

The future of technology
and payments

Are we living in a land of plenty?

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Join the conversation

This report is intended as a conversation opener.

Within it, we highlight seven technology-related trends that are set to have a direct impact on the payments business within the next three-to-five years.

In doing so, we bring together existing commentary and consensus from across the technology industry – and we present our analysis of the implications for our industry.

The report is not a Visa Europe proposition. Nor is it a statement of intent. Instead, it is a way for us to raise matters of mutual interest with our stakeholders – including our members, merchants, and other organisations that operate within the payments ecosystem.

For each of the trends highlighted we do have an opinion. Often it is a strong opinion. But it is there to be debated. What we aim to do is to spark off meaningful discussions about the future of our industry, the type of initiatives we should collectively pursue, and the role that Visa Europe can play.

So, please, read through and tell us what you think. We are keen to engage in further discussion – especially in any subjects that could represent joint research or development opportunities.

Adam Banks

Chief Technology Officer
Visa Europe

Payments and technology

Today's payments business is totally dependent on technology.

Progressively, the physical exchange of payment instruments (such as cash and cheques) is being replaced by the virtual exchange of payment data.

Over the past decade, for example, the use of electronic payment methods across Europe has seen a compound annual growth rate of more than six per cent. The use of cheques is in steep decline and the use of cash is increasingly concentrated within low value payments.

This progression from the physical to the virtual, and all of the benefits it brings¹, is reliant on technology.

Behind the scenes, our industry has always been dependent on an extensive technological infrastructure and a formidable transaction processing capability.

And, more recently, the use of technology has become increasingly evident at the front end – on the checkout desks of retailers and also in the hands of consumers.

Cards are progressively being replaced by smarter cards and smarter phones. A large and rapidly growing proportion of purchases and transactions are being initiated via the internet. User-operated acceptance devices (such as self-checkout facilities and unmanned ticketing and vending machines) are becoming ever

more prevalent. Contactless technologies are becoming a mass-market reality in several European countries. And, most significant of all, mobile devices are starting to be accommodated by and integrated within the payments ecosystem.

These moves towards more technological sophistication are certain to continue. Consequently any big trends in the world of technology tend to have a direct impact on the world of payments:

- At the enterprise level, technological change can influence the manner in which payment businesses are run, the extent of their capabilities, how the relevant risks are managed, and the type of products and quality of service they deliver to their customers

- Meanwhile, at the consumer level, technological change increasingly influences the way that people research and reach their purchasing decisions, organise their everyday finances and make and manage their payments

Drawing on existing commentary and consensus from across the technology industry, this report seeks to identify the main trends that are set to play out over the next three-to-five years. We then go on to consider the broader implications for the payments industry.

¹ The benefits of electronic payments over cash and cheque payments have been well documented. They are more secure, more efficient and more convenient. They are also more auditable, reduce barriers to credit and liquidity, and ease geographic restrictions to trade and exchange. For more information see http://www.visaeurope.com/en/making_money_flow.aspx

² Visa Europe is a membership association, exclusively owned and governed by some 4,000 European financial institutions and payment providers. These members will typically act as Visa issuers (issuing Visa-branded payment products to their customers) and/or Visa acquirers (enlisting and enabling merchants to accept Visa-branded payment products).

In total, we have identified seven trends. The first three of these are pure technology trends. The next four are social and behavioural trends, which this technology is facilitating. In each case, we discuss the likely consequences for the way that payment products and services are delivered, managed and processed.

Our conclusions have real relevance for:

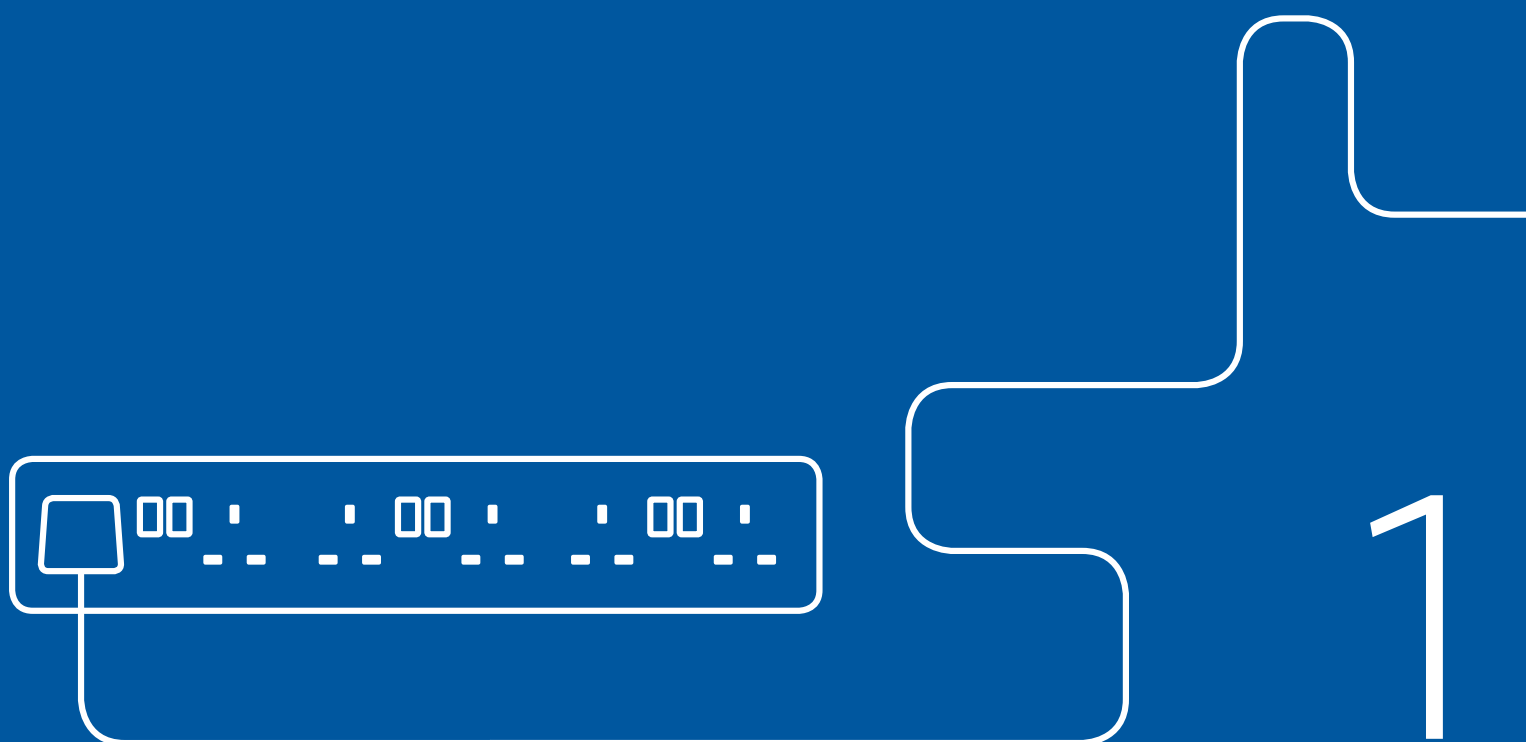
- The members we represent² – in terms of the opportunities and threats these trends represent, how they service their existing business, and the type of payment products they develop
- The wider payments ecosystem – such as vendors, developers and payment service providers, in terms of the products and services they deliver, and the value they bring
- The customers (retailers and consumers alike) we help our members to serve – in terms of the type of payment products and services they can anticipate for the future
- Visa Europe itself – in terms of the evolution of our own transaction processing business, our risk and security management services, and the payment-related innovations we pursue on behalf of our members

Trends and implications

	Trend	Context	Opportunities & implications
1	The land of plenty	Compute power becomes ever more abundant, affordable and accessible	<ul style="list-style-type: none"> • Keeping ahead of changing customer needs • Looking out for tactical opportunities • Hamstrung by heritage?
2	The power in your hands	Devices continue to evolve, liberating more power for more people in more places	<ul style="list-style-type: none"> • Gearing up for the inevitable • 'Front of wallet' takes on a new dimension • Infrastructure-less acceptance
3	The web of interconnections	Always on, always there, always aware, always informed, always connected	<ul style="list-style-type: none"> • Truly integrated, truly multi-channel payment platforms • A significant increase in online payment flows and expectations
4	The digitisation of reality	Our real lives become replicated and reflected in a parallel (digital) universe	<ul style="list-style-type: none"> • Accommodating more 'pull' payments • Smarter, safer risk management controls
5	The age of omniscience	Businesses gather enough data and processing power to become all-knowing	<ul style="list-style-type: none"> • Appreciating the hidden value of payment-related data • Acting on customer insights • Improving fraud management
6	The small town syndrome	The world becomes a more open and collaborative place in which to operate	<ul style="list-style-type: none"> • Cracking the social networking payments challenge • Embracing the collaborative computing ethos
7	The crisis of identity	Traditional identity management models become increasingly unsustainable	<ul style="list-style-type: none"> • Scope for a collective industry solution? • The need for a trusted partner

The land of plenty

Compute power becomes ever more abundant, affordable and accessible



The land of plenty is characterised by two developments

On the one hand, we have the sheer capability of today's IT equipment. The hardware becomes ever more powerful. The software becomes ever more capable. The memory becomes ever more abundant. The networks become ever faster and more intelligent. And the price becomes ever more affordable.

At the same time, we have the emergence of new ways to access compute power. Concepts such as cloud computing³ and grid computing⁴ are enabling businesses and even individuals to buy processing power as though it were a utility.

Let's consider these two developments in a little more detail.

³ The term cloud computing refers to computing services provided over the internet (or 'cloud'), whereby shared resources, software, and information are provided to computers and other devices on demand. It is a way to quickly increase capacity or add capabilities without investing in new infrastructure, training new personnel, or licensing new software. Cloud computing encompasses any subscription-based or pay-per-use service that, in real time over the internet, extends IT's existing capabilities.

⁴ The term grid computing typically refers to the combination of computer resources (perhaps by using the spare computing resources within a given organisation, or by using a network of geographically dispersed computers). Unlike conventional networks that focus on communication among devices, grid computing harnesses unused processing cycles of all computers in a network for solving problems too intensive for any stand-alone machine. Grid computing came to prominence with the SETI@home project (Search for Extraterrestrial Intelligence), in which PC users worldwide donated unused processor cycles to help the search for signs of extraterrestrial life by analysing signals coming from outer space. The project relies on individual users to volunteer to allow the project to harness the unused processing power of the user's computer. This method saves the project both money and resources.

