

The future of technology transforming mid-market business operations

An information guide from Access



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Foreword

The pace of change in the communications and technology sector is relentless and shows no sign of slowing down. The World Wide Web was invented 20 years ago and there is no doubt that the next 20 years will see the development of further technological breakthroughs that will have profound implications for both businesses and individuals.

Access' report provides an excellent summary of the opportunities and challenges that the pace of technological change will create for companies. It highlights how virtual cloud-based IT structures and 'software as a service' (SaaS) models have become a business and not just a technology conversation, potentially offering cost saving benefits to business as well as increasing the ability to manage scale more quickly.

Increased connectivity and social media proliferation bring ever greater working flexibility and impact people's working practices and staff management as well as the expectations of customers. Understanding customer need is important, but the ability to react quickly to those needs will present businesses with many challenges. They will need to become better at making the best of technologies available – to enable innovation that can create new business models and impact the long-term growth and competitiveness of a business.

Ultimately this report helps to highlight that the successful organisations of the future will be those companies who can seize on the technologies available to help adapt and change their cultures, business practices and strategies in a fast changing world market.

– Charles le Strange Meakin, Partner, KPMG LLP Cambridge

“We won't experience 100 years progress in the 21st century – it will be more like 20,000 years of progress at today's rate. Within a few decades, machine intelligence will surpass human intelligence, leading to the Singularity: technological change so rapid and profound it represents a rupture in the fabric of human history.”

Ray Kurzweil

American author, inventor and futurist

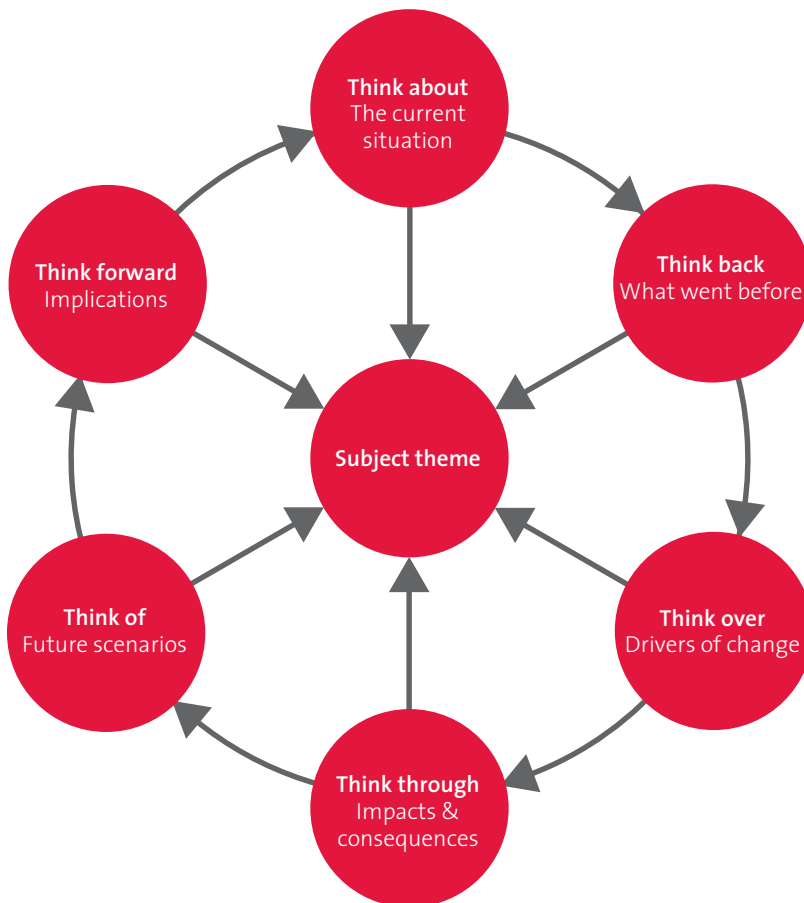
This report

2011 is Access UK's 20th anniversary and to mark the occasion the company has published this insight report, in collaboration with the Centre for Future Studies, which explores the ways in which technology will be enabling the transformation of business operations over the coming decade. Business solutions must be future ready. Technological developments over the period to 2020 will herald dramatic changes in business, financial and administration processes. This report explores the potential impacts and consequences.

About Centre for Future Studies

The Centre for Future Studies (CFS) is a strategic futures consultancy enabling organisations to anticipate and manage change in their external environment.

It's foresight work involves research and analysis across the spectrum of political, economic, social and technological themes. Clients include national and international companies, not-for-profit organisations, government departments and agencies.



Methodology

A search of extant, published literature was undertaken by the Centre for Future Studies research team to identify key technological trends and forces of change impacting on mid-sized businesses.

The data obtained was filtered for relevance and an analysis was undertaken of the likely consequences and implications.

Setting the scene

Sweeping changes in the business landscape will mean a new approach to IT delivery by 2020. A revolution in technology is transforming business and the ways individuals live and work. It's essential to adapt to the changes that lie ahead.

Three major forces will reshape business by 2020:

- The explosion of business-ready, self-service technologies
- The growing influence of a tech-savvy and self-sufficient workforce
- A business world and workplace totally unlike today's.

The business market will be radically changed as emerging economies dwarf established ones. A billion new consumers will enter the market bringing radically different views of products and services.

Surging resource costs, especially energy costs, will make today's business models unviable. Businesses will embrace technology to solve these challenges.

There will be a shift towards self-service technologies like software as a service (SaaS) and cloud platforms, technologies which business areas can take advantage of without the costs of previous technologies.

Business users will bring in devices like their smart phones or consumer apps and use them for work purposes. They already do this today to address the challenges and opportunities they see in supporting customers, streamlining internal collaboration and simplifying their work life.

When business executives can use dropbox.com to synchronise work information between work, home and mobile devices, they will.

Over the next 10 years, these self-service technologies will become even more powerful and easier to use, and increasingly tech-savvy business staff will be even more comfortable taking advantage of them.

Up to now, IT development was typified by a swinging pendulum from centralised, industrialised IT to decentralised and embedded IT which eventually swung back as costs mushroomed and enterprise concerns for security or for cohesive business models suffered.

These old paths won't work in the world of 2020 as the issue isn't technology alone, and the answer isn't control. This shift in technology independence for the business is being coupled with massive business environment change that requires a new path that enables the independence without sacrificing sustainability and incurring cost.

