

# Inside

CIO | EDITION



CIOs should raise companies to their full digital potential

A Luxembourgish outlook on the Global 2014 Deloitte CIO survey

Luxembourg as an ICT centre—The 'Post-ICT-Infrastructure Age': the foundation of Luxembourg's future?

Cloud adaptation and orchestration—Moving from the capacity cloud to the capability cloud

Cyber Threat Intelligence—Move to an intelligence-driven cybersecurity model

When Digital changes the way insurance works

Sales force effectiveness in the insurance industry and the impact of the digital transition

Chief Data Officer—Is this seat free?

Bring top line growth and cost reduction to your businesses thanks to Solvency II—Challenges faced by the insurance industry

The Single Supervisory Mechanism

Regulatory reporting—Are you only seeing the tip of the iceberg?

Will IT be one of the biggest hot topics for the private equity and real estate industry in the years to come?

Mobile devices—A security perspective

Challenges and trends in identity matching

Additive manufacturing—The effects of 3D printing

Continuous integration—End of the big bang integration era

From social media to social activation in the EU

Dematerialisation and document collaboration

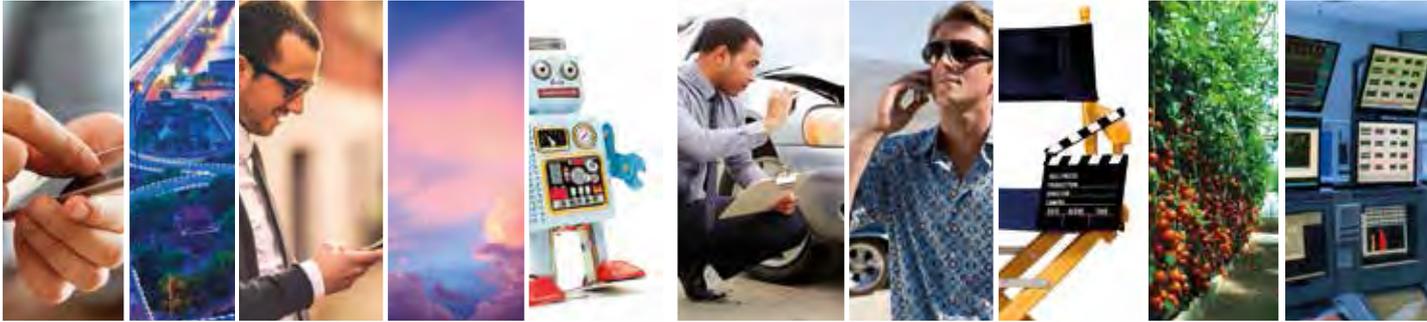
Islamic Finance—A technology perspective

The automatic exchange of information era—Moving towards global tax transparency

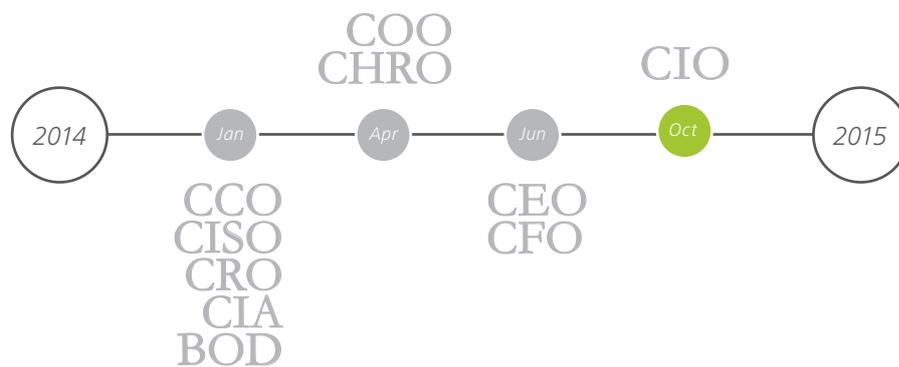
A leadership model and role description for the CIO 2.0

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# Foreword



Dear readers,

It is with particular pleasure that we introduce this new issue of *Inside* magazine, our quarterly publication focusing on hot topics catching the market's attention.

This issue of *Inside* is the last edition this year. 2014 has been our fledgling magazine's first full year, and we feel this is the perfect time to take stock of what we have achieved so far. Moving on from the original concept, the revised publication addresses topics related to a specific C-level function each quarter. The first edition of 2014 invited us to consider the issues inherent to the roles of Boards of Directors, Board Committees, Chief Risk Officers, Chief Information Security Officers, Chief Compliance Officers and Chief Internal Auditors, with a focus on risk and governance factors. The second edition of the year took us on a monumental tour of the roles of Chief Operating Officer and Chief Human Resources Officer. Just before summer, at the time of the Luxembourg Horizon Conference, our external contributors and Deloitte subject matter professionals tackled the activities of Chief Executive Officers and Chief Financial Officers.

As the calendar year comes to a close, it is time for us to return to the role of Chief Information Officer (CIO) to share views, analysis and reflections. As usual, this issue of *Inside* magazine includes a diverse range of articles reflecting the diversity of Deloitte's activities. Some are more technical than others, as naturally some IT topics require the reader to consider technical concepts. However, our belief is that in today's business world, IT topics are of the utmost interest to all economic players. We also know that for the C-level suite, these issues sit at the top of the agenda.

We hope you will enjoy this issue of *Inside*.

A handwritten signature in black ink, appearing to read 'Joël Vanoverschelde'.

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# Editorial

Dear readers,

It is a pleasure to welcome you to this 6<sup>th</sup> edition of Inside, Deloitte's magazine covering essential and actual market topics. After last year's CIO edition, we invite you to take another look at the challenges facing Chief Information Officers, by highlighting some hot topics, exploring them in detail and providing you with our analysis.

We have gathered a large number of articles written by experts, with some of them developing ideas raised in last year's CIO edition, and some investigating entirely new avenues. In the 2013 editorial, we encouraged CIOs to position themselves as Chief Innovation Officers. This golden rule remains very topical and can actually be applied beyond the sphere of IT. Today, as a country, Luxembourg perfectly embodies the challenges CIOs are facing and the government is showing a strong commitment to drive the country toward the age of Post-ICT Infrastructure, leading the way in the adoption of e-services and encouraging innovative companies to put down roots in the Grand Duchy.

As we are all aware, the digital revolution is well underway. Economics and information technologies are inextricably linked. All organisations must adapt to this far-reaching digitisation if they want to survive. Therefore, companies lusting after positions as market leaders in a world undergoing reinvention have to reconsider the way they regard technology. IT can no longer be considered a pure cost centre, but a strategic area and a field of effectiveness, differentiation and innovation. In this perspective, CIOs have a key role to play as they are best placed to "raise the enterprise's digital competency" and tackle the technological, political, organisational and security challenges that come with digitisation. That is why the articles opening this edition address this digital dimension in its various forms (Cloud orchestration, Cyber threat intelligence, etc.).

In this context you will also find the results of our 2014 CIO survey, which confirms that cost cutting is behind us and digital is on top of the agenda. Nevertheless, the road to innovation remains long. The majority of CIOs are still struggling to build the required capabilities for investing in emerging technologies, or to prioritise transforming their organisations from a cost to profit centre. The priority remains the delivery of business outcomes with regulatory issues being more important than ever.

The financial crisis has indeed highlighted the need for tougher rules, especially in the financial sector. And with more regulations comes the need for more data and increasing investments to meet the new legal requirements. In this edition, AXA's CIO Olivier Vansteelandt shares his experience of leveraging a regulatory driven data infrastructure investment into an Enterprise Data Warehouse, which is now supporting the growth of all business lines.

These two main areas—digital and regulatory/data—must not overshadow other important aspects when considering the current challenges facing CIOs. In this issue you will therefore find the usual variety of topics to tackle: new business trends (Islamic finance), new technologies (3D printing, document collaboration, etc.) and HR challenges, all of which have to be carefully analysed in order to cover the rich complexity of the functions of today's CIOs.

We hope you enjoy reading this edition.

Sincerely,



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# CIOs should raise companies to their full digital potential

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Today, customers embrace digital features in their daily life, to work, shop, book flights and holidays, socialise and connect, etc. All generations now actively use smartphones, tablets and apps. Wearable devices such as glasses and watches are emerging to allow users to interact with services and goods through augmented reality, thereby increasing opportunities to stay permanently online.