⁵ Moore's law describes a long-term trend in the history of computing hardware, in which the number of transistors that can be placed inexpensively on an integrated circuit has doubled approximately every two years - and will continue to do so.

Capability

We have known about Moore's Law⁵ since the 1950s. But, like any other form of geometric progression, the sheer scale of change can sometimes take us by surprise.

Consider the devices we use in our everyday lives. Think about the Apple iPad, and compare it to the closest equivalent from the mid-90s, namely the Intel Pentium-powered PC. The iPad's processor contains 40 million transistors. By comparison, the first Pentium chips had just three million transistors, yet they were 20 times larger, and 15 times slower.

That is just the start of it. The iPad's screen is so much sharper. The on-board memory can store around 60-times more data. The whole device runs for ten hours on a single battery charge. And it slips, inconspicuously, inside any brief case.

And the iPad is one example among many. A smartphone such as the Nokia N8 boasts comparable levels of compute power in a truly pocket-sized format. And the price of any of these devices is a fraction of what you would have paid for your trusty old PC.

At the enterprise level, things have been following the same trajectory. A modern, Intel-based server, with more than two billion transistors on board, also costs less than the mid-1990s Pentium. Memory is no longer a precious resource. It is so cheap and so plentiful that we don't even think about it. We never again need to archive or discard data.

As a consumer, you can expect to buy disk drives at €50 per terabyte⁶, and the cost of enterprise class storage is heading in the same direction.

Moore's Law suggests that things will continue to follow the same general trajectory. Experience tells us that, two years from now, all of the key metrics should have moved on – by a factor of two – all over again.

Accessibility

In the past, it was simple. If you wanted the compute power you had to buy the computer. And, at the enterprise level, buying the computer was like building and maintaining a rambling stately home.

You owned the land, you commissioned the architect, you dug the foundations, and you erected the building. Then, once it was in place, you hired the staff, you organised the day-to-day schedule and you fretted about the ongoing maintenance.

These days, buying compute power can be more like staying in a hotel. There are plenty to choose from (anything from a small boutique hotel, to a five star resort, to a serviced apartment). You can check in for a night, you can stay for a week, or you can move in for a few months. The choice is all yours.

A whole host of vendors, including Amazon, Google, IBM and Microsoft, now provide sophisticated, mature services. And various flavours are available – for example, simple, on-demand applications such as email and basic document sharing; point applications such as sales and customer relationship management; data storage and backup; and complete server environments for mainstream software packages or custom applications.

Again, this is just the start.

Growth estimates vary considerably. But the consensus is clear. Development will be driven from both the supply and the demand side. High-speed global connectivity, combined with the emergence of open systems⁷ and service-oriented architectures⁸, will mean that it is progressively more appropriate to purchase more of your technology as a service. And enterprise hardware will increasingly be bought by service providers rather than end-users.

⁶ A terabyte is a unit of information equal to approximately 1,000 gigabyte (or, to be more precise, 1,024 gigabyte). To put that into context, if you pulped 50,000 trees, turned them all into A4 sheets of paper, and filled each one with close-set text, you would end up with the equivalent of one terabyte of data.

⁷ Open systems are those that can be supplied by hardware components from multiple vendors, and whose software can be operated from different platforms. They are opposite to closed or proprietary systems.

⁸ A service oriented architecture (SOA) is a flexible set of design principles used during the phases of systems development and integration in computing. A system based on a SOA will package functionality as a suite of services that can be used independently within multiple separate systems from several business domains.

So what?

Within the next three-to-five years we do not expect this trend to have a profound impact on the 'supply side' of payments⁹. But, as a catalyst fuelling new retail business models and opportunities, it should have a real impact on the 'demand side'.

Keeping ahead of changing customer needs

The payments industry will have to run fast to keep pace with the practices and expectations of a new breed of retailers, particularly those operating online – whilst, at the same time, maintaining the level of security that all participants have come to expect.

In the land of plenty, you can dream up a new business concept, source all of the necessary components from your desktop, and assemble them immediately – and you will expect to deploy a simple, flexible, turnkey payment platform in exactly the same way.

Traditionally, Europe's payment providers may not have been perceived to be particularly nimble or accommodating. But, if the incumbent players do not respond and consider how they can match the agility of this new breed of businesses, aren't they leaving a clear white space into which others can step?

Protecting cardholder and account data

It is not just legitimate businesses who can operate in the land of plenty. The opportunities are open to the bad actors as well as the good.

The fact is, today's card criminals are determined to lay their hands on sensitive customer and account data. Intent on committing fraud on a truly industrial scale, they will continually probe for vulnerabilities – and, with more compute power at their disposal, they will plan ever more ingenious ways to steal or intercept data.

In the coming years, data protection initiatives such as PCI DSS¹⁰ will need to be complemented by new and different security approaches, including stronger authentication techniques, as well as data devaluation and data elimination. After all, if data can be rendered useless, the related risks are essentially eliminated.

Looking out for tactical opportunities

On the surface of it, the land of plenty offers few immediate opportunities for established payment providers to improve or adapt their own operations.

Any large player will already have made equally large investments in their own data centres. Their business model will have been designed accordingly. And, given the regulatory environment and the risk management culture, a very large incentive would be required in order for any dramatic change to be contemplated.

Moving sensitive data off site is deemed by many businesses to be a high risk strategy in our heavily regulated environment. There will always be concerns about data integrity, security and access control. Consequently, most CIOs will probably take the view that core business processing and storage is something that needs to be enterprise owned and managed. But, that still leaves plenty of room for more tactical initiatives:

⁹ See the section on Hamstrung by heritage on page 9 – and the considerable constraints facing the 'supply side' of the payment industry.

¹⁰ PCI DSS (the Payment Card Industry Data Security Standard) is an industry-wide set of requirements and processes to help ensure that sensitive data is kept secure. It is intended for use by any organisation that stores, transmits or processes cardholder account and transaction data.

- Consider for example, the **desktop** environment. Running those office applications across a sprawling estate of often obsolete servers and PCs has always been a management headache. So what about the potential for hosted email and collaborative services? Already the higher end suites rival the leading desktop products. And, priced per user per month, with all the service and support costs eliminated, they could offer real promise and immediate benefits to any large organisation
- Another real opportunity is in **analytics** (see our chapter on The age of omniscience from page 29). This is an area which is relatively new to many large organisations. They may not have invested heavily in their own data handling capability. The demand for compute power will always be sporadic, with vast resources required for short periods. And, using data anonymisation, it is generally possible to achieve your analytics goals without allowing sensitive data to move beyond the corporate firewall
- Also, think about the way the land of plenty could accommodate **research and development** (R&D) functions, such as new product development and testing, or the development of prototypes and proofs of concept. You now have the opportunity to channel vast flows of compute power into your innovation pipeline. Through the cloud, the power can be provisioned and adjusted on demand, with no need for capital investment, and few people tied up in systems engineering support

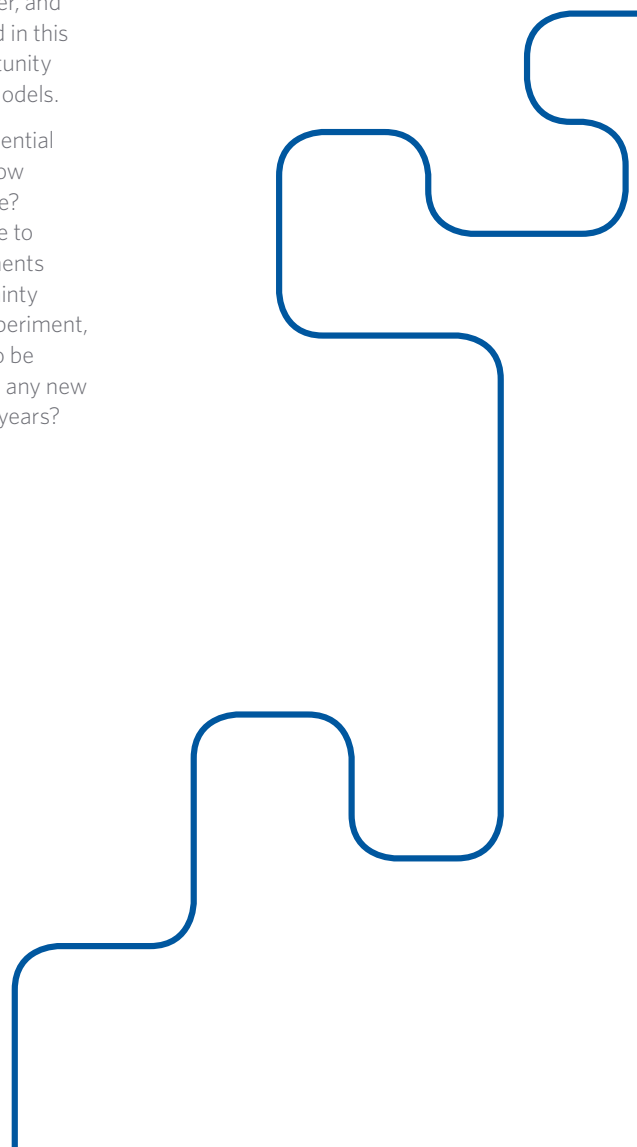
Hamstrung by heritage?

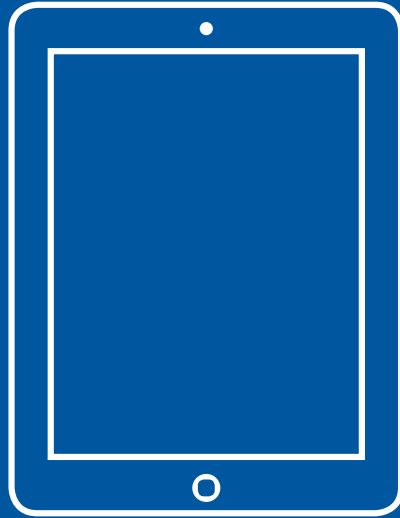
The challenges faced by the large players in the payment industry are comparable to those faced by the incumbents in any other sector.