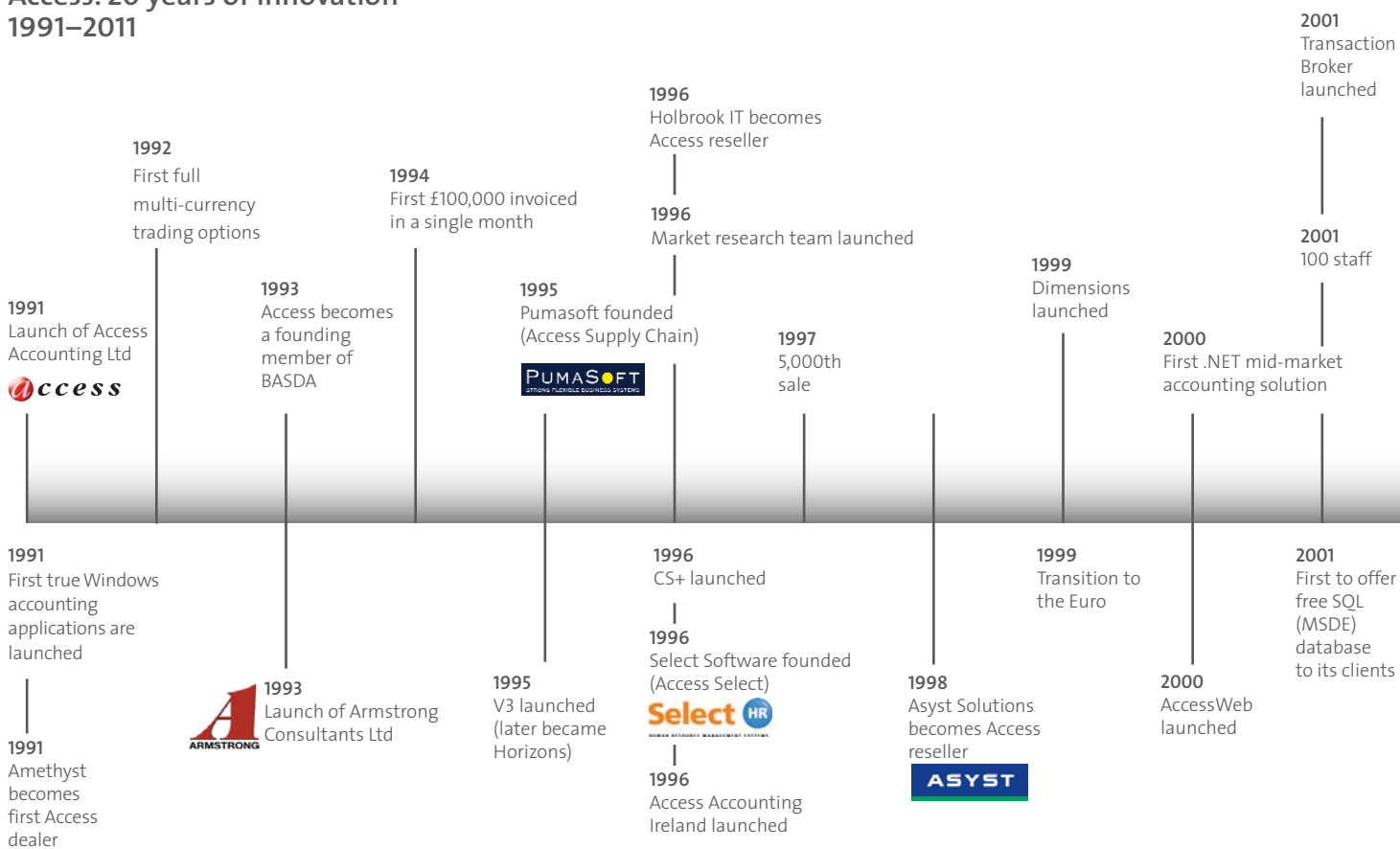
Business will incorporate technology in every process and work within an economy where there are almost no constraints from time and place and in which most hierarchical organisations disappear. The future competitiveness of businesses will depend on their ability to innovate and implement change enabled by technology. This revolution is leaving no person or organisation untouched. From business to education and 'not for profit', the digitisation and mobilisation of every process will affect everyone.

The challenge will be how to remain competitive and prosper in this new age of constant change and re-invention.

“Doing the impossible will simply mean doing something for the first time.”

Dr. Frank Shaw
Foresight Director Centre
for Future Studies

Access: 20 years of innovation 1991–2011



20 years of doing the impossible

Technology is so pervasive in our lives, businesses and culture today that it's easy to forget how brief the history of information technology really is. It's astounding to see how fast things have moved over the past 20 years. We take things for granted that just 20 or even 10 years ago would have seemed impossible.

Technology changes over the past few decades have had a profound impact on IT management. In the early 1980s, most computing was centralised, on large corporate mainframes. The applications were primarily related to accounting and finance, with a few notable strategic systems. It was the era of back office IT.

The explosion of networked PCs permanently changed the relationship between IT departments and users. In 1987 for example, 35 million PCs in the US seemed like a huge number. But within 10 years that had climbed to 126 million, and now there are over a billion PCs worldwide [Gartner] not to

mention all the smartphones and other mobile devices.

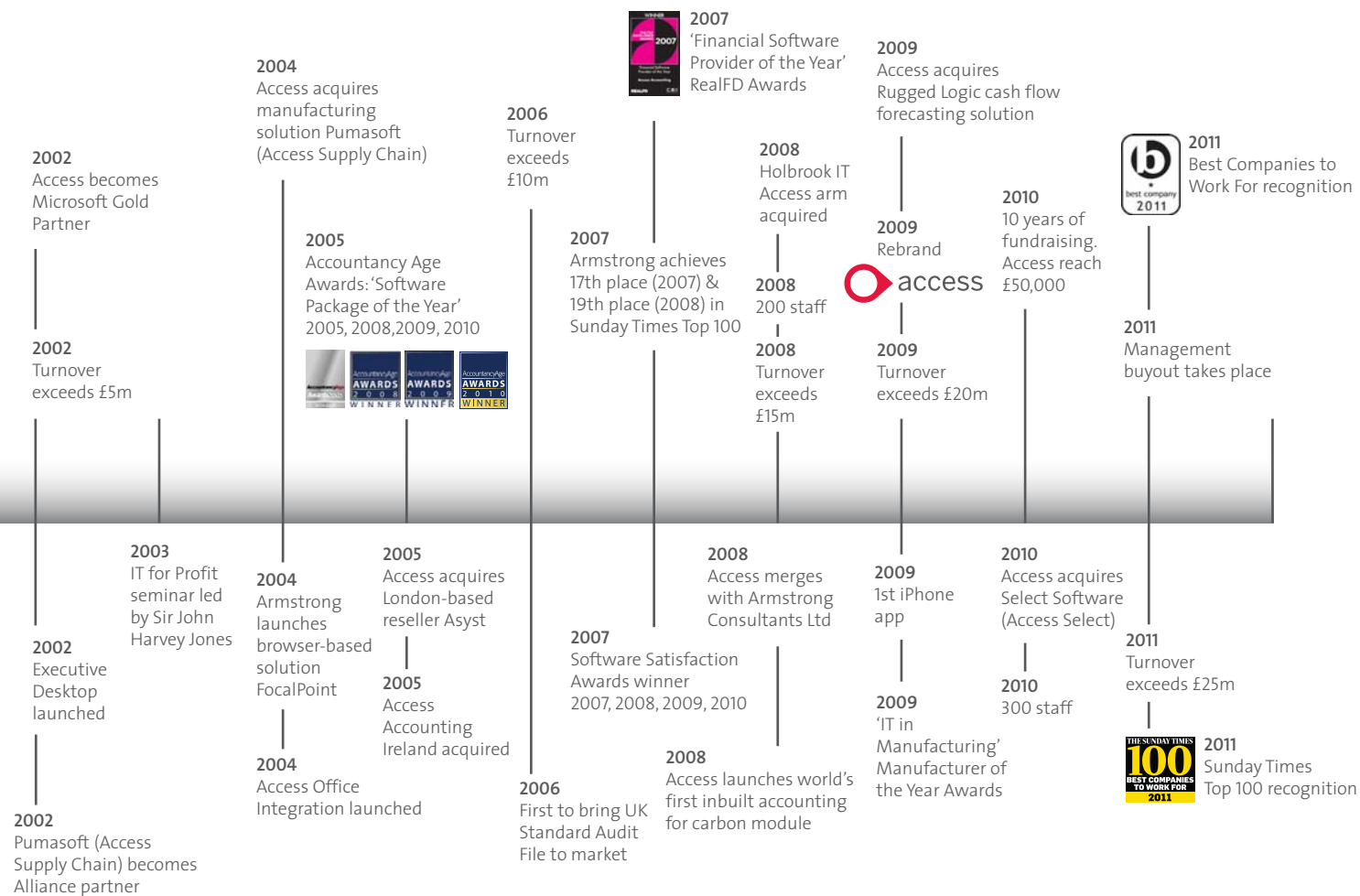
By the mid-90s, there was a whole new wave of change for CIOs to deal with. The rise of the internet and, in particular, the World Wide Web changed just about everything. The expansion of the web has been truly breath-taking. Stanford put the first US web server online in 1991; by last year, there were over 160 million individual websites, serving up more than one trillion web pages [Google] to over a billion and a half people. That's almost a quarter of the total world population!