Digital technologies have moved the goalposts considerably. The question for businesses is no longer whether or not to go digital. It is how business and IT should be transformed to support the digital migration. To what extent, and how quickly, should processes and channels be digitised so as not to adversely affect market shares.

Digitisation should not just be seen as an additional customer interaction channel enabled by IT technologies, but also as an essential feature of modern business. Indeed, to offer the best customer experience and benefit the most from digital technologies, leaders must pursue a full digital transformation. They should not only flick the digital switch to increase revenues by acquiring and retaining clients attracted by new digital offerings, but also reduce their cost base line through automation and digitisation of core processes.

As the digital disruption fundamentally changes market dynamics, the speed and effort required to maintain a competitive edge call for a review of operating models and IT infrastructure. Only leaders achieving digital transformation will be in a position to innovate and turn digital spending into sustainable competitive advantages. This is true whatever the industry or sector.



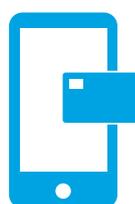
## Speed of mobile adoption

Mobile adoption is happening 8 times faster than Web adoption in the 1990s



## Mobile ownership

By the end of 2013, there will be more mobile phones than people on Earth



## Mobile commerce

80% of consumers are planning to conduct mobile commerce in the next 12 months



For private banks and life insurance companies, offering automated portfolio advice using internet applications is becoming a basic feature. To keep pace with the market, retail banks now need to offer mobile access to personal assets and propose new ways of using digital payment platforms, like Digicash in Luxembourg. Most advanced banks are also entering the 'gamification' era by presenting information and interacting with clients in a more playful way.

In the retail industry, shops are beginning to equip themselves with digital touch points to increase sales. They are also increasing their visibility on digital channels by using shop locators, which allow stock and promotions to be consulted online.

At home, we are becoming both active watchers and actors of the programmes we view, while VOD (Video On Demand) and TOD (TV On Demand) are popular on all devices and take-up of interactive TV is rising. We have become our own travel agents, scouting out the cheapest flights, hotel vacancies and restaurants in the area. We are also willing to rate the service we have consumed. The number of digital travel platforms is booming and new aggregator platforms are emerging. Traditional travel agencies must consider how they could transform their business in order to stay afloat.

Car makers have devised new digital dashboards for interactive cars using technologies such as *BMWConnect*. Audi is experimenting in London and Berlin with Audi City, a new concept store to sell cars.

BMW and SIXT have created a joint venture to rent cars across Germany without a rental agency, and only using smartphones.

The public sector is also impacted by the digital disruption and sees it as an opportunity. Even if the service to citizen is currently quite limited in Luxembourg when compared with cities like Dubai, the 'Digital Luxembourg' group has been created as an initiative to develop more and more digitised services.

All these new possibilities are supported by the telecom sector, which is offering increased 4G cover complemented by hot spot access in many places, thereby allowing us to connect anytime, anywhere and at a reasonable price.

All of these examples illustrate that the pace of change is quickening: competition grows more fierce, time to market shrinks and consumers become more educated and self-directed. Companies wanting to stay ahead of the game must not only innovate and offer new digital services but also transform their processes and IT end to end. Those who do not consider digitising their operations and IT will likely fail.

The real challenge of a digital transformation is not about being able to develop mobile and tablet applications to complement existing channels. It is about delivering a specific customer experience using the most suitable digitised operating model within an existing legacy environment.

## Signals

- The cloud services market is expanding five times faster than traditional IT spending
- Companies spent more than US\$30 billion globally on big data technology and services in 2013
- Leading CIOs describe their roles using terms such as 'imagination', 'chief innovation officer', and 'revenue-generator CIO'
- Half of CIOs feel unable to cope with the pace of change brought by digital technologies

## The dual roles of the CIO in the digital age

The rapid adoption of digital technologies is putting new pressure on IT organisations. As spending on cloud, mobile, analytics and social technology soars, CIOs have the opportunity to help drive strategy, innovation and revenue growth. At the same time, these technologies present major new challenges in the traditional domain of IT: building and integrating information systems while cost effectively operating a reliable and secure infrastructure. The role of today's CIO is twofold: builder of technology and builder of the business.

IT organisations are changing. Whereas they previously focused primarily on building and operating IT infrastructure and automating business processes, CIOs are now looking for new ways to bring value to their businesses. Today's IT organisations are increasingly focused on revenue growth, customer experience and data-based insight.

This shift is due to the acknowledgement by leaders of the power of 'digitisation': the use of digital technologies to enhance productivity and responsiveness, uncover insights about customers, innovate and create new business models.

The digitisation trend is supported by the ongoing decline in the prices of connectivity and computing

## The rapid adoption of digital technologies is putting new pressure on IT organisations

power, and the growing consumer adoption of digital technologies such as social and mobile media. From 2011 to 2013, for instance, the number of smartphone wireless subscriptions in the United States surged 70 percent to 200 million; average monthly mobile data usage per person increased 80 percent during the same period.

The thriving markets for digital technologies such as cloud, mobile, analytics and social media are a measure of their growing impact on companies:

- The cloud services market is expanding almost five times faster than traditional IT spending
- The number of mobile devices and wireless connections in 2013 grew to 7 billion globally, an increase of 500 million in one year
- Companies spent more than US\$30 billion globally on big data hardware, software and services in 2013, 25% more than in 2011
- Advertisers increased spending on social media advertising by 60% between 2011 and 2013 to US\$6 billion

It is important to keep the impact of digitisation in perspective. Cloud services, for instance, still account for less than 10 percent of the IT services market. Legacy applications and infrastructure are not going to disappear overnight. CIOs will have to manage, maintain and integrate them for years to come while guiding decisions about what to move to the cloud and what to keep on premises, for example.

The power of digital technology is leading CIOs to take a more expansive view of their roles. Their job is no longer merely to build and operate the technology their business needs to function. Increasingly, they will have to see their role as helping to increase revenue, improve customer experience, coax insight out of the growing amount of data generated by companies' digital operations and shape strategy.

A look at what the CIOs of some of the leading organisations in the United States are saying and doing illustrates the changing mindset and priorities of CIOs.

The CIO of the Coca-Cola Company aspires to be, what he calls, a 'revenue-generator CIO'. Coke is spending hundreds of millions of dollars each year on digital marketing, almost all of which is related to IT. The CIO says the marketing organisation often turns to the IT organisation for ideas about better ways to reach their customers.

At Dell, the IT and marketing organisations share a team that reports to both the CMO and the CIO.

The CIO of Walgreens holds two additional CIO titles: chief innovation officer and chief improvement officer.

Increasingly then, CIOs should play dual roles: builder of technology and builder of the business. Not all CIOs are able to or interested in playing the latter role, however. Some organisations are exploring the possibility of creating a separate position, Chief Digital Officer

(CDO), for an individual who would define and execute a growth-oriented digital strategy. CDOs may become more common in the coming years. But as all business becomes digital business, firms may ultimately merge their separate CIO and CDO positions.

While digital technologies are creating new expectations of CIOs, these technologies also create new problems. The traditional IT concerns of application integration, performance, cost management and security now require new approaches. Digitisation creates political and organisational challenges as well—a few of which are presented below.

**Expanded role and relationships:** increasingly, digital technologies are shaping and enabling corporate strategy. This thrusts CIOs into a strategic role, even as chief marketing officers, and in some cases chief digital officers, are playing in the same arena. Digital is also leading some firms to redesign core processes and operations, creating change management challenges. CIOs should forge ever-closer and more productive relationships with C-level stakeholders while navigating potential conflicts and competition.

**Legacy IT infrastructures:** companies implementing digital technologies often face requirements for scalability, high performance and flexibility, for which they are unprepared. Often this is because legacy IT infrastructures and applications are saddled with 'technical debt' that undermines agility and scalability.

**Architecture and integration:** companies adopting cloud computing face new questions about IT architecture: which systems should be based in the cloud, and which should be operated on premises? When is a public cloud appropriate, and when is a private cloud preferable?

**Performance management:** cloud providers offer service-level agreements with performance guarantees. But many IT organisations are unaccustomed to monitoring and verifying the performance of resources outside their firewalls. IT organisations may need to augment the services offered by a cloud provider to meet the service levels required by the business.



**Shortage of new skills:** as with any new technology, the use of digital technologies requires a whole host of skills and knowledge that are in short supply. These include managing cloud vendors; architecting mobile and cloud security; and developing cloud applications, which require new tools and increasingly use DevOps, an emerging software development methodology that stresses collaboration between software development and IT operations.