All of these well-established organisations will generally find it hard to prosper in the land of plenty. They are all constrained by their existing investments, people and culture. They cannot, therefore, take full advantage of the abundance in compute power. Yet they can use it selectively and based on experience, move to its cautious and gradual adoption for main business processing.

Concurrently, new entrants, with new business models, no baggage and nothing to lose, can experiment and grow. Backed by the abundance of compute power, and leveraging the other trends outlined in this document, they will have an opportunity to develop entirely new payment models.

Are we, therefore, looking at an essential asymmetry in the industry? If so, how disruptive a force could this become? And how big a threat does this pose to the established players in the payments industry? In the face of this uncertainty then, surely, the imperative is to experiment, to innovate, to watch closely, and to be prepared to adapt to and work with any new models that emerge in the coming years?





The power in your hands

Devices continue to evolve, liberating more power for more people in more places

2

Think about the way that consumer compute devices have evolved in the past few years. And think how much more they are likely to evolve within the next few

As a concept, the smartphone has been with us since the early 1990s. As a reality, it didn't actually take hold until the late 2000s, with the launch of the Apple iPhone and the emergence of true mobile broadband.

The reaction has been overwhelming. The response from other players in the mobile ecosystem added fuel to the fire. And, by the final quarter of 2010, smartphones were selling globally at a rate of more than a million a day (up 94 per cent on the fourth quarter of 2009, and equating to almost a quarter of all mobile handset sales worldwide).

It has been a less newsworthy but equally torrid time in the personal computing world. The notebook and the ultraportable have been joined by the ultra-affordable netbook. Meanwhile, the vital statistics of the standard desktop system have taken on truly gargantuan proportions. And now, of course, the two paths - the handheld and the PC - have converged with the tablet.

But perhaps the biggest change (which largely determines the ways that these devices are used) has been the near-ubiquity of high speed connectivity. Through a combination of WiFi¹¹ and 3G¹² mobile broadband, these devices can be constantly and universally interconnected. And, within our three-to-five year time frame, we are set to see the progressive emergence of yet more capable wireless network technologies, combined with a whole new level of inbuilt network intelligence such as location and context capabilities.

So, don't expect any let up in the pace of change.

For example, following on from the first few tablets (like the Apple iPad and the Samsung Galaxy), we can expect to see the market explode with new devices, encompassing a complete spectrum of different sizes, functions and configurations. Add in seamless convergence with cloud computing functions (like storage and software) and the smartphone or small tablet could easily double up as the desktop PC.

At the same time, plenty of different players are betting on the take-up of Near Field Communication¹³ (NFC), a technology that is particularly pertinent to payments. Already available in some high-end devices such as the Nokia C7, NFC is set to be bundled in with future iterations of Google's Android operating system. It will reside alongside many other types of functionality (for example to pinpoint location, determine proximity, assess temperature, read biometrics and so on).

In summary, tomorrow's phones will not be seen by consumers as phones, but as personal compute devices. Developments in interconnection and the cloud will make them powerful gateways into a world of limitless information, storage and compute power. They will also have rich context awareness, and deep integration with social computing.

Re-defining devices

As well as tracking the general trajectory of the consumer electronics market, it would also be wise to think beyond traditional concepts of compute devices. Because, in tomorrow's smart environment, any object with a digital heartbeat may well be networked.

Mark Weiser, an influential chief scientist at Xerox PARC defines the smart environment, as "a physical world that is richly and invisibly interwoven with sensors, actuators, displays, and computational elements, embedded seamlessly in the everyday objects of our lives, and connected through a continuous network".

Typical components of this future are smart homes and appliances, integrated with smart power grids; smart transport networks, integrated with intelligent cars and road systems; and, of course, security and access control. This future will provide boundless opportunities for payments, often triggered automatically, for example, to pay a highway toll or enter a central business district (already a reality in some countries), or simply by taking a product such as fuel or a bottle of water. It is a fascinating prospect, but not one that is likely to materialise within our three-to-five year timeframe.

¹¹ WiFi (Wireless Fidelity) is a local area network that uses high frequency radio signals to transmit and receive data over distances of a few hundred feet.

¹² 3G denotes the Third Generation wireless digital standard for high-speed voice and data networks with maximum transmission rates rated at millions of bits per second (Mbps).

¹³ Near Field Communication (NFC) is a set of short-range wireless technologies, typically requiring a distance of four centimetres or less. In a payments context, NFC is used to initiate and process contactless transactions. For example, an NFC-enabled mobile device can be used to conduct Visa payWave contactless transactions.

'Front of wallet' takes on a new dimension

The device is poised to become the be all and end all. Think about how few teenagers and young adults wear a watch today (why would they?). And then extend that same principle to cover the wallet and everything within it.

With the device threatening to subsume the physical card, the 'front of wallet' concept takes on an entirely new meaning. So think about the attributes that a preferred payment mechanism could incorporate:

- Overall prominence within the user interface
- Degree of convenience and ease of use
- Level of perceived risk
- What it could offer in terms of added value (for example, through compelling and relevant offers, or proximity-based discounts)

Also, think about the potential benefits of such a token. Could it open up opportunities for a whole new range of as yet unexplored services? And would success in this space usher in much higher payment volumes and a level of stickiness that could be all but unassailable?

Infrastructure-less acceptance

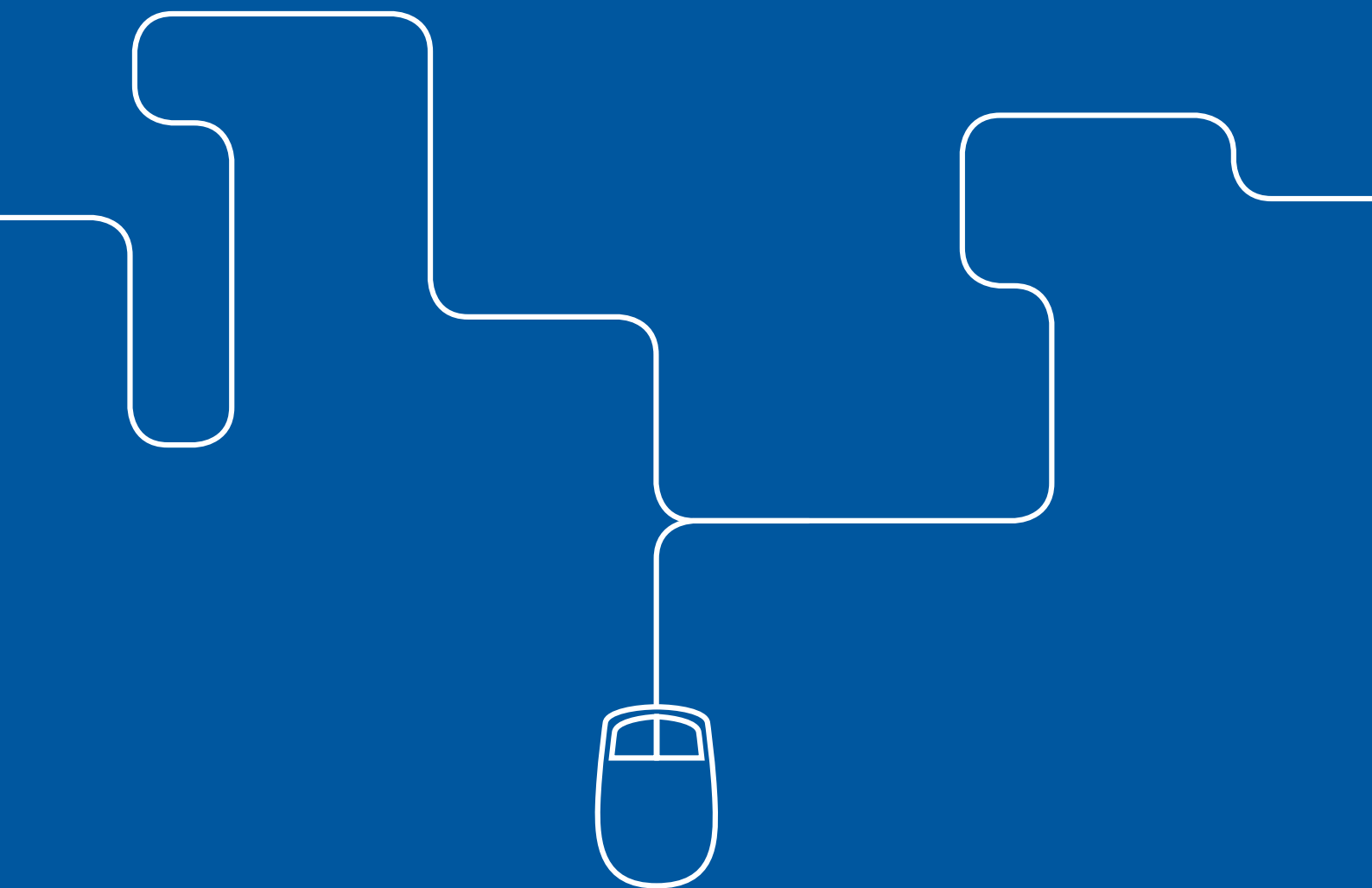
On the acceptance side of the business, device evolution could have some interesting implications for the acceptance infrastructure.

If a smartphone has many of the attributes of an existing acceptance device; if it can maintain constant, ubiquitous contact with the acquiring host; if it can be securely interrogated and validated then surely, it could double up as an acceptance device of the future? Could we even see current transaction flows reversed and the traditional point of sale (POS) removed from the equation entirely?

These models could be ideal for smaller merchants, particularly mobile merchants. Similarly, they could be appropriate to the type of tradesmen who currently resort to cash and cheques. And, for the payment providers, would they become an opportunity to reduce the costs and the burden of device management?

The web of interconnections

Always on, always there, always aware,
always informed, always connected



3

Cast your mind back 15 years

The internet was a much smaller and more orderly place. Amazon and eBay had just made their debuts. It was not unusual for global companies or government organisations to have no website. Access was via temperamental, painfully slow dial up modems. And, for most of us, e-mail was considered avant garde.

Now think back five years

Within that decade, despite the bursting of the dot.com bubble, internet and mobile technologies had wrought a social, economic and cultural change that could be compared to that caused by the industrial revolution 250 years previously.