Today, strategic systems both large and small abound. The availability of technology to any and all businesses, however, has changed the nature of the strategic play. It's not about the technology anymore; it's about the technology management.

Illustrative technological highlights 1990–1999

The 1990s were a revolutionary decade for digital technology:

- In 1990, the World Wide Web had only just been invented.
- Intel's first P5-based processor was released as the original Intel Pentium on 22nd March 1993.
- Mobile phones of the early 1990s were very large, lacked features, and were used by only a few per cent of the population of even the wealthiest nations.
- Instant messaging and the Buddy list become popular. AIM and ICQ are two early protocols.
- Businesses start to build e-commerce websites; e-commerce only companies such as Amazon.com, eBay, AOL, and Yahoo! grow rapidly.
- The first MP3 Player, the MPMan, is released in late spring of 1998. It came with 32MB of flash memory expandable to 64MB.
- The first GSM network is launched in Finland in 1991.
- Digital SLRs and regular digital cameras become commercially available.



- IBM introduces the 1-inch (25 mm) wide Microdrive hard drive in 170MB and 340MB capacities.
- Apple introduces the iMac computer initiating a trend in computer design.
- The development of web browsers such as Netscape Navigator and Internet Explorer makes surfing the World Wide Web easier and more user friendly.
- Microsoft introduces Windows NT 3.1, Windows 95 and later Windows 98 to the market.

Illustrative technological highlights 2000–2010

The 2000s are the decade of all things internet:

- The original Apple smartphone first hit the shops on 29th June 2007 and since then Apple has sold more than 50 million iPhones. The Apple iPhone has completely transformed the world's idea of what a mobile phone is and what it can do.
- Google went from being a silly-named search engine at the turn of 2000 to the conglomerate it is

today with a multitude of services including email, photo-sharing, smartphone development, computing and mobile operating systems (OS) development, and navigational mapping.

- On 25th October 2001, Windows XP is released and sets the tone for Windows operating systems throughout the decade.
- Facebook and Twitter: Facebook went live at the beginning of 2004 and Twitter was created in March 2006. Today Facebook has over 450 million active users. It is the web's largest photo-sharing site. Twitter on the other hand is a revolution all on its own. Twitter took social networking (and stalking) to a whole new level. Twitter and Facebook have convinced people that a virtual friend and a virtual follower is just as good as a real life one.
- In November 2004, QUALCOMM announced successful tests of assisted GPS for mobile phones.
- In early 2000, TiVo partnered with electronics manufacturer Thomson

Multimedia (now Technicolor SA) and broadcaster British Sky Broadcasting to deliver the TiVo service in the UK market. TiVo revolutionised the home entertainment. TiVo gave the power of television to the people.

- Apple's iPod first debuted on 23rd October 2001, when the world barely knew what an MP3 player was. Over the past decade, the iPod transformed itself with colour, size, screens and capabilities, but more importantly it has transformed the way we listen to music.

The future of work

An accelerating transformation of the workplace is taking place.

Businesses are entering a decisive decade when the workplace will be transformed and ways of sharing and developing ideas will be dramatically accelerated by new opportunities to collaborate online. Companies will need to address significant cultural and organisational changes to become leaders in the ideas economy.

“Take hold of the future or the future will take hold of you.”

**Dr Patrick Dixon
Futurist**

Technology has the power to transform traditional working practices in ways that we are only just beginning to realise. The ability to bring ideas and innovation to fruition will take months, weeks or days rather than years, and this will have a major impact on the way products and services are brought to market, businesses are structured, job roles are created and talent is rewarded and retained.

Today's organisational designs will be deemed obsolete. Looser, team-based organisational designs will need to be adopted. Gone are the days of multi-layered designs characterised by managers managing managers.

The shifting of the organisational design will, in turn, lead to a new kind of operating model – one that can accommodate a more transient workforce.

To this end, operating models of the future will need to weave the freelance and contract working arrangements into the way work is performed. Indeed, the next generation of workers is willing to trade the routine, predictable and secure for the freedom to choose where, when and how work is executed.

Basic business principles around business ownership and profit sharing may be shaken to its roots with companies likely being forced to increase employee-based ownership to keep them interested.

Since collaboration and flexibility will gain prominence in established work settings, positions and job titles might need to be redefined or removed altogether, especially if existing titles hinder teamwork and prevent required organisational elasticity.

Given the need for workforce fluidity, 'physical location independence' will be needed. Remote work locations that can be staffed on-demand by a team assembled of free agents will likely be part of the future business landscape.

The major drivers of change in the workplace

Economic

The impacts of the global financial crisis are deep and far reaching. The consensus among economists is that it could take a decade before economies are restructured and we're on course to sustainable growth. In response to the financial precariousness and market uncertainty companies are looking to reduce fixed costs and improve productivity. Down banding, part time working and remote working are on the increase. More workers are freelancing, telecommuting and working non-standardised hours; businesses are becoming more open to flexible workspaces; design focuses on facilitating flexibility and collaboration. Cost-cutting has also forced many companies to rethink their operations from the bricks and mortar up. The economic environment is conducive to new ways of working.

Demographics

In less than a decade from now, the Millennials (or Generation Y – those born between 1980 and 2000) will be firmly entrenched within all management layers of most large corporations around the world. Generation Y is the first wave of workers who grew up with technology.

They're comfortable leveraging multiple sources of data and information to simultaneously accomplish multiple tasks. They have ample collaborative networks available to them to help them generate ideas and identify solutions.

Millennials will demand a shift away from 'command and control' reporting lines to more cooperative-based leadership models that provide greater autonomy and freedom of choice in the way work is performed.