**Security:** companies face major challenges when balancing security requirements with users' demands for an easy, attractive mobile experience. This is especially true when mobile devices are becoming diverse and may run software of unknown origin alongside authorised company applications. Cloud computing presents its own security challenges. Organisations should allow their networks to connect with multiple cloud service providers' networks, which opens new vectors and increases the risk of cyber-attacks.

**Think big, start small, fail quickly, scale fast:** because digital technologies are disruptive and digital capabilities need to be inserted into existing operational environments, digital transformation cannot take a big bang approach but should rather be a step-by-step journey. CIOs should provide separate dedicated and agile environments to prototype digital development. Provision should be made for them alongside legacy IT infrastructure so as not to disrupt or destabilise it. Once they are mastered and validated by the business and IT organisation, digital developments can be integrated within the core business platform. CIOs also need to expand their role, take new bets on risky investments or decisions and give themselves permission to fail in order to succeed. Organisations are missing a trick if CIOs feel the need to wait for permission from business leaders to innovate.

So how do you get started with the digital transformation as a business leader? Don't wait until you have all pieces of the puzzle before you start. Be agile, start small—depending on your company's digital maturity—by looking to reposition your company's offering in the digital ecosystem using pilots and proof of concepts. Refine the strategy step by step.

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## The CIO of Walgreens holds two additional CIO titles: chief innovation officer and chief improvement officer

Use the CMO to lead the digital transformation programme and encourage a digital culture within the organisation itself. Use digital champions to educate and encourage others to think of digital as a core component of the business.

Trust and confidence established with customers must be maintained with the introduction of the new digital operating model and through the creation of the digital user experience. Continue to ensure that your new digital operating model is robust and secure.

Digital transformation does not come without cost and involves significant investment. The success comes from converting costs into revenue and efficiency.

### How to measure the benefits of the Digital Transformation

Reporting to senior business leaders and peers on the net position of the digital portfolio will provide clarity on the overall contribution of investments to business value. The digital strategy, the roadmap and the investment plan combined with Key Performance Indicators (KPI) and metrics are essential in the digital transformation. Those KPIs can report on many dimensions. They do not only consider the company's P&L, they report on revenue creation, customer satisfaction, customer retention, cost reduction, productivity and efficiency, and measure customer experience differentiation with others competitors. This will give executives the means to monitor the realisation of the digital business case.

Adopting a 'test and learn' approach to deploy the digital operating model is a proven method. Working with proof of concepts and pilots in a flexible way reduces the time-to-market of the new digital product or service and will give early indicators of the return on investments such as increases in sales, increases in visibility and the project's pitfalls. This will allow leaders to refine the roadmap and the operating model quickly if metrics show that objectives have not been reached.

Every digital business case is different depending on the company governance and culture and the type of business. However, there are some best practices to improve chances of funding the business case:

- Measure costs and benefits at brand and customer level
- Do not expect an in-year return
- Reassess investment decisions on a quarterly and yearly basis
- Work by pilots and proof of concept to assess pitfalls and success in order to refine the strategy and realign spending and investment strategy to support the digital transformation

#### Typic dimensions to consider in a business case



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Trust and confidence established with customers must be maintained with the introduction of the new digital operating model and through the creation of the digital user experience





# A Luxembourgish outlook on the Global 2014 Deloitte CIO survey

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## Introduction

For the second consecutive year, Deloitte ran its global survey for Chief Information Officers (CIOs) and equivalent Information Technology (IT) leaders, gathering insights from over 900 CIOs across 49 countries within the Americas, Europe, the Middle East, Africa, Asia and Australia. Participation by Luxembourg technology leaders has given us the opportunity to understand how IT organisations in Luxembourg currently compare with their global counterparts.

Last year we explored the effectiveness of CIOs as business partners and the need for them to step up to make a greater impact in the boardroom. This year we extend that concept and turn the spotlight on the role of the CIO as a business leader of growth through innovation.

The global Deloitte CIO survey took place over a period of two months, covering 28 questions, with an increase in participants of approximately 20% compared with 2013. The high response rate achieved across the globe has allowed us to make better geographical comparisons and draw stronger conclusions on regional and country-specific trends.

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## Luxembourg CIOs continue to allocate the lion's share of their budget towards routine IT activities

We are delighted to present some of the preliminary key findings from the survey, based on our local market knowledge, delivering insights focused on Luxembourg. We have carefully selected the results for our local market, which we believe would be of most interest to you, whether in terms of local or global outcomes. The article is structured around the key themes in the survey, presenting one section per area.

We will soon be issuing the complete set of our international survey findings in a separate Deloitte CIO survey report.

We hope you find this report a valuable tool to help further develop your role as a trusted IT leader. To the many executives who have provided input into the 2014 Deloitte CIO Survey, thank you for your time and insight.

**IT budget trend**

**79% of Luxembourg CIOs saw their budgets increase or stay the same in 2014 compared to 71% last year which is quite encouraging for the country.**

The results of our survey confirm the observation from our 2013 report that the worst of IT budget cuts are behind us, with only 21% of Luxembourg CIOs reporting a decrease in budget. 30% of Luxembourg CIOs reported a budget increase and 49% saw no change in their IT budgets compared with a year earlier. An analysis of IT budget trends in the local Financial Services (FS) sector shows that the local market is no different from the global players. 84% of local FS respondents reported either an increase or no change in their budgets, with only 16% experiencing a decrease. This result is in line with global findings, with 19% of CIOs globally reporting a decrease in their budgets.

Luxembourg CIOs continue to allocate the lion's share of their budget towards routine IT activities. 56% of 2014 Luxembourg IT budgets is spent on Business As Usual (BAU) activities and 44% on Change activities.

Contrary to last year's findings, local results reveal an increase in the IT budget by 3% for "keeping the lights on". In the 2013 CIO Survey, we observed local players allocating 53% of their IT budgets to BAU activities and 47% to support change.

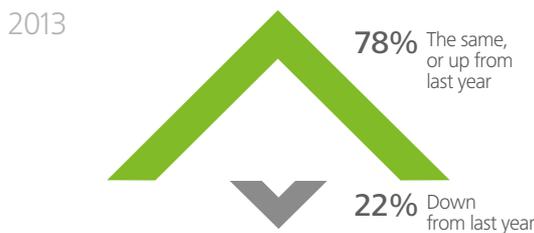
CIOs globally reported a slight positive focus towards change and growth activities with a 3% shift from BAU activities compared with last year. This slight shift supports the macroeconomic trend of business growth and expansion.

This is a discouraging result for Luxembourg compared with global findings.

Do Luxembourg CIOs allocate the same share of their IT budget to transforming their services across industries? As expected, the answer is no. The FS sector allocates 46% of its budget to supporting business growth and change activities, while the public sector spends only 29% of its budget on this area.

**IT budgets**

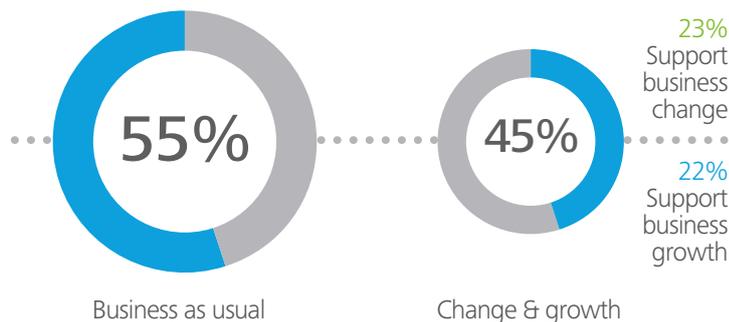
Annual shifts



*Contrary to global findings, an increase is observed in the share of local IT budgets spent on routine IT activities compared with last year*

**Budget allocation**

Business as usual vs. change & growth





### IT priorities for Luxembourg IT leaders

**Innovation continues to be a low priority in the Luxembourg CIO agenda, while responding to new business needs is once again the highest priority for local CIOs.**

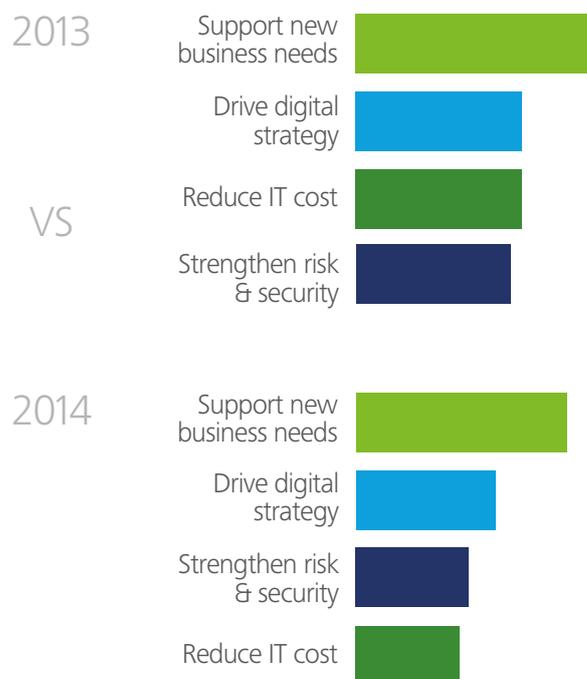
A significant majority of global and local CIOs still state that responding to new business needs is their top priority for the next 12-18 months. Confirming last year's CIO survey results, developing IT sourcing strategies and increasing offshoring of the IT function are seen as very low priorities on most CIOs' agendas, both locally and globally.

