embrace digital, the ease with which alternative providers can be identified and evaluated could easily drive a higher propensity to switch banks or use substitute providers.

People are now connected and informed. They have limited patience and increasingly expect to have their needs met on their terms, 24x7. Customer experience remains a point of differentiation, but in the future that experience incorporates a few more digital ingredients.

²⁴ Forrester Research, 2013

²⁵ 'Generation X' are people born between 1966-1976; 'generation Y' 1977-1994 and 'generation Z' 1995-2009

New levels of customer experience

Banking is now a
digital business

Both the shape and the clockspeed of the customer journey are changing due to technology influences.

This has implications for the attributes of good service. The experience should be tailored to the customer, clearly designed to their circumstances, information and preferences. Demonstrating this is critical to earning customer loyalty.

Customer journeys should flow seamlessly through organisations and between organisations to deliver the best outcomes – anything that can be digitally joined, should be. The experience should be engaging, convenient and involve low customer effort – appropriately exploiting the customer's technology capability.

To illustrate how this might apply in practice, consider the changing role of a bank in purchasing a new home:

- The bank's focus will be on helping the customer to purchase their home, not selling a mortgage
- The bank will be knowledgeable and relevant – helping customers to understand from the outset how much they can afford and providing guidelines on monthly budget implications of different housing options for 'people-like-me'
- There will be rich engagement with the customer throughout the experience, exploiting technologies such as video calls, online chat, virtual advisors, text alerts and face to face
- The bank will really support customers by connecting them with a helpful ecosystem to assist them with their decisions – information on the local area, links to property lists and estate agents and even social media forums
- The customer will be informed and in control at all stages and the process will be seamless, with quick decisions and fulfilment

These changing consumer expectations are also transferring to the business world. Technology increasingly contributes to the day to day running of businesses and how they interact with their customers. Clients expect their banks to be informed, to be available when and where required and to add real value to their businesses. And it is a given that banking services must be simple to access, flexible, safe and efficient.

The customer centric bank is a digital bank

The banks that best respond to the changing needs of customers are the ones that will succeed in the future. They will understand that digital permeates the customer experience, shortening elapsed time and bringing together multiple partners, to deliver the ultimate outcome that the customer wants.

Banking is now a digital business. The big technology shifts described in this paper are already here. The pervasive effects of technology demand a step change in innovation from the banking industry. Each individual, and organisation, is experiencing changing technology to some extent. That in turn is shaping perceptions of what is possible, and therefore what constitutes good and useful service.

New customer behaviours are emerging and banks need to respond appropriately in order to remain relevant. The call to action couldn't be louder!

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