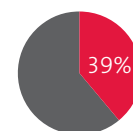
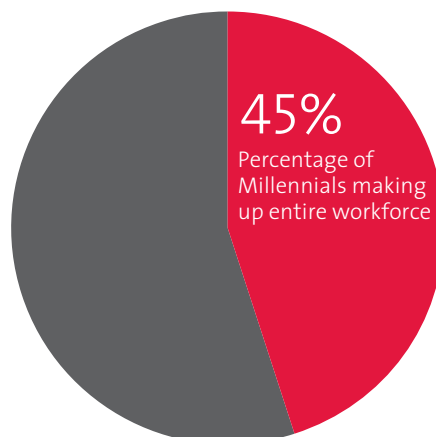
The pyramid management structure will slowly be replaced with a more fluid and responsive network design. A networked organisational design is the next evolutionary step. One that provides the work flexibility that Generation Y prefer, and the scalability that businesses require in order to better manage costs and maintain quality through business cycles.

Millennials will be close to half (45 per cent) of your entire workforce by 2020 (Source: Office of National Statistics).

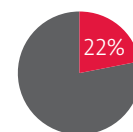
- Thirty nine per cent of Millennials select the mobile phone they want, regardless of whether IT supports it.
- Twenty two per cent say they have self-provisioned an IT service found on the web that helps them get their job done.
- Thirty-four per cent of Millennial employees say they have better technology at home than at work.

(Source: Millennial expectations and attitudes PWC 2009)

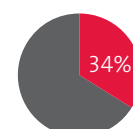
Millennial expectations and attitudes



Percentage of Millennials selecting mobile devices regardless of IT support



Percentage of Millennials finding IT support online



Percentage of Millennials with better technology at home than work

A world full of constantly improving digital technology is the only world this generation has known. They are true digital natives, born into a world of bits and bytes. The vast majority in the UK (84 per cent) have access to fixed/mobile broadband. (Source: Ofcom 2011)

At the other end of the age scale, the older generations – Baby Boomers and Generation X – will be working past what was the statutory working age. This will fundamentally bring into question our assumptions about age diversity, the employment of the over 65s and the provision of pensions. Organisations will need to be smarter about managing the motivation, health and productivity of an increasingly age diverse workforce. Managing the talent of people in their 60s and 70s together with dealing with the question of fairness in organisations will be two key issues facing the future world of work.

Technology

Technology is the major enabler of change. We are already living in the mobile society where mobile devices have become the remote control for our daily lives. Any technology that enables better communication, shared knowledge and information and accomplishes tasks is being widely adopted.

The mobile society is completely different to the industrial society. It requires a new logic and signifies a reordering of business models and new flows of communication.

The rapid rise of online social communities has created a new paradigm for personal networking. In a logical progression, many social communities are now based on portable wireless devices. Such mobile social communities will continue to extend the reach of electronic social interaction.

The smart phone will be the portal to all communication needs; business and social networks. All displays from phones to large format displays are and will become increasingly more interactive, progressing beyond the

mouse and keyboard to using voice, touch and gesture. Gesture will win over touch in the end.

When work is tied to the physical world, location is key. Workers live near where they work or commute. But that can be considered the old model; work as a place.

In the future, work can be anywhere the worker is. This is the new model that is visualised. It's about communication. It's about connection. It's about community. For workers, this means they have access to opportunities far beyond 'nine to five' and where they live. For employers it means they can source the best brains from anywhere in the world.

What does the future workplace look like?

The work environment will be more chaotic, less routine, characterised by increased volatility, hyperconnectedness, 'swarming' and more. People will swarm more often and work solo less. They'll work with others with whom they have few links, and teams will include people outside the control of the organisation. Simulation, visualisation and unification technologies will demand an emphasis on new perceptual skills.

Work will be modular: 'Project' will be the unit of measurement of work... this means, a job won't be a job any more, but a collection of projects, sometimes with the same employer and sometimes not. Work will be more like Hollywood's film industry, gathering the right team for the right project, and having more than one 'picture' on the go. This will require a lot more self-organising and a lot more self-discipline, but organisations who define work around the unit of 'project' instead of the unit of 'job' will have a better chance of succeeding.

In this chaotic, unstructured and insecure 'work world' of the future, businesses will be 'hyper-connected'; this means that overall control and responsibility will be hard to identify, if they exist at all. This has enormous implications for how people work, how employers contract their employees,

and for the IT that supports and augments the work.

The future workplace will be more or less virtual. If you are just part of a swarm, you won't have an office, a manager or work colleagues. Nevertheless you will still have a 'place' where you work – and you will be at it 24/7. This will create a life of overlapping demands, with no clear differentiation between 'work and home life'. Personal, professional, social and family matters will blur into one.

Workplace performance will assume much greater criticality, leading to real-time workplace performance measuring. Circadian rhythms will feature prominently in planning the way we work. At some point, the first reality TV programme centred on an advanced working model will be screened.

The war for talent will intensify and be fought on a global scale.

New business models will take shape through a process of creative destruction.

The enabling power of technology combined with the environmental and fiscal need to encourage greater flexible and remote ways of working will be posing significant challenges to leadership, virtual team dynamics, and remote people management.

Greater globalisation and enhanced mobility of the workforce and rising levels of structural unemployment may place pressure on organisations to shift to models of increasing contractual flexibility. The future of work is on-demand. The word career will become as outdated as the word typewriter.

"The future often arrives too soon and in the wrong order."

Alvin Toffler
American writer and futurist

The future of work is transparent. Time and tasking tools will revolutionise productivity management. Each employee's work will be directly related to the bottom line.

The future of work is flat. Hierarchical structures will give way to self-management and collaborative working.

What role will HR be playing in getting to the future first?

The biggest challenge for HR in most organisations will be the transition from a transactional function to a strategic partnership within the business. Business models will change significantly. Organisations will be facing some of the toughest people management challenges ever: the talent crisis, age diversity, the changing expectations of workers, remote working teams, virtual collaboration, virtual organisations, the skilling and re-skilling of workers. To make the transition from transactional to strategic, HR professionals will need to become visionaries informing strategic thinking and leading the organisation to the future. For it is human interaction that will be at the core of innovation.

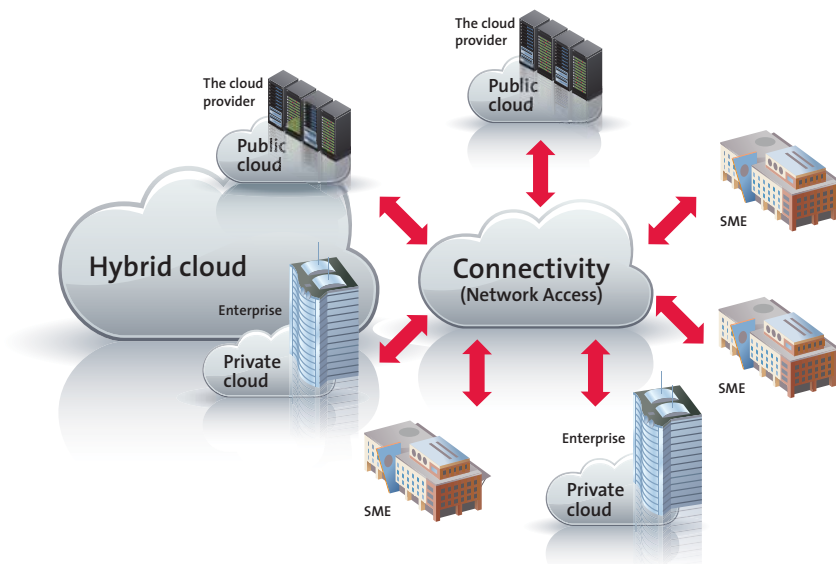
The 2020 organisation

The 2020 organisation will be one that is markedly different than what we see today. It will be a world in which the next generation of worker chooses to embrace personal independence and one in which businesses must work hard to attract this talent.