A comparison of global and local findings, however, reveals that driving the digital strategy has a much lower priority in Luxembourg than what is observed globally. Driving the digital strategy is among the top three priorities on the CIO agenda globally but only seventh in Luxembourg.

Innovation is still not a high priority. In line with global findings, almost 40% of local CIOs are ring-fencing less than 10% of their budget for innovation. Interestingly, global findings reveal that those who ring-fence more than 10% tend to be smaller organisations with fewer than 2,000 employees. This perhaps reflects the entrepreneurial mindset of the smaller organisations.

### IT priorities

In next 12-18 months



## Luxembourg differentiates itself from global findings with a stronger willingness to enhance the customer experience through technology

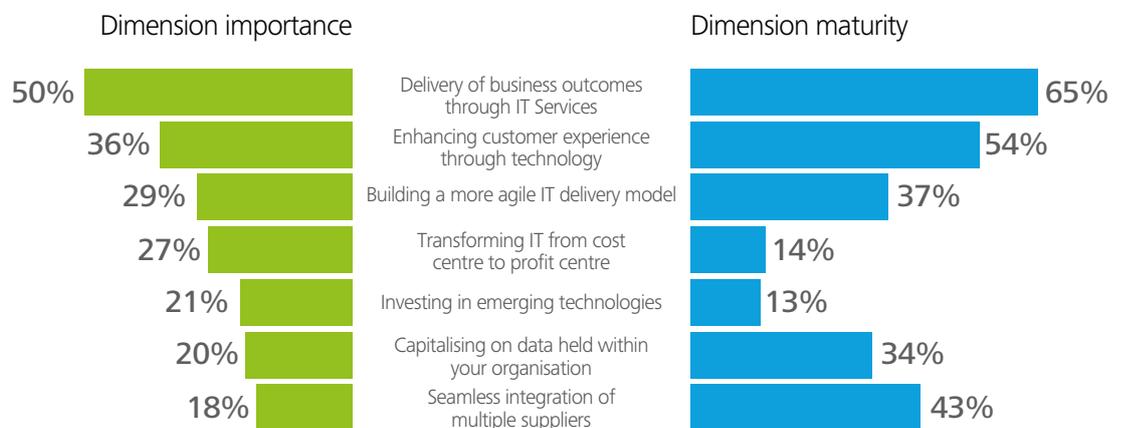
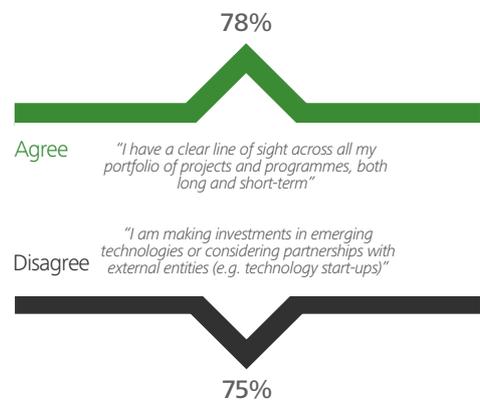
### CIO portfolio management

**CIO portfolios prioritise delivery of IT services over growth and might lack the capabilities to transform their organisations from a cost to profit centre.**

In line with last year's survey, CIOs continue to prioritise the delivery of IT services over innovation and growth. For example, CIOs are twice as likely to prioritise IT delivery over 'transforming IT from a cost centre to a profit centre' or 'investing in new technologies'. This entrenched perspective may act as a restraint on those CIOs looking to pursue growth agendas through their IT portfolios.

Luxembourg differentiates itself from global findings with a stronger willingness to enhance the customer experience through technology. It comes in as a second priority, after service delivery, in all sectors except in the public sector. Our local market is also showing a stronger focus on building a more agile IT delivery model.

Significant capability gaps may prevent innovation-driven CIOs globally from managing and assessing their portfolios more effectively. Just one in five CIOs has the operational capability to invest in emerging technologies or prioritise transforming their organisations from a cost to profit centre. CIOs also identify capability gaps with respect to monetising data with fewer than four in 10 having a 'mature capability' in that respect. Luxembourg numbers show even less encouraging figures than global findings.



**IT leaders report a good level of maturity in terms of portfolio management, but opportunities exist to improve measurements of return on investments**

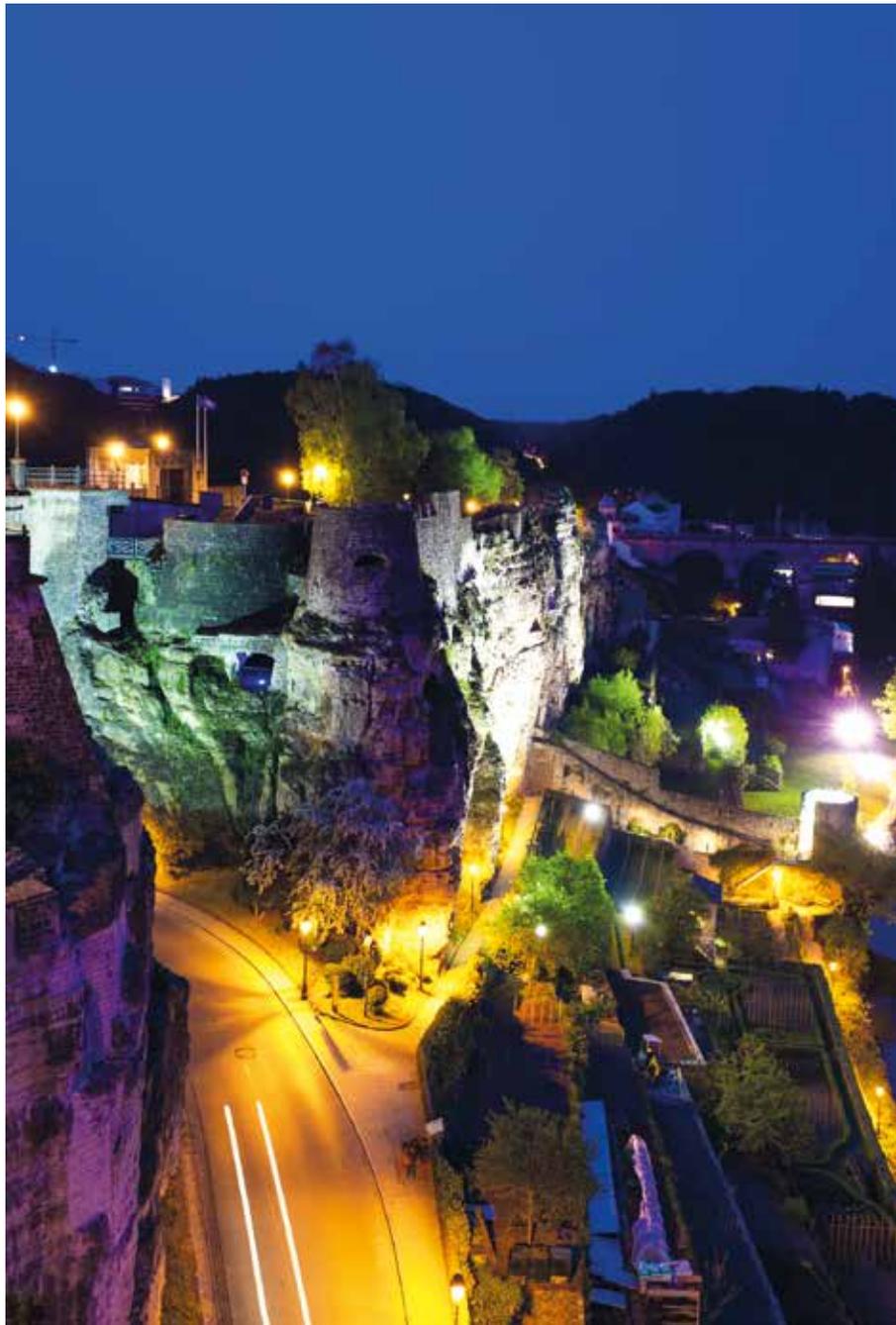
Almost 80% of Luxembourg IT leaders have a clear line of sight across their entire portfolio of projects and programmes, in line with global findings. Results are even better in the Luxembourg public sector, with a 100% score, while the private sector reports a less impressive 61%. On the other hand, public sector leaders seem unable to adapt their portfolio priorities in response to changing conditions, while this score exceeds 80% in the FSI sector. This indicates great variations in this domain. Overall, Luxembourg is reporting slightly better agility for adapting to changing market conditions than global findings indicate.