Those without an e-mail address and a mobile suddenly had a real sense of exclusion from society. Any large, consumer-facing enterprise without a sophisticated website was probably going out of business. Government services were moving online. High speed, home broadband and wireless networks were becoming commonplace. Even some mobiles were capable of connecting online.

During this period basic connectivity became mainstream. Whole new industries developed. Global giants such as Google and Amazon were created. Significant threats were posed to incumbents, not just in technology, but also in retail, communications, music, media and advertising.

From then until now, we have seen the consolidation of those early trends. As the online community has gained its confidence and found its voice we have also seen the explosion in social networking. With the emergence of mobile broadband and WiFi, the internet is no longer desk-bound. With location awareness we have also seen the foundations of new services – from navigation to search and retail-based opportunities, to the beginnings of augmented reality¹⁴.

This goes well beyond connectivity. It represents the beginnings of true interconnectivity. And, from here on in, we expect to see two main trends.

More of the same

It might be more of the same. But this will still be very exciting.

With the imminent roll-out of one gigabit per second broadband in some areas of Europe, a further 20-fold increase in connection speeds is a short-term certainty. Meanwhile, new strains of wireless technology (such as LTE¹⁵ and WiMAX¹⁶) will provide a gigabit-class connection capability over long ranges and with very fast response times. This will replace today's slow and patchy 3G experience, and bring services to remote rural areas (although, admittedly, there may be an uncomfortable interim period where 3G is overstretched and new services are not yet available).

This level of bandwidth and availability will drive consumer demand for critical apps and services such as mobile banking and payments. It will also make more advanced cloud computing more feasible. And, together with the speed, comes far more network intelligence and a far greater understanding of exactly who and where you are.

As we reported in our second chapter (The power in your hands), NFC will be one of extras that come as standard on any smart device. This will be another big breakthrough, enabling richer interaction with the immediate environment, including the existing EMV-based acceptance infrastructure.

Future internet

Web 3.0, Ubiquitous Computing, Pervasive Networking, The Smart Environment, The Internet of Everything. These are just some of the terms being used to describe the way that the internet may evolve and expand to incorporate things as well as people. Here is how the concept was recently described by The Economist:

*"Imagine if all the objects in the world had all the information that they needed to function optimally. Buildings would adjust themselves according to the temperature. Ovens would cook things for exactly the right time. The handles of umbrellas would glow when it was about to rain. We long ago inserted "intelligence" into objects in the form of thermostats and the like; the internet of everything will extend this principle exponentially, giving us unprecedented control over the objects that surround us."*¹⁷

Many commentators have envisaged a step-change to a highly automated and totally interconnected world of intelligent objects and smart environments.

At Visa Europe, we take a more measured view. We find the future internet concept a useful visionary tool but we believe progress will be evolutionary. In particular, we are mindful of:

- The vast investments in existing and planned infrastructure, such as fibre
- The current fragmentation of distinct solutions into specific industry niches such as logistics and transportation
- Public concerns about safety, privacy, trust and change
- The lack (or excess) of standards which could potentially lead to demands for regulation.

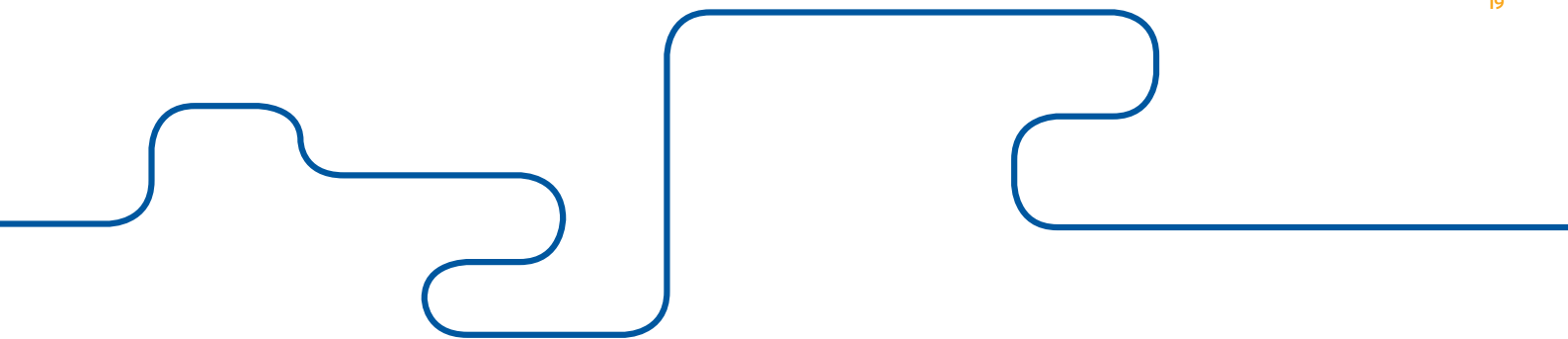
So, yes, future internet is certainly on the radar. But, from a payments perspective, there are some more immediate ramifications to consider.

¹⁴ Augmented reality (AR), describes the enrichment of the real world with the virtual, typically by adding additional information or graphics which will aid someone's understanding of a given situation. For example, by superimposing imaging data from an MRI onto a patient's body, augmented reality can help a surgeon pinpoint the location and dimensions of a tumour.

¹⁵ LTE (Long Term Evolution) is a fourth generation (4G) wireless broadband technology, that is widely expected to supersede the current generation of 3G technology, providing significantly faster data rates for both uploading and downloading.

¹⁶ WiMAX (Worldwide Interoperability for Microwave Access) is a communications technology that uses radio spectrum to transmit tens of megabits per second in bandwidth between digital devices. Similar to WiFi, WiMAX brings with it the ability to transmit over far greater distances and to handle much more data.

¹⁷ The Economist, The internet of hype, 9 December 2010.



So what?

The need for truly integrated, truly multi-channel payment platforms

In the world of retail, a consistent multi-channel experience has always been the aspiration. And the payment experience should probably be regarded as one of the key components.

In reality, the 'joins' are all too apparent. The retailer's 'web offer' and its 'mobile offer' may get confused about who I am. Then, of course, there is often a jarring disconnect between the physical and the digital.

Many retailers are actively seeking to blur the distinctions. In some, I can buy online and collect in-store. In others, I can choose and scan my items in-store, pay for them online, and get them delivered to my door the following day. For holistic concepts like this to evolve and flourish, the retailer needs to be sure of who I am, irrespective of the channel. And it would be logical if I had an easy, consistent, convenient way to pay.

Here, as in so many other areas, there is real promise for payment providers to add tangible value to new retail concepts and formats. But, to do so, won't it be necessary to partner much more closely across the value chain? Won't it be necessary to work in partnership to fashion secure solutions, and to deliver them in a way that excites and engages consumers?

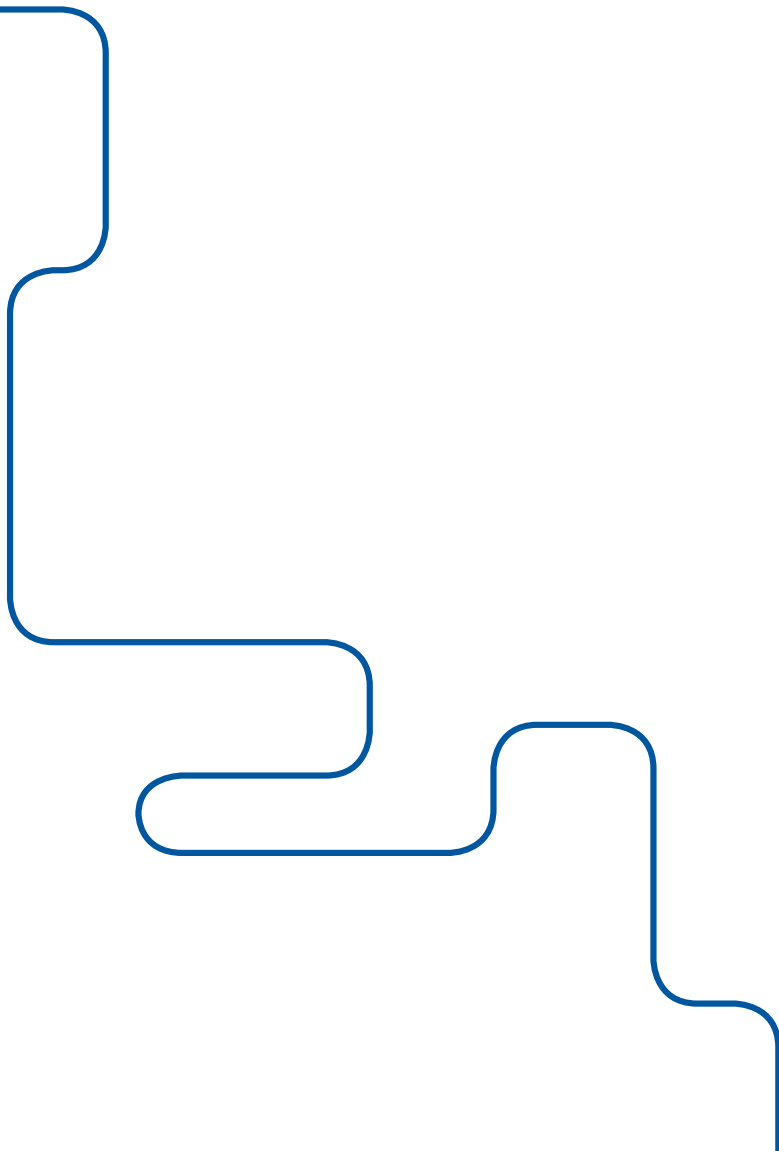
Surely, the industry imperative is to understand exactly which systems and parties need to be connected to which other systems and parties, in order to create new value – and then to act on that understanding?

Anticipating strong, steady growth in online payment flows

Already, digital commerce accounts for around 20 per cent of Visa Europe processed payment volumes. It is still growing at more than 30 per cent each year. And the web of interconnections promises much more of the same.