With this, comes a very real leadership challenge whereby organisations will need to think differently about their management structure and the skills, competences and capabilities that will be required to thrive and prosper.

Clearly, a greater degree of emotional intelligence will be required by senior leaders so that they can proactively guide organisational transformation while continuing to grow and evolve successful enterprises.

Greater corporate insight and sensitivity will be required to create an organisational design or operating model that will consistently draw the best and brightest and deliver sustainable performance.



Key technological mega trends

1. Cloud computing

Cloud computing is by far the hottest trend in technology. At its broadest, it refers to the delivery of a computing service over the internet. Some examples of this technology have been around for a while – for example, Hotmail and Gmail are both examples of an email service hosted on the web. But now companies, and not just consumers, are poised to use cloud services for core applications.

The benefits of cloud computing are that instead of buying, installing and supporting software, organisations can rent it over the web. This can potentially save firms money on hardware, software licences and the expensive staff needed to maintain equipment. Private cloud computing, or using the same techniques but behind a corporate firewall (avoiding sensitive data crossing the public internet), is also gaining a lot of interest.

Although cloud computing has been talked about for a while, it's only in the past couple of years that the factors required to make it work, including reliable high-speed broadband, are becoming a reality.

However, obstacles do remain, such as security of data, so there's some way to go before we'll see overall adoption. By 2020, the cloud will be a mainstream place for everyday computing.

As the security risks of cloud computing are debated, new cloud

models will emerge to address these concerns and adapt to customer needs. Hybrid models will allow organisations to move part of their data into the public cloud, while keeping other IT-resources on-site or in a private cloud.

New hybrid offerings will allow customers to combine dedicated hosting, public cloud, and private cloud to realise new and customised solutions. An example of the hybrid cloud model is Amazon's Virtual Private Cloud, which allows organisations to connect their IT infrastructure to the Amazon Web Services cloud via a private network channel.

Cloud computing will alter the way we access personal content, and forever change the way businesses structure IT. There are three drivers:

- We compute everywhere: we have mobile phones, laptops, tablets and we want all of them to access the same personal and business content. Limiting applications to one device isn't just old-fashioned, it's inconvenient. Any cloud hosted content or programme will be accessed from any internet-connected device.
- Cloud computing is cheaper in most instances: it costs more to run computers than it does to buy them.
- Companies can experiment in the cloud: without the cost of maintaining a physical environment and with a computing capacity that can change to fit demand, companies are free to experiment with new ideas.

The development of the cloud is a fundamental change in computing. By 2020, cloud computing will likely just be known as 'computing'.

The global cloud computing market will grow from a \$40.7 billion in 2011 to \$241 billion in 2020, according to Forrester Research.

2. The mobile cloud

The cloud and mobile are intersecting giving rise to the 'mobile cloud'. The term simply indicates the most common end point accessing a particular cloud. Even though the mobile cloud is still in its infancy, there are four critical developments to watch:

- The mobile cloud will accelerate the 'consumerisation' of IT. As knowledge workers increasingly rely on non-PC devices like smartphones and tablets as their go-to computing platforms, IT will be forced to change. IT won't think about things on a node-by-node basis anymore. It will think of resources as aggregate services that they must make securely available to a number of devices, including phones and tablets.
- Risk equations are changing. While vulnerabilities are skyrocketing on mobile devices and hackers are turning their attention to them, smartphones, tablets and other mobile devices do not offer the vast number of attack vectors that PCs do.
- The mobile cloud will change how we work. Microsoft, Google, Salesforce.com and others are rolling out cloud-based features that enable collaboration.
- The mobile cloud will pave the way for the 'Internet of Things'. Imagine a time when everything from refrigerators to parking meters to pacemakers is connected to the internet?

IBM predicts that there will be one trillion connected devices by 2015. Cisco moves that up to 2013. Ericsson looks further ahead and believes there will be 50 billion connected devices by 2020.

It's happening now. Sensors are already monitoring environmental conditions in vineyards. Smart parking meters are already sending text

messages to alert drivers of vacant parking spaces, and sensors are being used to monitor corrosion in pipelines. Previously, these kinds of applications had limited scalability because they tied back into proprietary applications and systems. Soon, though, it will be the mobile cloud driving the so-called 'smarter planet', as IBM calls it.

3. Mobility

Mobility is gaining momentum and creating a 'perfect storm' environment. The key drivers of the current mobility momentum include:

New trends in IT: Organisations are moving toward cloud computing and unwired mobile solutions as they recognise the cost and business benefits of running business applications on-demand and on-device. The shift of the mobile solutions development paradigm from one app on one mobile OS on one device to multiple apps on multiple OSs on multiple devices became inevitable.

Mobility innovation and advances: The new generation of mobile OSs, such as iOS, Android, and Windows Phone 7, combined with the recent advances in mobile software development kits (SDKs), provide effective tools for quickly developing reliable mobile applications with a rich user experience for a lower cost.

A heightened mobility maturity level: The overall level of maturity of mobile technology and different supporting technologies increased dramatically over the last few years. Technologies, such as faster networks, smarter GPSs, and a multitude of new sensors, add greater value to mobile solutions. Mobile devices are now very powerful and are optimised to be used over different networks. Machine-to-machine (M2M) hardware, communication protocols, and applications are emerging very quickly.

Strong business needs: The perfect storm environment of mobile consumer solutions and devices makes mobility a sure competitive enabler and differentiator. The globalisation of doing and managing business has made it even more important to be able to access business information to make informed decisions and perform tasks anywhere, any time.

"The future is always beginning now."

Mark Strand
American poet, essayist,
and translator

Therefore, many companies are ready, or have already started, to reengineer their business processes to move toward a real-time 'mobile enterprise' and deliver sustainable business value.

The day when the mobile enterprise will be the enterprise itself is not far away. By 2013, mobile phones will overtake PCs as the most common web access device worldwide.

4. Virtualisation

Organisations are steadily 'virtualising business' to meet the imperatives of this decade by building sophisticated eco systems of strategic partnerships. Outsourcing is no longer just about service delivery, but delivering and being responsible for clear business results. Virtualisation is the moving of physical servers to virtual ones. This shift allows users to use just one piece of hardware to support multiple systems.

Virtualisation is referred to as 'Green IT', because by using less hardware businesses are using less energy through server consolidation. It also reduces expenses by requiring less hardware, reducing maintenance costs, lowering overheads and increasing the server-to-administrator ratio.

The datacentre will continue to get trimmer. Virtualisation means a decrease in rack-mounted physical servers, while storage devices get smaller and cheaper while capacity increases. Cloud-managed and hybrid hardware will make datacentres even more streamlined.

By 2020, most servers will be operated virtually in massively scaled data centres.