The results also outline great variations in measurement of ROI, which is globally not used by more than a third of respondents, except in the Luxembourg public sector where all leaders actively evaluate the performance of their technology portfolio in terms of value, risk and reward. A well designed demand management process with clear and measurable expectations defined in business cases could help starting analysing project portfolio throughout several axes, be it from a technical or a business point of view.

**Technology adoption and trends**

**Luxembourg IT leaders share more similar technological priorities than their global counterparts, with an increased focus on digital and less on public cloud and analytics.**

Results from this year confirm the trends that were observed last year. Adoption of new technology is globally improving relatively slowly, with the largest increase being made in the domain of analytics. The local market clearly remains focused on the adoption of private cloud, followed by digital, which comes second this year, ahead of Bring-Your-Own-Device (BYOD) and mobile applications. Luxembourg differentiates itself from the global results by its lack of adoption of analytics and end-user device convergence, as well as its lack of interest in gamification and augmented reality.



Private cloud continues to be the most widely adopted new technology, globally and locally, where the level of adoption now reaches 40%, compared with 32% last year. Adoption is particularly strong in FS, where CIOs have to comply with more stringent regulatory constraints. This is followed by the private sector, where the adoption rate now exceeds 20%. The public sector is still only piloting research activities on cloud technologies this year.

Despite the fact that digital strategy is less of a priority for Luxembourg CIOs, it is the second most adopted technology with more than 20% adoption, contrary to global findings where mobile applications came second, as they did last year. This evolution outlines the willingness of the Luxembourg market to actively support the digital disruption that most businesses are facing. Even so, this trend varies significantly across the participants in the survey. It is certainly perceived as a must-have, especially in the public sector, which shows the highest implementation rate. BYOD comes third in the results of the survey, with a 20% level of adoption, exceeding global results. It is followed by mobile applications and social media, where Luxembourg still lags behind the global adoption level.

Finally, the field of analytics/big data is clearly lagging behind in Luxembourg as no participant reported adoption, compared with 12% on a global level. The local market is nevertheless making headway with 14% of participants in the implementation phase, and 26% of them wishing they could invest more in that area, before digital and private cloud.

#### **CIOs could do more to enhance relationships with CEOs**

The survey shows that the Luxembourg results with regard to CIOs' relationship with internal stakeholders, Chief Executive Officers (CEO) in particular, are not very different from global findings. Although CIOs widely believe in the importance of a good relationship with their peers, just under 40% of Luxembourg CIOs stated that they had strong relationships with CEOs, compared with around 43% found in the global results. Therefore, Luxembourg CIOs are on the right track but still need to find ways to strengthen this relationship, in order to convince CEOs of the benefits of IT investments.

It would be of great mutual benefit for CIOs and CEOs to share the business strategy and better align IT with business needs.



**Around 37% of Luxembourg CIOs stated that they had very good relationships with CEOs.**

Interestingly, the survey also shows that in a world of emerging tech trends such as the cloud, BYOD, mobility and big data, new additions to the C-suite are being highlighted in both the global and the Luxembourg findings. These roles include the Chief Data Officer, the Chief Digital Officer and the Chief Marketing Officer. However, the majority of Luxembourg CIOs do not consider or rate their relationship with these new stakeholders as important or strong as with the other CxO with whom they are used to working.

With the rise of social media, other digital technologies, and the significant power that data and analytics have today in changing the business landscape, it is becoming crucial for CIOs to develop their working relationship with the new stakeholders in order to nurture innovation and contribute to business growth.

Therefore, mindsets need to be shifted in this area to embrace the emerging roles required to cope with today's fast-paced digitalised environment.

**Missing opportunities with external stakeholders**

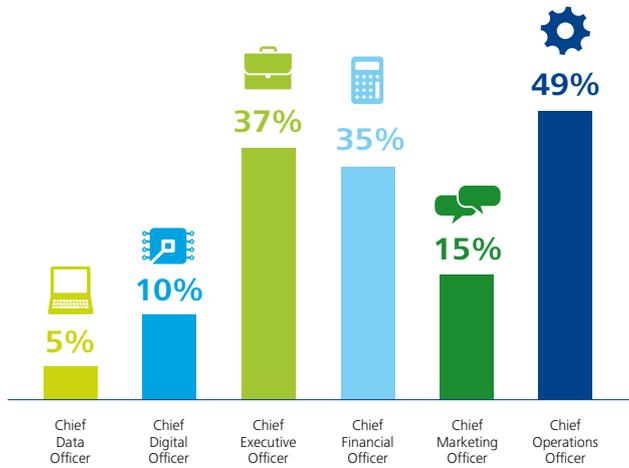
Confirming the global results, the majority of Luxembourg CIOs do not consider their relationships with alliance partners, technology analysts and CIO networks important. It is also confirmed that Luxembourg CIOs still need to enhance their relationships with external customers, suppliers and vendors.

Luxembourg IT leaders need to be aware that there could be a lot to gain from strong relationships with external stakeholders. A strong relationship with suppliers and vendors could lead CIOs to an increased value of services delivered, whether in a better service quality, delivering beyond contractual value, or in gaining extra money by lowering costs. Other external stakeholders, such as technology analysts and CIO networks, could also introduce them to new technology trends and innovative ideas to deliver more value to the business.

**CIOs still strive to become true business partners**

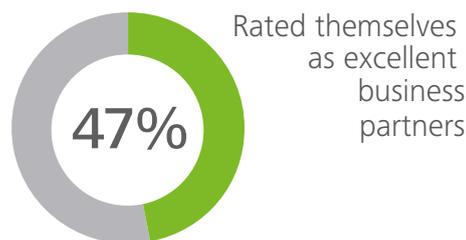
Our survey results reveal that the majority of Luxembourg CIOs are aware of the strategic role IT plays in driving business growth, and they recognise the importance of engaging as business leaders and strategic partners. However, they are still struggling to achieve this role.

This year, around 47% of CIOs consider themselves excellent business partners—a significant progress compared with last year's 26%. Luxembourg findings are now in line with the global figures in this area. Although this is considered an important step forward, it still highlights the need for more progress on this topic in order to enhance the IT/Bbusiness relationship.



*The total percentage is not 100% as the purpose of this graph is to show the different percentages of CIOs having very good relationships with some of the internal stakeholders.*

**IT business partnering Effectiveness**



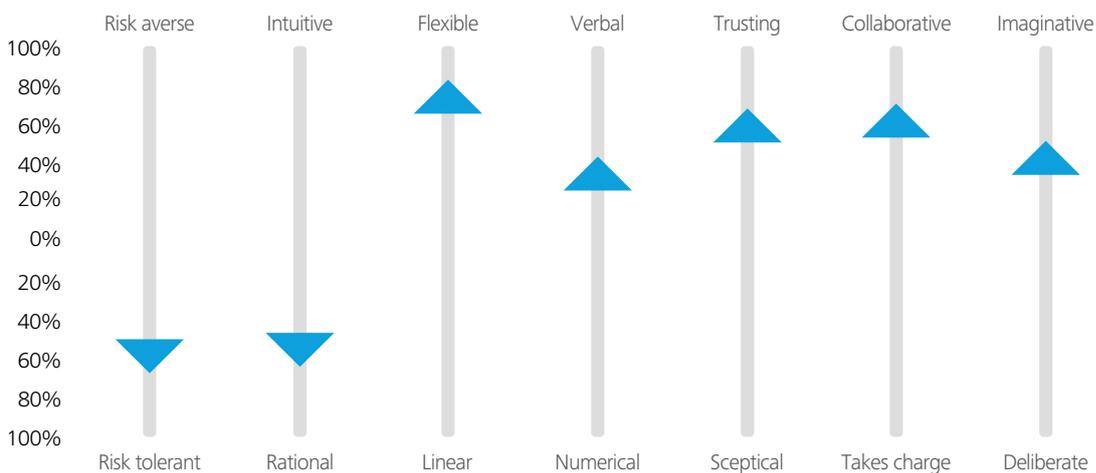


### CIO pulse

#### Re-invent behaviour and style

Luxembourg results, as well as global findings, reveal that a quarter of CIOs describe themselves as taking charge of situations; a sharp contrast to the perceived abilities of CEOs and Chief Operating Officers (COO). Also, two-thirds tend to be more rational than intuitive. Although it is very rewarding in many situations, this is probably less advantageous in innovating for business growth. Taking into account the constraints of their organisations, two-thirds of CIOs lean towards risk tolerance that may be in line with the business support role of the IT function.