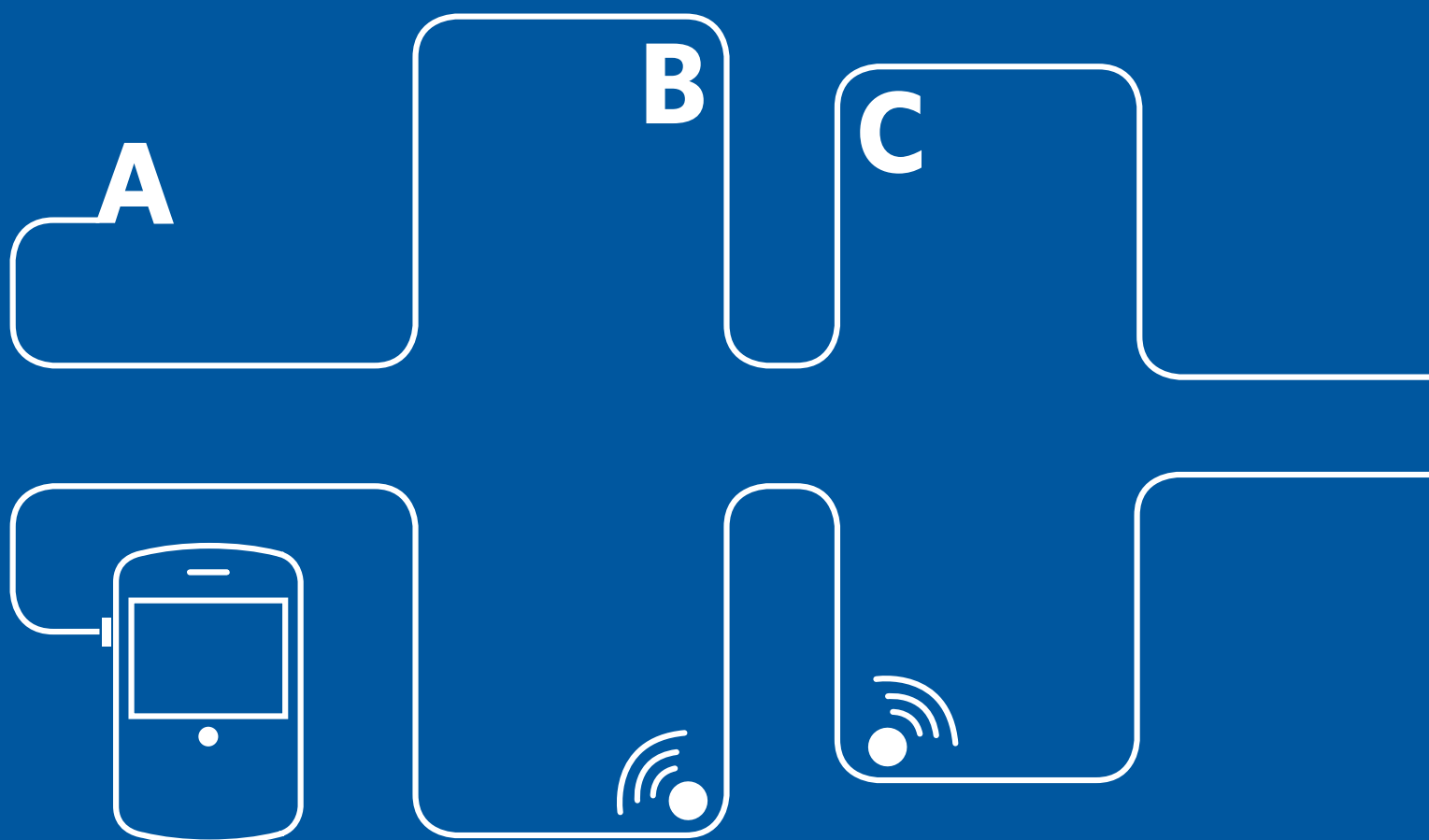
As people become more and more comfortable with using mobile, interconnected devices, more accustomed to more extensive, reliable coverage, with greater bandwidth and as they become more dependent on a wider array of applications then, isn't it inevitable that they will use these devices to initiate even more payment flows? So shouldn't the industry be positioning itself to benefit from the consequent increase in payment opportunities?

But, again, the same caveats apply. Traditionally, cards have been used online by default. Banks cannot regard the existing range of payment products and services as a final or enduring solution. Instead shouldn't the industry find more ways to meet more needs more effectively? Mustn't we ensure that our collective payment system continues to be the easiest, most natural way to shop online? Otherwise, won't we leave more of that clear white space?



The digitisation of reality

Our real lives are replicated and reflected in a parallel (digital) universe

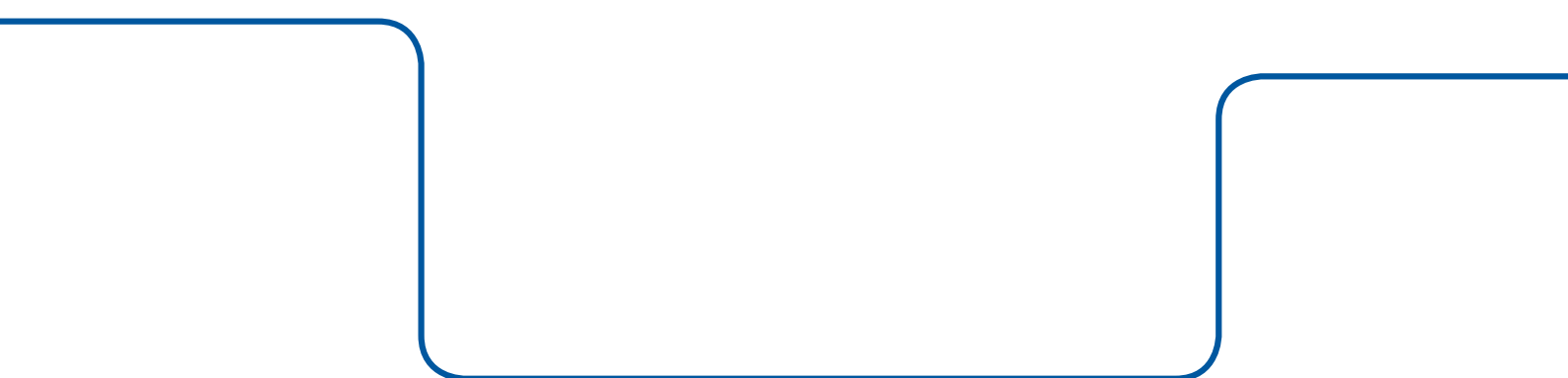


It all started with parcels

Way back in 1981, Federal Express created a computerised tracking system. Using this magical new capability, every shipment could be traced along every leg of its journey.

This was an early and classic example of the digitisation of reality. A real-world process became mirrored in the digital world. For the company and its customers it was a huge leap forward, and a real competitive advantage.

These days, every parcel is tracked by every logistics company. The systems are opened to the internet. It is easy for everyone to track and trace. Customers get a direct line of sight to the parcel's journey, and providers spend less money on expensive call centres.



The same basic phenomenon is starting to manifest itself across many other facets of our business and social existence.

The real world is becoming strewn with sensors (barcode scanners, RFID¹⁸ transmitters, thermometers, GPS monitors, and so on) picking up on every pertinent detail. The virtual world then takes in all of that information. And, from there, it can be monitored and acted upon.

Often, as these virtualisation systems become more automated, they take on a life of their own. Consider today's baggage handling systems, which require little human intervention (other than to actually heave the bags on and off the conveyor belt). A virtual bag will, for example, 'know' if it has missed its connection. It can even 'tell' its owner so. It will also be aware of its own security status, and any limitations that this may place on its onward journey.

In the future it is feasible that every physical entity will have its virtual equivalent. And it won't just be tagged. The virtual object may be imbued with intelligence by virtue of its interconnection with the real world. Again, this is about the internet of everything – the smart environment. It is a vision which excites us. But we believe its realisation will be a measured and incremental journey (not a sudden step change).

The more immediate consideration – and the one with potential for significant payment flows – is the digitisation of peoples' persona, their preferences, their preoccupations and even their possessions. This process is well underway and destined to accelerate.

As ever, the smartphone (in all of its emerging guises) plays a prominent role. It is fast becoming the 'everything hub'. Just consider some of the content and the interconnections:

- Social – contacts, phone, appointments, journal, e-mail, Facebook, Twitter, tracking friends and family
- Media – all my digital music (when was the last time you touched a CD?), my favourite print publications (with proper look and feel, which even read themselves out loud), a couple of high definition (HD) movies that get renewed each night, my photo album, editing and sharing of HD video, internet – both general access and with favourite sites packaged as apps, podcasts of my top radio and TV shows
- Hobbies – guitar tuner and chord directory, sheet music, fishing flies and knots, hikers' maps, spirit level
- Travel – navigation, maps, GPS, compass, augmented reality, local services guide, weather, guidebooks, phrasebooks, speech translator
- Fun and games – too numerous to mention!

¹⁸ Radio-frequency identification (RFID) is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves.

As The Economist puts it, *“it is the smartphone and its “apps” (small downloadable applications that run on these devices) that is speeding up the convergence of the physical and the digital worlds. Smartphones are packed with sensors, measuring everything from the user’s location to the ambient light. Much of that information is then pumped back into the network. Apps, for their part, are miniature versions of smart systems that allow users to do a great variety of things, from tracking their friends to controlling appliances in their homes.”*¹⁹

In other words, my smartphone is an extension of me – a new vital organ; a totally user-centric phenomenon. And, once again, remember the sheer scale of the smartphone phenomenon. This is not about a privileged few. Worldwide, we are talking a quarter of all handset sales. In the more developed economies the proportion approaches a half of all sales. Growth rates are nearing 100 per cent. And apps are being downloaded at the rate of more than three million a day.

This is a profound change to the way people live their everyday lives. The sceptics may say they have seen it all before (from the filofax to the personal digital assistant or PDA). But this is destined to be far more transformational (more akin to the impact of the television or mass transportation). And with vast swathes of the population choosing to interact digitally, we can safely assume that they will expect to transact digitally.

¹⁹ The Economist, It’s a smart world, 4 November 2010.

So what?

Accommodating more 'pull' payments

In most cases, today's consumers make discrete decisions to make a payment – settling the restaurant bill for example, or paying for the grocery shopping. They 'push' and the payment infrastructure responds.

As reality becomes more digitised, we can probably assume that more payments will be made more automatically – and 'pulled' through by the infrastructure.