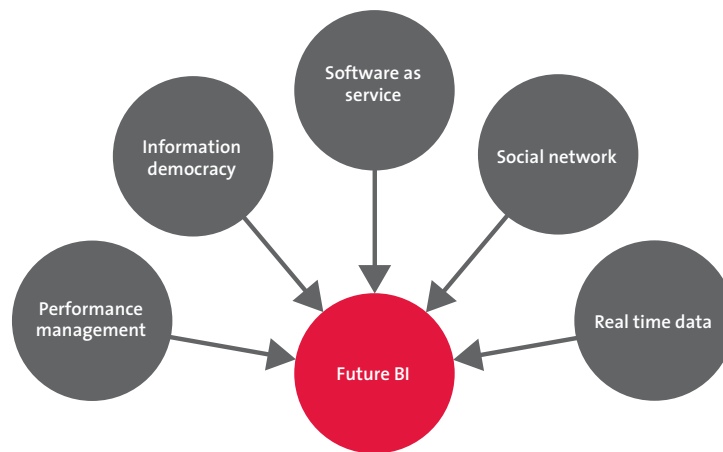
5. Social media

The convergence of the internet, Web 2.0, and mobile technologies has created a disruptive shift in business.

Whether the focus is on marketing, or product innovation, social media can be used to drive your business performance providing you have a plan and the means to measure its success.

The new future business trends

1. Business and technology fusing into one system, one conversation, and one strategy, for one world.
2. Innovations are about new business models, enterprise and marketplace collaboration, new leadership and knowledge engineering.
3. Knowledge engineering: the formation and networking of knowledge which creates results, is the true asset of the 21st century.
4. The capture and analysis of customer information about product/service use, needs, wants, desires and behaviour is mission critical to the enterprise.
5. The integration of customer touch points across all channels is essential to future success.
6. The capacity of an organisation to understand the key trends that will shape the future of technology, customers, society and the marketplace will determine the survival of the enterprise.
7. More disruptions are coming in the form of electronic exchanges, security breaches, and changing customer demographics.
8. Human capital, the value of talent will be the most valuable resource in the 21st century.
9. The new future will need new leaders who are aware of how to attract talent, manage innovation, set high visions and execute profitably. There is a new paradigm about leadership that is emerging.
10. Shaping customer relationships and enhancing customer satisfaction through the use of technology innovation will be business-critical for every enterprise.
11. Real-time agility – how fast an enterprise can embrace leading-edge technology – will determine the efficiency, speed, and cost-effectiveness of its operations.



12. Managing rapidly emerging technological change within an organisation will be one of the central capabilities for everyone across the enterprise.
13. Technology-enabled products and services that incorporate deep customer contact, on-demand choices, and intuitive interaction will drive business success.
14. Just-in-time training – Thanks to cloud-based technology, we're on the brink of a revolution in just-in-time training. This will enable people to use their laptops, mobile phones, and tablet computers as tools to receive training precisely when they need it.
15. Rise of business services – Awareness of the fact that organisations purchase technology to fulfil business needs is growing significantly.
16. Business analytics coming of age – A large number of small niche companies and even large companies like IBM and Oracle are investing millions of dollars in developing and enhancing business analytics products and services.
17. Popularity of application services – These smart technology and business models are making middleware software, hardware and tools almost redundant by giving core access to the application tier of business systems.
18. Business intelligence and other forms of analytics have a higher priority for organisations.

Top ERP trends

1. CRM – With customer relationship management a direct focus for companies seeking to increase sales and decrease the associated costs, ERP purchases fronted by CRM are at the forefront.
2. Business intelligence – Companies are focused on reducing margins of error, relying on enterprise resource planning (ERP) systems to provide operational data for informed decisions.
3. Market stratification – Both large enterprises and SMBs can gain access to powerful ERP solutions on hosted and on-premise platforms.
4. Market consolidation – Nearly synonymous with the ERP marketplace, strong ERP players will continue to acquire the weaker ones.
5. Hosted ERP – Companies will be replacing their 10 year old systems and opting for less expensive, yet powerful solutions on SaaS platforms.
6. Mobile platforms – To leverage the full value of ERP, it must move to a platform to support mobile devices.
7. Accountancy software – Packages are being developed to fit all need levels and infrastructure requirements. Accounting software is the indispensable tool in building the profitability of any business now and in the foreseeable future.
8. ERP II – In 1990, ERP was enterprise centric with very little awareness of anything going on around it. Today, we're moving towards collaborative commerce, or c-commerce.

To do that you have to share information outside the enterprise. ERP II systems are not just the backbone of the enterprise. They are also the information link for an enterprise in the supply chain. That's because the business of tomorrow is going to play multiple roles in multiple supply chains, from traditional sources to electronic marketplaces.

Technology trends transforming further education

Ubiquity

The 21st century is already an era of 'pervasive connectivity', a world networked through devices rather than people. Soon, virtually every device we touch will be 'smart' and equipped to communicate over global, high-speed networks. These pervasive networks ensure information is instantaneously available almost anywhere, and as applications increase in sophistication (such as augmented reality and 3-D simulated reality apps), they will increasingly mimic and enhance the experiences we receive in the real world.

Learning environments need to capitalise on this ubiquity and incorporate it into their curriculum to add relevance and value.

Mobilisation

In the last decade we witnessed the emergence of a truly wireless society. On the go access to information enhances the learning experience and expands the educational opportunities. Mobile learning environments will know no bounds and never has to stop. No longer is the university bound to the campus, rather learning can extend to the far reaches of the world.

Personalisation

Both products and experiences are being personalised to the level of the individual consumer. The phenomenal growth of MySpace and YouTube demonstrate how much demand there is for personalisation of the online experience and these tools can be adapted to create online educational communities and learning centres.

Imagine a world with individualised curricula and course work that can be continuously adjusted to accommodate the retention, interests and speed of an individual student.

Adoption of business technologies

Institutions are having to operate in a highly competitive commercial world. The demands and pressures of a challenging financial environment, increased competition and increasing student expectations will be met through the application of technologies designed to effectively and efficiently manage the organisation.

Virtualisation

Virtualisation in the educational context is the simulation of reality in electronically created environments. It has the potential to drastically change the learning environment. Institutions that incorporate digital media and virtualisation into their curriculum can extend their reach. We have already seen social media tools provide ways for faculty and students to share information and ideas, collaborate and problem solve and schools and educators take advantage of virtual classrooms and resources. It's a powerful learning tool that can be used to really immerse students in all aspects of a particular subject and bring those subjects to life.

Those institutions that are able to effectively harness the power of all these connections and digital tools are going to be able to attract talent, improve the quality of their education experience, and create a more collaborative and productive learning environment that will sustain opportunities for students around the world.

Technology and professional services firms

Web 2.0 will significantly change the ways in which professionals interact with clients, collaborators and colleagues. Externally, it presents the opportunity to create communities where ideas and information can be shared to generate dialogue around client needs and build working relationships.

Internally, Web 2.0 technologies have signalled potential efficiency gains, such as slashing e-mail traffic by allowing users to edit common documents collaboratively.

Professionals must find ways to exploit the technologies in such a way that they add value to client relationships and in ways that re-inspire public trust in the professions as efficient, learning cultures. It is now quite possible for a firm to set up authenticated communities of professional collaborators who amass reliable knowledge in a particular area, with clients invited to participate in the build-up of know-how.

With the power of technology, the knowledge-based professions have much to offer as they can transform the level and quality of information available. There is a growing demand for the integration of professional services tools and technologies into other business systems such as accounting software, billable time and WIP and project costing.