#### Describe yourself as a CIO: The ends of the spectrum



*The CIO's discretion in developing self-awareness of personal style in different business situations is essential to adapt behaviour when dealing with other business leaders and making an impact in the C-suite.*

**Riskier IT investments vs IT budget constraints**

**Unlike the global findings, 41% of Luxembourg CIOs see IT budget as the main constraining factor for riskier IT investments.**

The survey results suggest that CIOs are willing to take intelligent risks with regard to IT investments, but two main factors should be observed more closely to enable riskier investments.

Firstly, in contrast to global findings, IT budget is the biggest constraint on initiating risky IT investments for innovation and growth rather than the business leadership's attitude to risk.

Secondly, 32% of CIOs in Luxembourg see the business leadership's attitude to risk as an obstacle. This trend is not in line with the global results. Moreover, in Luxembourg, business leaderships may be more inclined to adopt risk portfolios to foster growth through innovation.

In the Financial Services sector, the third constraint is regulation with 24%.

One strategy that may effectively help to clarify the overall contribution of investments to business value is reporting to senior business leaders on net business value.

**Innovation within IT organisation**

For businesses that aspire to grow through technology innovation, there is still work to be done to change attitudes and embed an innovation culture in the IT organisation. In accordance with global findings, less than a third of CIOs consider IT innovation important to the IT function. 47% of CIOs consider innovation to be important to their organisation but receive little funding in the IT budget to effectively deliver it. The culture of innovation in the private sector tends to be much more formalised with structured approaches and programmes.

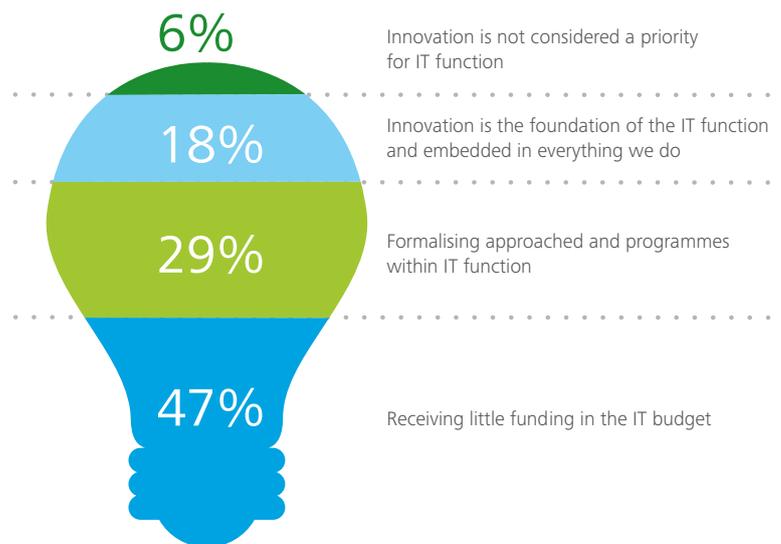
Being at the heart of technology innovation would help sharpen business instincts and identify growth opportunities. Not every investment will pay off, but despite the fact that most of the CIO investment portfolio is likely to remain BAU IT services, outcomes on those investments should not be compromised by innovating for business growth.

**Investment barriers**

Face by IT leaders



**Perception of culture of innovation**



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## CIOs are uniquely positioned to act as central hubs in aligning analytics strategy with the business

### Hot topic: analytics - key findings

While, at global level, 63% of CIOs recognise that analytics support their business strategy and even represent a strong driver for business strategy elicitation, 60% of Luxembourg CIOs acknowledge that analytics are mostly tactical and not closely related to business strategy. Only 16% of Luxembourg CIOs can say that analytics are able to provide some competitive advantage.

Aligned with global trends, the survey results indicate that the CIO's role in analytics is mainly focused on delivering technology capabilities, rather than insight. In addition, a third of Luxembourg CIOs either have limited responsibility for delivering analytics or say their role in delivering analytics is unclear. At global level, this indicator accounts for only a fifth of the respondents. Therefore, an opportunity exists to change the CIO's responsibilities to a more holistic-insight and information-driven role.

### All the indicators in the survey show that Luxembourg lags behind the global recognition of the power of analytics

At global level, a third of CIOs do not know their executive sponsor for analytics, or claim that no single sponsor has been defined. This ratio is even more dramatic in Luxembourg where half of the CIOs point towards the same situation.

At both global and Luxembourg level, the survey suggests that the lack of a single clear sponsor appears to be a key hindrance to widespread adoption. In Luxembourg, more than 40% of respondents say that the most important barriers are the absence of a centralised approach towards capturing and analysing data, and that leadership does not understand or support the use of analytics.

Other major challenges of equal importance are budget limitations, the lack of proper technology and infrastructure, and the well-publicised analytics talent crunch.

### Hot topic: analytics - insights

The impact of recent regulations and European directives, such as Solvency II, Basel III or the Single Supervisory Mechanism, highlights the importance of data for making critical decisions based on facts as opposed to instinct. The challenge is to marshal, analyse and interpret data whose quality has been checked and to apply the results to the decision-making process.

CIOs are uniquely positioned to act as central hubs in aligning analytics strategy with the business. The lack of a coherent approach to analytics is not a data or a technology issue; it is a governance, people and process issue. Because CIOs manage and answer the needs of a diverse set of stakeholders, and because they are the custodians of enterprise data, they are well-positioned to bring together diverse actors to generate optimal solutions.

## Conclusion

After a prolonged economic downturn, the vast majority of Luxembourg organisations benefit from stable or increasing IT budgets. Nevertheless, the lion's share is assigned to BAU activities, while responding to new business needs and strengthening risk and security management are the top priorities in the next 12 to 18 months. Innovation continues to be given a very low priority, and local CIOs see IT budget as the main constraint for more risky investments.

Compared with their peers, Luxembourg CIOs are more consistent in the application of technology trends, although they appear to be more followers than early adopters. Private cloud is the most widely adapted tech trend and continues to grow, but all indicators show that Luxembourg lags behind globally when it comes to analytics and big data. Despite being the second most adopted technology trend in Luxembourg, Digital/multi-channel seems not to be a priority in the coming months despite not being deployed to its full extent and being a must for Financial Services Industry.

Despite the prioritisation of CIOs' budgets for delivering core IT services, there is still room for improvement when it comes to measuring the ROI of their project portfolio and analysing

it from a risk perspective. Yet local CIOs are more capable of adapting to market changes compared with global ones.

The role of CIOs is changing with emerging technologies, which requires people with a blend of both technology and business capabilities. This will, in turn, force CIOs to reconsider their relationships both internally and externally. Internally to become a trusted strategic business partner, and externally to leverage new trends and share experiences, in order to foster innovative ideas and speed up delivery of business objectives.

More than just delivering technology to support business goals, CIOs can embrace the opportunity to change their responsibilities to a more holistic positioning and become business leaders. There is an opportunity to be able to convince business to make riskier, but transparently, monitored investments and be able to demonstrate business opportunities through new technology capabilities.

Now is the time for CIOs to choose whether to remain custodians of core IT systems or become drivers of growth through technological innovation.



# Luxembourg as an ICT centre The 'Post-ICT- Infrastructure Age': the foundation of Luxembourg's future?

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Both the international and the Luxembourg business environments have changed dramatically in recent years and governments as well as the private sector have been instrumental in these changes. The basis of competition in the world is changing, investments for starting new business are low and barriers to entering an industry are in some cases disappearing. Some industries are being completely redefined as a result of these changes, while new ones are appearing.