We can see the early signs. When purchasing from iTunes, consumers are not repeatedly asked for authorisation. Several online services have been successful in extracting a regular, automatic fee (think Spotify Premium²⁰ or Audible²¹). And commuters in London have their Oyster²² cards automatically topped up when funds are running low.

When your entire being is replicated in the digital world, isn't the scope for these 'pull' payments extended commensurately? Ordering your meal from an electronic menu for example? Or exiting a car park? Or entering a congestion zone?

And the implication for payment providers? Wouldn't it be wise to make sure that it is your products from which these payments are 'pulled'? If you put yourself in this position then, surely, substantial future flows are virtually guaranteed?

Smarter, safer risk management controls

When reality is digitised the scope for risk and fraud management is extended by a factor of two. Comparisons can be drawn between the real you and the digital you, and any divergence between the two could set the alarm bells ringing.

If, for example, it were clear that your phone was in one place whereas a payment transaction originated from somewhere else, fraud could be detected and avoided. And, with people wielding such powerful and contextually aware devices, there could be an opportunity to implement ever-tighter, ever-smarter fraud controls whilst continuing to enhance the consumer and merchant experience.

On the surface, such solutions might sound attractive. But there will always be a need to balance the potential benefits of improved risk management with the need to respect personal privacy.

Also, consider the scope to involve customers in selecting authorisation and risk management parameters. By accessing their personal dashboard through their mobile device, why shouldn't they be empowered to select their own transaction limits? Couldn't they be entitled to block transactions from certain merchant categories or certain geographic locations? And, if their circumstances changed, couldn't they be encouraged to update their profile accordingly?

²⁰ Spotify is a music streaming service offering unlimited streaming of selected music from a range of major and independent record labels. It is available as a free service, funded by advertising. Or, for those who are prepared to pay a monthly fee, the Spotify Premium service is free of advertising and incorporates a number of additional features including offline access via smartphones.

²¹ A subsidiary of Amazon, Audible.com is an internet provider of spoken audio entertainment, information, and educational programming. A variety of subscription models is available, in which users pay a monthly fee.

²² The Oyster card is a form of electronic ticketing used on public transport services within the Greater London area.



The age of omniscience

Businesses are gathering enough data and processing power to become all-knowing

5

Big Data²³ is a big talking point. And it is getting bigger all the time

The physical world is becoming strewn with sensors. And, when it comes to producing data, we are truly prolific beings. Those of us wielding a mobile, a laptop and a payment card generate data every moment of every day – simply by living.

Armed with this type of data, today's businesses could become all-knowing – or omniscient

They could improve their efficiencies (because they know exactly what is inefficient). They could deliver on customer needs (because they have a more complete understanding of who these people really are and how they behave). And they could be sure that all of their investments are targeted at the right time, to the right people, in the right way.

Or so the theory goes...

In the real world, harvesting and handling vast quantities of data can be something of a challenge.

First of all, the volumes can be unwieldy. Every second, the Large Hadron Collider at CERN, Europe's particle-physics laboratory, can generate 40 terabyte of data. Every hour, Google processes around 1 petabyte. Every month, Facebook serves up 570 billion page views, adds three billion photos, and shares 25 billion items of content. By 2013, the amount of traffic flowing across the internet annually will exceed 665 exabyte²⁴.

These numbers are barely comprehensible, even to those who work in the technology business. And, despite the abundance of interconnected compute power, the ability to communicate, store and process these data is under increasing strain. The market intelligence firm IDC, for example, believes there is already a large and growing gap between the creation of data and the available facilities in which it can be stored

The giants in the data business – the likes of Amazon, Google and Facebook – can maybe take it all in their stride. Number crunching is what they do. They benefit from huge, custom built environments. They have the premium IT skills and the latitude to scale up on demand.

But, for those in other sectors, getting up to speed – and keeping up – can be more of a challenge.

For example, the skills required to analyse all of this data are trading at a premium. Google's chief economist, Hal Varian, has famously predicted that the job of statistician will soon be the sexiest around. And many of the biggest beasts in the technology business have been on a data-related spending spree. According to *The Economist*, Oracle, IBM, Microsoft and SAP have collectively spent more than US\$15 billion on buying firms specialising in data management and analytics. This industry is estimated to be worth more than US\$100 billion and growing at almost 10 per cent a year, roughly twice as fast as the software business as a whole.²⁵

Privacy is another critical consideration. Even when companies are acting well within the legal requirements, the public can be sceptical of their true motives. There is much for everyone to gain from a smarter world, but a necessary prerequisite is the consent of its inhabitants.

The size of the prize is considerable. Those businesses that outperform the wider market tend to be the 'data haves'. In fact, more and more of today's successful businesses are actually in the data business. On the surface of it, they may appear to be a conventional company in an unrelated sector. But their competitive advantage is drawn largely from their analytical prowess.

A classic example is DVD rentals. Anyone can get into this business by taking a franchise from, say, LoveFilm. But having the product and marketing it proficiently is not enough. Success consists almost entirely in understanding the customer and making good recommendations to sustain their subscription once they have watched all of their old favourites. Netflix, a US pioneer, put up a US\$1 million prize to improve its recommendation system by just 10 per cent.

One can even suggest that top retailers, such as Walmart, Carrefour and Tesco, are really in the data business. Their sourcing, logistics, and customer insight, for example, are their keys to cost/price reduction and sales growth, based on data and advanced analytics.

And consider the performance of a Chinese business called Li & Fung. Founded in Guangzhou a century ago, it is now one of the world's biggest supply-chain operators. It owns no factories or equipment. Instead, it orchestrates a network of 12,000 suppliers in 40 countries, using real-time data and analytics to source goods for brands ranging from Kate Spade to Walt Disney. Its annual turnover exceeds US\$14 billion.

So, big data has to be a big consideration for any commercial enterprise.

²³ Big Data is a term which is typically used to collectively describe the various tools, processes and procedures which allow today's businesses to create, manipulate, and manage very large data sets.

²⁴ We know that a terabyte is equal to 1,000 Gigabyte, and equivalent to 50,000 trees worth of printed paper (see footnote 5). This means that 40 terabyte is equivalent to two million trees, 1 petabyte (at 1,000 terabyte) is equivalent to 50 million trees, and 665 exabyte (at 1,000 petabyte per exabyte) is 33.25 trillion trees.

²⁵ The Economist, Data, data everywhere, 25 February 2010.

So what?

Appreciating the hidden value of payment-related data

In theory at least, the payment industry has to be regarded as one of the most data privileged sectors in the world.

Other industries may have just one customer interaction a week (or a month or even a year). They have little idea of what is really happening outside of their own immediate domain. By contrast, a successful payment provider can deduce exactly where, when, how much and with whom people are spending their hard earned money. And, as cash and cheques are progressively displaced, this data – and its value – escalates accordingly.

Few other businesses have such a complete understanding of consumer lifestyles. Even the mobile sector could be envious. And, in the future, shouldn't this degree of understanding be regarded as a significant competitive asset?

Liberating payment-related data

The European payments industry has traditionally been cautious about its data. It has, quite correctly, been mindful of security, privacy and regulatory constraints. And its data has remained penned within corporate data centres that are simply not suited to high-volume advanced analytics.

But one trend we are certain to see is data anonymisation. This technique can retain the insights but eliminate the risks and the sensitivities. Payment related data can be liberated from the old constraints, and significant value can then be realised.

Payment related data volumes tend to be large, but they are not in the petabyte league. For example Visa Europe's complete store of all transactions is about 20 terabyte per annum²⁶. This means it is perfectly practical to anonymise all data and ship it into the cloud environment of cheap storage and powerful analytics, while still complying with all regulatory requirements and safeguarding security.

Cleaning up payment-related data

As everyone in the industry knows, certain aspects of payment-related data can be of questionable quality.

For example, the data stored in Point Of Sale systems, such as data relating to specific merchants or merchant categories can be riddled with anomalies. It fulfils its original purpose extremely well (that is, identifying and authorising transactions) but, when you try to be more creative, issues can materialise and escalate.

This is one area where advanced analytics can deliver immediate dividends. Using techniques like collaborative filtering²⁷ and fuzzy matching²⁸, excellent results can be achieved (as Visa Europe has demonstrated with its own data). And, once the data has been cleaned, further analysis can yield deep insights.

Acting on customer insights

Successful payments businesses have a unique opportunity to understand past customer behaviours and determine future propensities.

Predictive analytics have an uncanny capability to identify those customers who will respond favourably to a given product offering. Targeting can become far more accurate, costs minimised, and customer satisfaction enhanced.

²⁶ 20 terabyte of data is equal to 20,000 gigabyte, or, according to our tree calculation (see footnote 5) equivalent to 1 million trees worth of printed paper.

²⁷ Collaborative filtering is the process of filtering for information or patterns using techniques involving collaboration among multiple agents, viewpoints, data sources, and so on.

²⁸ Fuzzy matching (as opposed to exact matching) is a technique used in analytics to identify data with similar characteristics, but without sacrificing relevance.

²⁹ Customer churn is a term used to describe levels of customer attrition, customer defection or customer turnover. Churn prediction is, therefore, a means of identifying those customers who are most likely to defect.

Churn prediction²⁹ could also become commonplace, enabling the retention of valuable customers. Analytic models, and even real-time analytics, could increasingly become embedded in call centre operations, allowing operators to know when and how to make appropriate product suggestions.