The rapid rise of the participatory web means that Web 2.0 is both too big and too important for firms to ignore. There is no 'one size fits all' solution for professional firms, but by thinking creatively, the technology can be harnessed to encourage innovation, attract talent and build new revenue streams.

Technology affecting the manufacturing industry

The new decade of technology is right around the corner for the manufacturing industry. Some manufacturing applications will move to the 'cloud' where in some instances they are cheaper to deliver, more frequently upgraded and will allow access to more real-time information.

Manufacturers will initially look for support with applications such as CRM and customer-facing software but will be slower to move to cloud-based ERP systems. Hybrid solutions are likely to be adopted alongside engineering to order.

With the new technological capabilities, manufacturing management will be an 'us' system instead of an 'I' process. The companies that are able to take advantage of the new world of the interconnection of customers, partners, suppliers and employees will be the real winners in the coming decade.

Software is the future of manufacturing

Companies are changing their way of manufacturing products, opting for more design-oriented and personalised products. One new approach is known as engineering to order, in which businesses buying from manufacturers order by referring to a list of general rules, not a catalogue and price list. For each order, a manufacturer makes and assembles a product very specific to the customer's needs. That approach also cuts costs, because raw materials and parts don't have to be held in stock – they can be purchased to match the latest order.

By 2020

The manufacturing industry will change significantly over the next 10 years. It will become increasingly global by 2020 and supply chains will increase in complexity and consolidate. Closer collaboration with customers and suppliers and the systems put in place to manage this will be key to future success.

By 2020, manufacturers in developed nations will have moved away from mass-production towards greater specialisation as they seek to find more profitable opportunities higher up the supply chain. Conversely, companies from emerging market countries will have moved from low-profit localised manufacturing to a more standardised, high-volume approach.

Technology trends for the charity sector

Mobile

The requirement for mobile working will continue to rise seeing the use of more mobile devices, and the greater utilisation of applications such as geo-location and mobile phone campaign tools such as payment/donation facilities and QR codes.

Social media

Supporters, volunteers, members, beneficiaries and potential donors/members are using these more and more, which is why charities and not-for-profits need to embrace them. People will expect a real-time web experience and will increasingly own the relationship they have with organisations. Social CRM will emerge as a term, where online activity will become part of customer relationship management.

Integration

The need for centralised access to information remains a high priority for not-for-profit organisations, which will result in better integration between different systems, platforms and the web.

Security

More home and mobile working will bring heightened security challenges for not-for-profit organisations in terms of data, information, networks, and identity.

Cloud computing

'Online' will become a more effective way for charities and membership organisations to manage their networks, with the risks and opportunities this brings.

Engagement is the new 'investment'. To be able to advocate a cause, non-profits need to engage with their supporters. There is a constant need to reach out to more supporters who exist on different, evolving social platforms, and cultivate a personal relationship with them. Technology offers an assortment of ways to do this. Return on Engagement (ROE) is the new Return on Investment (ROI).

Trends in the wholesale distribution industry

The wholesale distribution industry is changing rapidly. Today, customers are in the driver's seat, competition is tough, and the supply chains have become more complex. Add to that high fuel prices and a sluggish economy, and you have a tough environment to run a successful business. Distributors have to adapt to these changes, because standing still means falling behind.

"The future is here. It's just not widely distributed yet."

William Ford Gibson
American-Canadian
speculative fiction novelist

Three fundamental market requirements are key to future success:

Business processes optimisation across the enterprise

Distributors are forced to become much more responsive, agile and innovative while keeping a close watch on costs. So, they need to automate and standardise their business processes across the entire enterprise. Technology helps making the transition to a real-time enterprise, which improves operations and helps boost customer satisfaction and loyalty.

Collaboration with business networks

The days of the supply-driven strategy are numbered; the demand-driven strategy is becoming increasingly important, as it can help cut inventory and costs for all participants in the network. Information sharing is critical when following this strategy, as is the need to embrace the internet – the key service tool for the always-online customers.

Extended and networked enterprises

Extended enterprises have expanded their internal integration to inter-enterprise business partners, leading to better information sharing and higher demand visibility across the network. Networked enterprises have gone a stage further and have interoperable supply chains within business network.

Technology for the legal profession

2011 is a watershed year for the UK legal sector. The Legal Services Act (LSA) 2007 was fully implemented in October 2011, completely transforming the legal sector landscape.

The Act aims to provide a regulatory framework that promotes diversity, increases competition, improves public access to justice, and protects consumers' interests.

Against this backdrop, law firms are faced with both challenges and uncertainty. The recently announced findings of a report by Baker Tilly reveals that 83 per cent of those surveyed believe that their business will change significantly in 18 months' time.

The Act is a platform for innovation requiring a change in mind-set and a re-think of business objectives. This is already beginning to happen. Fifty per cent of respondents in the Baker Tilly survey have either changed their firms' plans or expect to, due to the LSA.

There is a growing belief that a multi-disciplinary practice (MDP) is the future business structure of legal professional services organisations. Practices will not just consist of solicitors, but also accountants, independent financial advisers, estate agents, surveyors, and any other professional services providers, working together under one roof. Clients will be able to obtain advice on conveyancing, tax and financial planning, personal injury and wills, from a single firm.

Operational efficiency key to any type of practice

Regardless of law firms' future plans, be it merging with another firm, entering into a network of law firms to expand reach, bringing in external investment or seeking private equity or becoming a MDP, the ability to demonstrate operational efficiency, compliance and corporate governance will be crucial in being perceived as attractive businesses. This also means that practices will need to do more than just be good at law, they will need to be equally good at collaboration, project management and good financial planning.

Achieving synergies and cost efficiencies in the day-to-day operations of practices will become an imperative. The need for these capabilities will be more pronounced as the shift in the payment structure from an hourly invoicing model to a fixed fee becomes the norm.

Given the potential varied scope of professional services offerings, law firms will need to consider technology that is wider in scope than the traditional practice and case management systems used up until now.

Enterprise resource planning indispensable

Adopting the mind-set of large enterprises, law firms or MDPs need to consider implementing workflow-based ERP systems that encompass everything from client management, case management, resource planning, finance and accounting, compliance, reporting and business intelligence.

ERP systems can enable more efficient integration through the use of a single system. They can help identify patterns and similarities across regulatory requirements and reduce duplication effort, delivering cost efficiencies in managing exposure to risk and non-compliance. In addition, they can ensure that firms always maintain audit trails of all transactions, billings and payments in adherence with the various country specific and industry legislations.

This will become more pertinent than ever before as non-industry specific personnel become involved in running these businesses, ensuring that corporate policy is enforced and guesswork reduced. Similarly, from a human resources department perspective, an ERP system can incorporate HR systems to help forecast budgets, identify need for new skills, meet staffing needs, and ensure that professionals with the right expertise are allocated to clients – this is especially important given the Solicitors Regulation Authority's (SRA) move towards a more qualitative style of measuring professional conduct and service delivery to customers.

The LSA will increase the commoditisation of legal services, already set into motion by the growth of internet based offerings. This, along with the entry of household brands with substantially more financial muscle means that law firms that don't think strategically will face an unprecedented, uphill struggle to survive. Adopting the right technology will be the key to business performance regardless of the size of the practice.