Information Technology has become prevalent in all aspects of our lives, and even more so in business. The technical infrastructure in Luxembourg is currently of a very high standard, and there are also other factors making Luxembourg an attractive place to do business. Nevertheless, the world is not standing still! The evolution of technology, especially information and communication technology, is causing waves of change, and what was an advantage yesterday might be a barrier tomorrow.

So how does Luxembourg measure up when it comes to ICT? Are the current changes going to improve the country and make it an even more attractive place to do business? Will the technical foundation be further strengthened in order to attract new businesses? Two areas driving business and ICT forward in Luxembourg are innovation and the government initiative 'Digital Lëtzebuerg'. Will they be able to make a difference and ensure that the business and ICT landscape in Luxembourg remains strong and vibrant? We have taken a fresh look and asked for expert opinions.

#### **What is changing in Luxembourg?**

What can be done to set Luxembourg apart as one of the ICT centres in Europe? What can still be done to improve its status? Where do the opportunities for development lie?

For Luxembourg, with a large and well-established international business community, it is critical to ensure that new sectors are supporting existing businesses, and not hindering their success. The large potential value can be found where these new digital sectors converge with traditional businesses, and this should be Luxembourg's key focus.

As touched upon before, for many years, a great deal of effort has been spent on developing Luxembourg into an innovation hub with a large mix of ICT-related services. Some areas are poised to impact and change the Luxembourg ICT landscape in the years to come.

#### **'Digital Lëtzebuerg'**

A new initiative called 'Digital Lëtzebuerg' seeks to gather and coordinate diverse projects and create a holistic approach to 'digital' for the government. Close collaboration with the private sector is intended to create solutions to improve digital in capabilities for businesses Luxembourg.

This new government initiative builds on the recent years of strong ICT focus, what can be called the 'ICT-Infrastructure Age'. The objective of the new 'Post-ICT-Infrastructure Age' is twofold. Firstly, to strengthen Luxembourg's position as an ICT centre, and secondly for Luxembourg to become a 'High-Tech' centre of excellence for specific sectors and industries.

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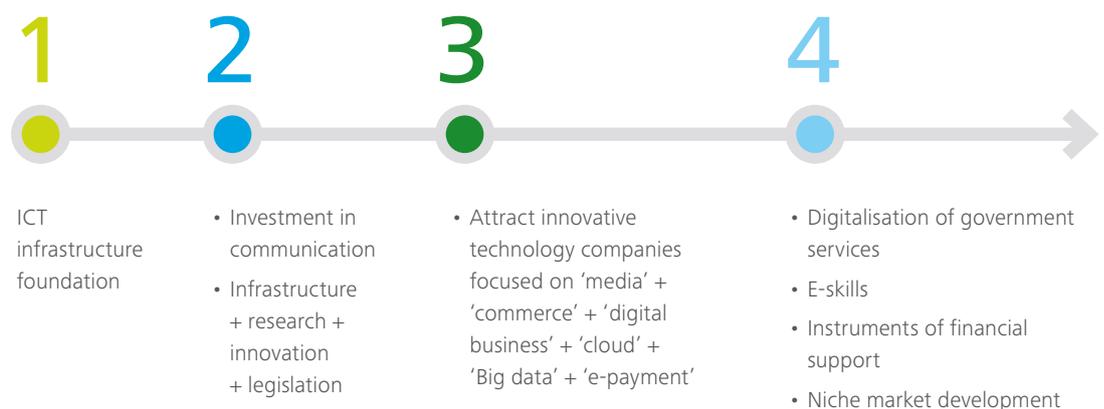
“This overall goal is for Luxembourg to become an open, modern, and highly connected digital economy.”  
Jean-Paul Zens

The ‘Digital Lëtzebuerg’ framework aims to enable the best possible collaboration between public and private parties to attract business to Luxembourg. FinTech and related initiatives are creating an edge for Luxembourg as a financial IT centre with regard to e-payments, virtual currencies, etc. and a similar edge should be created with the help of ‘Digital Luxembourg’ (i.e. the Luxembourg Privacy Cluster initiative) for the ICT sector in general.

Currently, the ongoing investment in infrastructure, research and innovation is being fine-tuned and targeted Changes to the legislation on ICT, data and privacy are being made to enable new strains of

business. This will in turn attract innovative technology companies who will enable new types of businesses, but also fuel development in existing sectors. There are two parts to the ‘Digital Lëtzebuerg’ initiative. One part focuses on government services offered by various ministries in order to digitalise government services and functions. There will be greater focus on governmental e-services and the three leading (see below) ministries will be responsible for ‘evangelising’ to other public administrations. The other part focuses on how the private sector can be involved in developing digital capabilities in Luxembourg (e.g. through ICT Luxembourg).

The chosen format involves using working groups on specific topics/areas where it is deemed necessary.



Three parties are leading the initiative from a public sector perspective. From the Ministry of State Jean-Paul Zens, from the Ministry of Economy Mario Grotz (& Romain Fouarge) and from Luxembourg for Finance Nicolas Mackel.



The first part of the framework has been divided into eight defined stages. It takes stock of existing projects and pinpoints gaps between the current situation and the desired future state. Then, a strategy can be developed and implemented. Once started, the focus will be extended to cover international communication and target strategies.



1  
Inventory of the government's ongoing projects



2  
Status of existing projects and planning



3  
Analysis and evaluation of the new axis of development



4  
Definition and agreement of the strategy



5  
Strategy execution and monitoring



6  
Craft extern communication strategy



7  
Definition of target countries



8  
Promotion abroad in target countries

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## “Data protection is made in Europe. Strong data protection rules must be Europe's trademark.” Viviane Reding

Much greater coordination is required to solve current and future skills problems. Many of the skill sets required for the future are not currently taught today, and only learned through experience. It will take time to change the education system and it is therefore critical to be able to import and attract new talent from abroad for both the public and private sectors.

The second part of the initiative, concentrated on the private sector, has two areas of focus:

- Improving the use of digital ICT into existing companies
- Encouraging innovative ICT companies to settle in Luxembourg

There is not yet a clear roadmap for this part and efforts are being mobilised to address how this collaboration will take place.

One important question is whether or not ICT companies should have a ‘front-row seat’ to create further advantages for this industry. For example, should the government invest in start-ups to assist as a fundraiser? The best approach for Luxembourg is not yet clear and a lot of effort is currently being put into this to create a viable strategy.

Security and data protection are considered critical topics and enablers for creating further advantages for existing companies in Luxembourg or those wanting to start up here. One of the issues is how to implement the forthcoming EU data protection regulation. This can potentially be done faster in Luxembourg than in other jurisdictions, creating an ‘enhanced data privacy’ approach. The new EU data protection law is intended to replace the current patchwork of national laws.

Following the US data spying scandals, data security and protection is an increasingly competitive advantage for businesses. The Privacy Capability Cluster proposal from SnT (securityandtrust.lu, an interdisciplinary centre of the University of Luxembourg) is an example of how data security and protection can be aligned and affect the direction ICT assets and investments will take in Luxembourg in the future.

These elements all play a critical part in the ‘Digital Lëtzebuerg’ framework forming Luxembourg’s digital agenda for the future.

### Innovation—required for long-term success

For Luxembourg to enter the ‘Post-ICT-Infrastructure Age’, there are several factors that will need to be considered and combined. Simply remaining an ICT-infrastructure centre will not suffice in the future. Taking advantage of innovation and developments in technology and combining them into specific value propositions and solutions is a necessity.

**Luxinnovation’s** objective is to stimulate the competitiveness of the Luxembourg economy through research, innovation, creativity and design. The agency offers a wide range of services to businesses in general and to innovative start-ups in particular. This is done by helping them shape and implement their innovation projects, notably by facilitating access to knowledge, funding and technologies, to research infrastructures and markets, to business cooperation and business opportunities.

According to Jean-Paul Hengen, ICT Cluster Manager at Luxinnovation, the main reasons for start-ups and entrepreneurs to come to Luxembourg are:

- A promising economic and legal environment to do local business and expand internationally
- A dynamic start-up scene with numerous public and private initiatives supporting company creation
- The public research sector is well developed in a range of fields. The University of Luxembourg’s Interdisciplinary Centre for Security, Reliability and Trust (SnT) conducts high-level research in the field of IT security and collaborates extensively with private sector partners

- The government offers grants for R&D and innovation projects carried out by companies. In addition to projects carried out by individual businesses, collaborative R&D work involving several partners is encouraged

**Technoport** is taking this to the next level and making it practical for specific ideas/people. It acts as an incubator for technical and innovative business ideas. It is possible to participate in different start-up programmes, the use of facilities to work and develop (even using their prototyping lab, Fab Lab), and collaboration with like-minded people. According to Diego De Biasio, Technoport CEO, Technoport offers two work programmes.