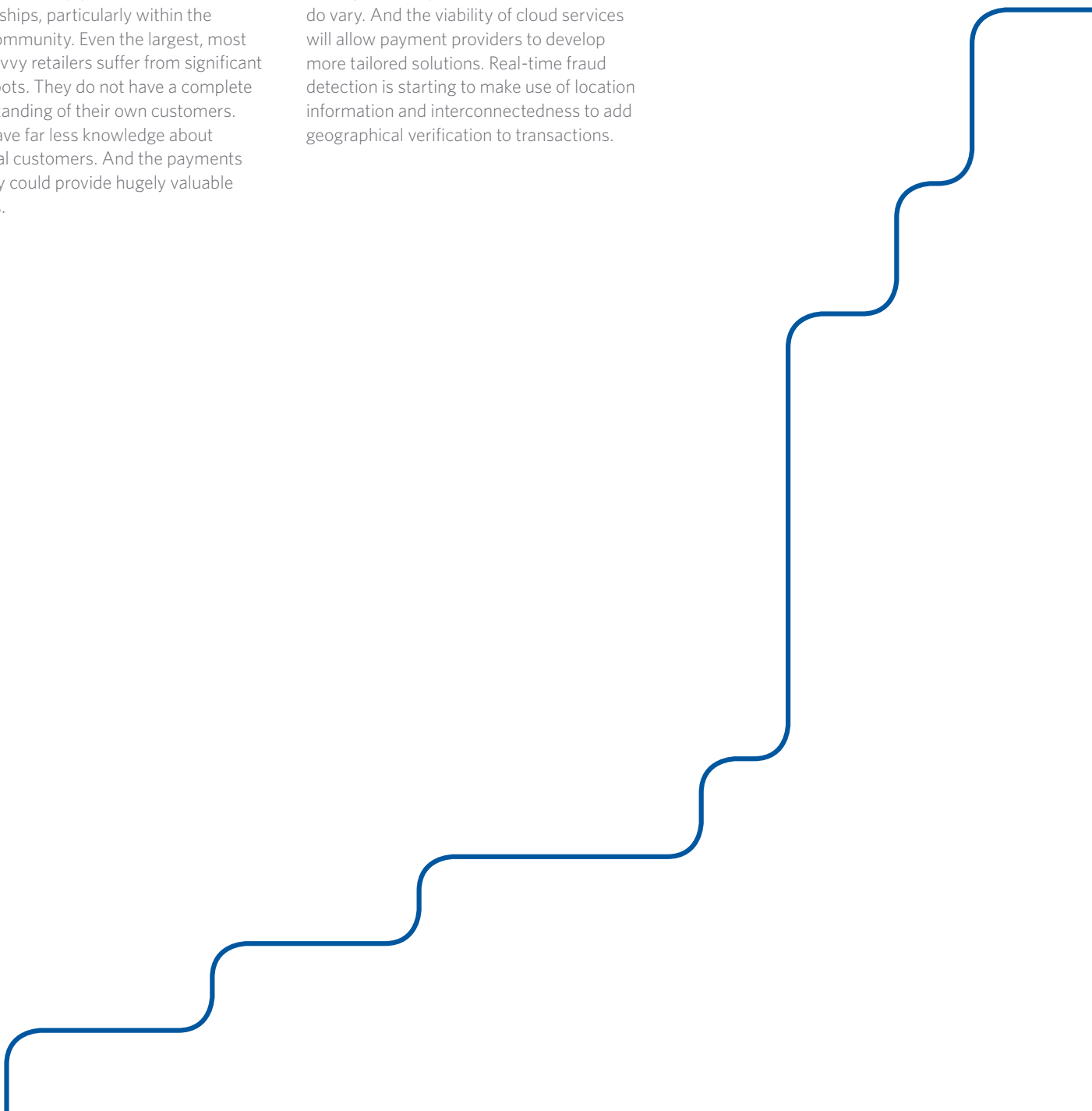
Also, the payment industry will have the means to develop productive business partnerships, particularly within the retail community. Even the largest, most data-savvy retailers suffer from significant blind spots. They do not have a complete understanding of their own customers. They have far less knowledge about potential customers. And the payments industry could provide hugely valuable insights.

By engaging at this level, hasn't the payments industry got the opportunity to become a much more vital and valid business partner? And, by operating in this way, couldn't we do more to move the agenda from the cost of payment services to the value they generate?

Improving risk management

Advanced fraud detection techniques are already in widespread use. But the results do vary. And the viability of cloud services will allow payment providers to develop more tailored solutions. Real-time fraud detection is starting to make use of location information and interconnectedness to add geographical verification to transactions.

Pooling of data amongst players could become common. By combining diverse data types within the cloud, and drawing on larger data sets, couldn't we anticipate clearer insights into customer behaviours? And wouldn't these insights enable us to deliver an improved customer experience?





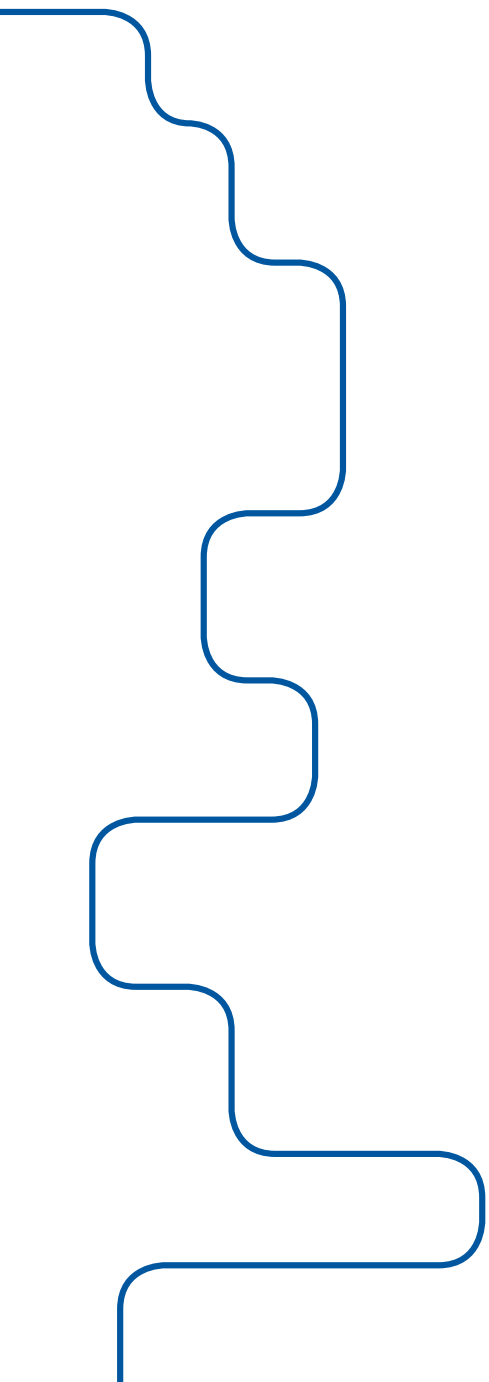
The small town syndrome

The world is a more open and collaborative place in which to operate

6

The confluence of trends outlined within this report has definite consequences for the ways we work, play, organise and socialise

It is as though we have all moved, en masse, to a small country town.



When you live in a small country town, you get to know lots of different people. You talk to who you like. You get to hear things. And the things that interest you, you start to pass on.

You find out the best place to get your car fixed cheaply and reliably; who can help you fix your PC; which doctor takes the most time and trouble with their patients; which shop sells the freshest vegetables; which pub sells the best beer; what the wages are at the local saw mill; what kind of car its boss drives and which gossip is worth listening to.

You tap in to an informed and reliable network covering all the important things in life, based on word of mouth. It is a world in which the speech of big business and government is generally viewed with real scepticism.

This small town syndrome has far reaching implications. It changes the way we connect to and with other people. It changes the way we make our buying decisions. And, if we are smart, it also changes the way we run our businesses.

So, let's begin with the social side.

Social networking is surely one of the extraordinary phenomena of the last few years. To usher in the new decade Facebook toppled Google from its pedestal as the most visited website with almost nine per cent of traffic, compared with Google at a little over seven per cent³⁰.

Of their online time, in 2010 people spent 23 per cent on social networking, up 43 per cent on the previous year (compared with ten per cent on games, and eight per cent on e-mail. And more than 60 per cent of mobile page views are to such services³¹.

And it is not just Facebook. There are many different flavours of social networking, including blogging-based services (Blogster and Twitter), business and professional services (LinkedIn), special interest services (Last.fm for music, Flixster for film and LiveMocha for language learners), religious services (Muxlim and MyChurch), plus a whole host of national and regional sites. It is also common for more general websites (such as those related to soap opera or technology) to have a substantial social networking element.

Growth in users is just part of the story. The mobile internet, for example, can add more context, particularly location. And look out for added dimensions, like social shopping, where people post their purchases and recommendations.

With such a huge population spending so much time and energy, there must be vast commercial opportunities to exploit. Yet it seems that no-one has yet found the silver bullet, other than the obvious - advertising (and advertising alone cannot account for Facebook's extraordinary US\$50 billion price tag).

Things are no less profound on the business front.

In and of itself, social networking is an intriguing tool. Many business leaders (like IBM's Sam Palmisano, PepsiCo's Indra Nooyi, and Apple's Steve Jobs) are active social networkers. For them, it is a way of broadly communicating real-time messages to the audiences they want to reach. They can write a message anywhere, anytime, and share it with interested parties.

³⁰ Experian Hitwise, December 2010, <http://www.hitwise.com/us/press-center/press-releases/facebook-was-the-top-search-term-in-2010-for-sec/>

³¹ Nielsen, August 2010, http://blog.nielsen.com/nielsenwire/online_mobile/what-americans-do-online-social-media-and-games-dominate-activity/

At the same time, consumer marketing companies are lining up to use these networks to reach specific segments with personalised messages. Kraft Foods, for example, is now one of the largest publishers of food-related materials. Through its Smarter Planet initiative, IBM has created an entire thought leadership community.

Dig deeper and more approaches become apparent. Crowdsourcing³² enables you to engage your customers directly into your product development programmes. Mashups³³ allow for cooperative action among businesses and developers.

Wherever you look in the world of business, the small town syndrome has put a far greater emphasis on collaboration between different organisations. For example, there is a trend towards larger organisations harnessing the skills, the drive and the pure energy of entrepreneurial start-ups. In the mobile ecosystem, it is the developer community (via the apps available on Apple iTunes, Android Market, and the like) that breathes life into the smartphone proposition. And other sectors are increasingly eager to apply the same broad principles.

So what?

Cracking the social networking payments challenge

Clearly, there are some tactical opportunities in targeted payment offerings, based on elements such as real-time location, analytics to identify influencers, working with merchants, and so on – but market competition should drive these anyway.

Isn't the bigger challenge for the European payments industry to adapt and extend its existing solutions to make them a more natural fit for the social networking world? Social networking sites are increasingly acting as platforms on which sophisticated applications can be built. The entrepreneurial community will be sure to build the commerce applications, such as shops, auctions and promotional schemes. But, to do so, won't they be actively looking for a trusted and accepted payment mechanism?