Business technology scenario for 2020

By 2020 the nature of corporate IT will have changed significantly. Corporate IT will be about choice and flexibility with companies being able to access solutions which best suit their specific needs. Some will move to the cloud entirely while others will choose hybrid solutions combining on-premise with the cloud. One size will not fit all. This future is already with us in varying degrees.

In the cloud, users of ERP and CRM software will be able to access it from anywhere, whether at home, on the road, on a plane or even in the office. The software will be far easier to use, will run on any device (phone, tablet, computer), and will offer active help based on usage patterns and knowledge of common problems other users encounter. The software will provide instant sophisticated analytics and dashboards. Information will be more accurate and more readily available anyway in an easily consumable form. People will be far better supported in their decision making by having the right data always easily accessible. ERP and CRM software will keep them apprised of what other people in their organisation are doing and allow all kinds of social interactions as they perform their work.

More than 50 per cent of business email and collaboration systems, measured by users, will be hosted in the cloud by 2020, according to a recent report from IT analyst group Gartner. These currently account for between 3 per cent and 4 per cent of the total market. However, this will grow to 10 per cent by 2014, 20 per cent by 2016 and 55 per cent by 2020, Gartner predicts.

In today's Enterprise Content Management (ECM) world, the worker finds the document that's needed. This dynamic will change over the next 10 years, driven in part by advances in collaborative, social, case management and other ECM related technologies. ECM will become more than content repositories, process, records and searching.

Workers and their business roles will be the central aspect, with all processes and communication flows, either inputs or outputs, in context to these roles. The document will find the worker.

Devices

Many people will still be using mice and keyboards. But touch screens, voice input and gesture type devices (like Kinect) will make computing seem much more like we saw in the movie *Minority Report*.

By 2020 we will have a much greater proliferation of devices for all sorts of specialised purposes. The one thing they will have in common will be the ability to run Web applications. This means modern ERP and CRM software will run directly on these devices as soon as they are invented.

Connections to the internet will be seamless and universal. Today we are struggling with this, but by 2020 the infrastructure should all be in place to deliver the internet in this manner.

Usability

We've seen huge improvements in usability for web-based applications. Applications like Facebook could have never taken off and reached 500 million users if each user needed to be trained and coached in how to use the application. We are seeing that usability going into single user finance and book keeping programmes today. Small business applications are getting easier and easier to use. By 2020 we should see these usability improvements permeating mid-market ERP, CRM and HR applications.

Programmes will continue to gather usage data; for web-based applications this is easier since no sort of 'call home' feature is required. Web applications can gather very detailed analytics on how people are using the programme. This data can then be used to either provide active help when people get stuck as well as to feed back into the development organisation to help make future versions of the programme even easier to use. It shows which features are used and which ones aren't used, so developers can concentrate on improving the parts of the programme that are used the most and where the improvements will benefit the most people.

Connected services

By 2020 all mid-market ERP, CRM and HR systems will have sophisticated web services application programming interfaces (APIs). These interfaces will make it very easy to interface to these programmes as well as to link them together in custom ways. Programmes running in one cloud will be easily able to interact with programmes running in another cloud or even on-premise.

Since most screens will be accessed by URLs, it will be simple to 'stitch together' the screens of multiple applications to create very powerful integrated composite applications.

Applications will link and interact with many different web applications whether free or commercial. This tight seamless integration and aggregation of services will greatly help productivity and improve decision making.

Workflow

With common web service based APIs, it will be possible to build workflow engines that orchestrate the activities in a number of these applications. Custom workflows will be constructed that cross the boundaries from ERP to CRM to HR. These workflows can even cross to other standard web-based services like maps, documents or any service with a web service interface. The power of combining workflow with connect services will be immense.

Cloud

Most companies won't operate their own data centre. It will just be too expensive compared to the various cloud based alternatives. It will be easy to provision more resources and economies of scale will make it very affordable. Companies will just need to ensure their data is backed up and protected sufficiently for their needs, but this will be more a matter of contract management. With all this data moving to the cloud, techniques will become available to anonymise and share this corporate data.

Virtualisation – legacy applications

Virtualisation technology will continue to improve allowing legacy business applications to live in the cloud and benefit from the economies of scale there.

Rather than be maintained separately in each company that uses it, these will become centralised in specialised data centres that can efficiently virtualise these.

Business intelligence

Business intelligence will be one area where huge strides will be made. We will see a convergence of search type tools like Google Search with advanced analytical tools based on data warehousing that provide very sophisticated slice and dice type applications. Over time all the sophisticated mathematics will move into the background and you will be able to ask simple questions like you do into Google search today. But instead of just returning a ranked list of web pages, the algorithms that go into the results will be much more sophisticated and the results might be presented as charts, graphs and spread sheets.

There is already so much data on the web that we have a hard time mining it. As storage gets cheaper, the amount of available data will continue to increase exponentially. We simply won't have time to go through it, or search it out by hand. We will become more and more reliant on automated agents that can find the data we need and present it in a meaningful way. We seem to rely currently on 'analyst estimates', but as we progress we should start to be able to replace these with real data that is far more accurate.

Sophisticated business dashboards will provide a powerful means to present and monitor business information.

Social

ERP and CRM applications will incorporate more and more ideas from the current social media sites like Facebook or LinkedIn. You will be able to see what people are up to in your company. You will have far less of the right hand not knowing what the left hand is doing. People will be able to comment and contribute to many decisions allowing better decision making, better consensus and better buy-in.

Today social media is very consumer oriented. But many of the companies in the current internet bubble are trying to solve social media for corporations. By 2020 we should see a leading 'corporate social media' application emerge that provides true productivity and use for the corporation.

Mega trends 2020

- 50 billion devices will be connected by 2020. Anything that needs an internet connection will have one. We will move from a connecting world to a connected world, where devices will talk to each other thanks to mobile broadband. We will move from connecting people to connecting devices.
- Eco-friendly will not be an option anymore, it will be about survival. Sustainability will shape political agendas. For the last 10 years, ecology has been a nice thing to do for most of us, basically just an option. By 2020, ecology will be a matter of life and death. Countries will face unprecedented natural disasters due to climate global change. Floods and droughts in several regions of this world will change political agenda and will encourage local governments to create incentives and tax-based on people's carbon footprint. Consumers will demand an eco-conscience from their brands.

- The media industry will be redefined. Services will be network agnostic, and the barriers to produce content will be extremely low. Access to information will be real time on any device and seamless. This will reshape the current role of telcos, media companies and device manufacturers.

- Social shopping will be a common way of getting information about products and services. Most of the OSs that are running in our devices will be social networking enabled.
- By 2020, today's digital natives will be in their 30+. They will make decisions in companies and will have a high buying power. There will be a new paradigm shift in terms of media consumption, multitasking, communication and ways of working.
- Mobile devices will take advantage of a ubiquitous network to fetch real time information. Augmented reality will help people to find information about place by just pointing their camera phone. Laptops will use holographic keyboards and will project their keyboard on any type of surface. E-health kits will help doctors to monitor on real time patients, sometimes thousands of miles away. Also eco-conscience companies will bring technology to reduce our carbon foot print like

electric cars, automated traffic lights and toll gates, and cars that communicate between each other via V2V networks. Mobile phones will not look like today's phone as flexible materials, holographic capabilities, projector embedded will revolutionise the mobile industry.

For more information

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