Is there any logical reason why the industry cannot step up to this challenge?

We have the pre-requisite skills, the brand strength and also a phenomenal distribution network. But the industry does not yet offer a final or enduring solution – backed up, for example, by a personal identity management (PIM) scheme that could even enable trusted financial transactions between online personas or avatars.

If, as an industry, we do not rise to this challenge, isn't it inevitable that others will fill the considerable vacuum?

Embracing the collaborative computing ethos

In technology terms, the payments industry has traditionally been self-contained. In-house development teams have been asked to do everything – from building the intranet site, to developing the key controls, to managing the desktop PCs, to building an entire new data centre.

In the burgeoning world of collaborative computing, is this approach really sustainable? Shouldn't the payments industry try harder to harness the energy and the specialist skills available within the global developer community?

Of course, in a world where risk and regulation figure so prominently, there is an understandable reluctance to break with tradition. Perhaps one way forward is to identify areas of the business where the approach could be road-tested? Could one such example be in data and analytics? Or perhaps in R&D?

Emerging from the collaborative computing ethos are two relatively distinct ecosystems. One deals with the generation of new ideas and products. The other deals in their delivery. Can we expect more than a few businesses to be able to excel in both?

³² Crowdsourcing is the act of outsourcing tasks, traditionally performed by an employee or contractor, to an undefined, large group of people or community (a crowd), through an open call. For example, the public may be invited to develop a new technology, carry out a design task, refine or carry out the steps of an algorithm, or help capture, systematise or analyse large amounts of data.

³³ The term mashup was originally used to describe songs that meshed two different styles of music into one song. It has since become applied to other situations which integrates complementary elements from two or more different sources.

The crisis of identity

Traditional identity management models become increasingly unsustainable

We believe that the world is facing a crisis of identity

The trouble is, the personal identity management (PIM) models that have grown up over the past 200 years or so are increasingly inadequate in today's world – and this inadequacy is causing unacceptable costs, risks, inefficiencies, and barriers to innovation and growth.

This is not just about authentication. It is more multi-layered and multi-faceted

Modern existence is enabling and requiring people to actively maintain and manage multiple identities and personas. And, so far, the technology has not caught up with the way that people are living their lives.

The trends outlined in this report exacerbate the situation. But they are not the sole culprits. The forces of globalisation, migration, and social fragmentation mean that more people are interacting with more entities more often. With the spectres of organised crime and terrorism it becomes more important to confirm and also to protect identities. And in an age of increased tribalism and individualism, people are more keen to express and portray themselves.

Attempts to remedy the situation range from state-run initiatives (such as the UK's ill-fated Identity Card scheme), to technology-led start-ups with lots of bright ideas but little chance of practical success.

We address this theme a little differently from the six that precede it. There is less market activity. There is also less scope for payment industry players to respond unilaterally. And the materialisation of any sustainable solutions is likely to go somewhat beyond our three-to-five year time horizon.

First we take a historical perspective on the subject of identity. We then explore the ways in which our social and technological changes are leading us into crisis. And, finally, we consider the likely characteristics of any viable, long-term solution.

A historical perspective

Once upon a time, you were the baker, the blacksmith's son or the village idiot. Your identity was so little in question, with its daily social re-affirmation, that the notion of an identity (as distinct from an actual person) barely existed. Parish registers were kept, censuses were taken, but these had little bearing on you and your everyday life.

With industrialisation, urbanisation and mass-employment, things began to change. Identities started to become more important, at least in helping employers and authorities to keep and enforce order. Then, with the emergence of the middle classes, and the rise of consumer banking, the local bank manager began to take an ever-more active role in ascribing and conferring personal identities (at its most basic, a payment card is, after all, a means of identifying a specific individual and linking them with a given account).

With the growth of the state (in public education, for example, or healthcare and social security), government assumed an increasing role in identity management. But still, the grip of personal financial services (banking, insurance, mortgages, and investment and payment products) remained the dominant force in an increasingly complex system.

The cracks begin to show

The explosion in internet use, starting with e-mail and e-commerce, and later social networking, has further fragmented the picture.

People regularly hold dozens of user IDs and passwords to access a plethora of services. They may also sustain several different e-mail addresses. At the same time individual identities have shattered into multiple personas. The new tools of social networking show that humanity has an unlimited capacity for social activity, with millions of individuals actively projecting their identity across a diverse social world.

Meanwhile, in financial services, choice and globalisation have made consumer behaviour infinitely more complex (a single consumer may have ten or even 20 different services providers, and many more regular financial relationships beyond those). At the same time, organised crime and terrorism have brought an added requirement for robust identity management. And the state brings yet another dimension - with many government agencies to deal with across multiple channels.

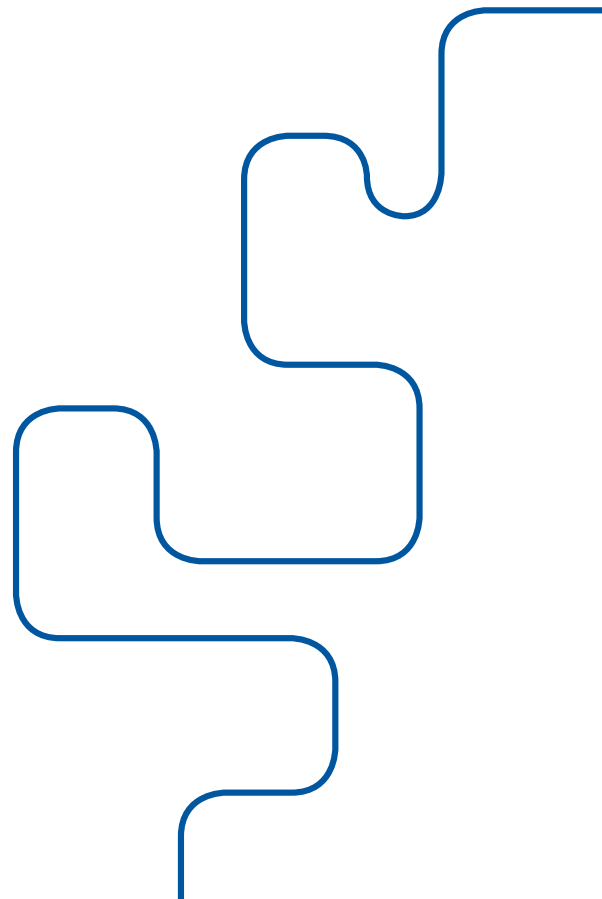
For the traditional custodians of identity (the banks and the state), the new diversity of behaviour and requirements becomes ever-more unmanageable - creating unacceptable systemic costs, risks and lost opportunities to innovate.

We are now at a turning point in the management of personal identity. It is clear that neither the individual, nor the institutions, nor society is well served by this worn-out legacy from simpler times.

Whenever, wherever and however another being 'transacts' with us, they generally want some inkling of who we actually are. And, as those 'transactions' become more formal, they want to trust who we are.

On certain websites (such as eBay or Amazon Marketplace) the rating and review systems can indicate that we deserve that trust. But such systems are completely isolated from all of our other personas. Wouldn't it be better if the trust of one counted for the trust of another? And wouldn't it be just perfect if the well of trust we had built up over our lifetimes could somehow be projected within or channelled to all of our 'transactions'?

It is also clear that individuals are seizing back power to own and control their identity. How many parents have allowed their children to use their payment cards (on their iTunes account, for example, or to replenish their talktime, or to buy a book from Amazon). We trust them, but would the card issuer (who is blissfully unaware of our own private arrangement)?



What could a solution look like?

It is not too difficult to postulate the characteristics for a robust personal identity management (PIM) solution:

- 1 Would it be standards based?
- 2 How could it function at a regional level and be interoperable at a global level?
- 3 Would there be an internet-based collection of identity components stored at the individual level?
- 4 Could the collection of components include photos, biometrics and scans of notarised documents (passport, bank statement, proofs of address, and so on)?
- 5 Could the individual solely manage the contents of the collection, including its encryption, to avoid the possibility of mass data theft?
- 6 Would a trusted third party be able to provide independent assurance of the relationship between the real-life person, the real-world evidence of their identity, and their virtual identity?

- 7 Could there be 'high street' agencies that provide facilities and assistance?
- 8 Could access for the individual be via a secure methodology (perhaps even biometrics to allow for the loss of credentials)?
- 9 How would the service support personas, credentials and avatars?
- 10 Could the service be held in public trust, managed by a highly trusted organisation, and capable of replication and access to federated organisations?

Based on a universal PIM system, a sophisticated authentication service could be delivered. Credentials could also be verifiably conjured onto mobile phones, Facebook pages, and so on, in a flexible manner, appropriate to the situation. And, because you have a universal, cast iron guarantee of someone's identity, a whole host of commercial opportunities become immediately apparent.

Clearly, the success of such a PIM service would have profound implications for the European payments industry:

- It could open up huge new payment streams – within social networks, for example, or between avatars or personas, or through federation of identity (a formal version of children using their parents' card), or for casual and mobile merchants
- It could enable the industry to take the high-ground – by adding great value to society, to the state, to businesses and to individual consumers
- It could reduce fraud – both in payment transactions and across society as a whole

As such, this would be a true game-changer. It is not an initiative that could be realised within a three-to-five year horizon. But isn't it one that the industry could start planning and designing right away?

So what?

So what should the collective industry do about this?

Banks have always been in the business of ascribing and conferring identities. Today's crisis of identity is causing untold cost and inconvenience (within the industry, to individuals and across society at large). And there is undoubtedly an opportunity to deliver a universal solution.

Also, thanks to its correspondent banking legacy, the industry has a highly interconnected and standardised infrastructure. And, notwithstanding the turbulence of recent years, individual institutions retain a reservoir of real trust.

Surely, it is a topic which deserves a prominent place on the collective industry agenda? And surely, having instigated and implemented other global standards (such as EMV), we have the capability and the credibility to do it again?

What do you think?

If you have been intrigued – or infuriated – by the content, we would love to talk in more detail. We hope this report will prompt constructive, compelling conversations between us (Visa Europe) and you (our members and our wider stakeholders).

To continue the conversation, you can contact the Visa Europe technology team directly at futurevision@visa.com

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