- Pre-commercial (or for challenging ideas) is free for up to 4 months (not legal entity yet). There were 130 applications in 2013 (65% ICT related) and 84 applications in the first 6 months of 2014
- Start-up (or 'launch your business') is a more formal, longer and fee-based programme where the actual business will be formed. There were 9 companies in 2013 supported by Technoport and 3 new companies were supported in the first 6 months of 2014

The Technoport Belval facility is mainly used by ICT entrepreneurs and with its 4000 m<sup>2</sup> office space it is well suited to support them. Foreign companies primarily come to establish R&D or innovation activities in Luxembourg using Technoport as a facility to get started with their innovations.

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**“If you want something new, you have to stop doing something old.”**  
**Peter F. Drucker**



Diego De Biasio further explains the main reasons why international companies choose Luxembourg and Technoport as a place to start up:

- For some industries Luxembourg is a neutral place (i.e security applications) which also quickly applies new standards (i.e mobile payments)
- A great majority of start-ups aim at international markets, with Luxembourg being a good test market
- Technoport has a high success rate, with 11 out of 35 companies being acquired and further developed by the new parent

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## The digital age is not new; it has been around since the '50s when the first electronic computers were developed, but there is something really different about today

Some of the success stories are:

- NeoValens acquired by Desktop Standard (U.S.)
- e-Xstream Engineering acquired by MSC Software (U.S.)
- Jamendo acquired by MusicMatic (B)
- LuxScan Technologies acquired by Weinig Group (D)

The various start-ups have raised more than €49 million in investments since 2009.

A lot of people and resources are clearly focusing on making Luxembourg an attractive place to start up and create new businesses and services. This has proved successful until now and all actors interviewed were optimistic about the future of the programmes and the potential for success. It is less clear however how existing companies are supported for their innovation initiatives.

### A business view

The digital age is not new; it has been around since the '50s when the first electronic computers were developed, but there is something really different about today. There is amazing innovation taking place in mobile, analytics, social, cloud and cyber segments where the potential to leapfrog the competition is at the collection point of these forces.

There will be winners and losers as a result of these changes, which we are already seeing evidence of today. Many companies are prospering and similarly, there are many examples of organisations that have not been able to change their businesses and adapt to the new reality and consequently have ceased to exist or have been taken over.

The challenges differ for new businesses like Yapital. Having the backing of a strong parent company, and being armed with sufficient resources to make the venture a success, changes the picture. Nils Winkler, Yapital CEO, explains their main reasons for settling in Luxembourg:

- Legal situation in Luxembourg is favourable for e-payment companies
- The general tax regime is good for businesses
- Luxembourg has an excellent reputation for business
- There is a skilled workforce with potential to fill most of the required roles (though some needed to be 'imported')
- Access to regulators is less complicated than in many jurisdictions, and regulators are willing to adapt and assist businesses when required
- The first-class ICT infrastructure was critical in their choice as their business requires low latency and ultra-high availability

Nevertheless, starting up an innovative and pure digital business in Luxembourg was not without problems and there are areas of improvement where new businesses should be assisted significantly to ensure efforts are directed to value-adding activities.

## Status and outlook

The 'Post-ICT-Infrastructure Age' is a reality and the combination of initiatives for innovation, digital business agenda, financial technology focus and data security and protection certainly makes a strong cocktail. However, is this enough to counteract the negative effect of other changes and where does that leave Luxembourg as an ICT centre?

From our discussions we can see a fair amount of optimism concerning the future of Luxembourg as an ICT centre and its ability to pave the way as a business enabler and critical foundation. All interviewees displayed a fresh belief that the combination of strong focus on innovation, by assisting both entrepreneurs and existing businesses to develop and cooperate, and moving forward on the 'digital roadmap' will be the enablers driving the 'Post-ICT-Infrastructure Age' in Luxembourg.

According to the Global Innovation Index 2014\*, which measures innovation capabilities and measurable results, Luxembourg has jumped from 12<sup>th</sup> position last year to 9<sup>th</sup> place in 2014. This is certainly evidence that the initiatives are bearing fruit.

During the discussions we noticed some areas for improvement:

- CIOs must become 'innovation aware' and get engaged in the digital agenda where possible. They must be open to cooperate with new organisations building new business opportunities
- Working with hacker communities can be interesting to develop a model that is strong and interesting for businesses



- Consideration for how new companies are welcomed in Luxembourg to enable them to focus on business development—not administration and finding their way

The digital agenda is here to stay, driven by massive innovation in the ICT industry, and will keep developing for the years to come. Combining this with on-the-ground innovative initiatives and projects, the groundwork has been laid for large-scale changes across all industries and sectors.

It is therefore critical that companies engage and become active in the digital and innovation agendas to take advantage of existing possibilities and find new ways of developing their business in the 'Post-ICT-Infrastructure Age'.

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We would like to thank the following individuals for their kind participation and for sharing information and insights:

- Jean-Paul Zens, Director of Media and Communications Department, Ministry of State
- Mario Grotz, Director General for Research, Intellectual Property and New Technology, Ministry of Economy and Foreign Trade
- Nicolas Mackel, CEO Luxembourg for Finance
- Romain Fouarge, Director of Information and Communication Technologies, Ministry of the Economy
- Jean-Paul Hengen, Head of ICT Cluster, LuxInnovation
- Diego De Biasio, CEO Technoport
- Nils Winkler, CEO Yapital

\* [www.wipo.int/pressroom/en/articles/2014/article\\_0010.html#top](http://www.wipo.int/pressroom/en/articles/2014/article_0010.html#top)



# Cloud adaptation and orchestration

## Moving from the capacity cloud to the capability cloud

Jesper Nielsen  
Director  
Technology & Enterprise Application  
Deloitte



## There is a revolution taking place as we speak; a global revolution of a scale which promises to rival the last industrial revolution.

This time, however, the revolution will be powered by IT, and will change the way we work, our expectations and our behaviour, as well as effectiveness and efficiency throughout the physical world. Cloud services are one of the underlying forces enabling this change.

Maintaining, building and extending an organisation's capabilities is the goal of every IT department, but the IT delivery model has been stagnating for a long time. There are currently five very significant forces of change in the IT landscape: social, mobile, analytics, cloud, and cyber. These offer the promise of a paradigm shift in IT.

Areas that have been neglected for far too long in IT—holistic data management, enterprise architecture and service integration—cannot be left unattended anymore. They are becoming increasingly complex and are proving to be critical core disciplines in all IT departments.

However, cloud solutions come in various shapes and forms, which is why orchestration is increasingly considered to be a highly critical component for successful cloud implementation. Virtually every

organisation should be developing a strategy to integrate, aggregate and orchestrate its collection of cloud and on-premises assets.

Cloud orchestration does not necessarily cause disruption for the business, but it does change the IT service model, bringing with it wide-ranging implications for people, processes and technology.

Company-wide cloud adoption is fast becoming a reality, but much usage is in addition to on-premises systems rather than providing a replacement. As a result, these cloud services increasingly require integration back to internal core systems, such as legacy financials, order management, inventory, HR, manufacturing and other enterprise systems.

Companies are connecting clouds in strings, clusters, storms and more, and are cobbling together discrete services to create end-to-end business processes. Tactical adoption of cloud services is giving way to the need for a coordinated, orchestrated strategy—and for a new class of cloud offerings built around business outcomes as opposed to bits and bytes.

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## When thinking of cloud solutions, what often comes to mind these days are Infrastructure-as-a-Service or Software-as-a-Service solutions

### What is the cloud and how will it develop?

The term 'cloud' is not new. Everyone may be talking about it, but not that many companies are actually doing it. In EMEA, there is an even larger gap in cloud adaptation than in the rest of the world. If we are to believe the research, cloud is the largest tech trend and enabler in the IT industry today. That begs the question: why are organisations—and more specifically Luxembourg-based organisations—not rushing to the cloud?

We should begin by clarifying what exactly is meant by the term 'cloud' and discussing how it is currently changing. It is also important to consider what the implications for incumbent CIOs may be, and how they should look at the principle of adopting the cloud and its integration from a serious standpoint.

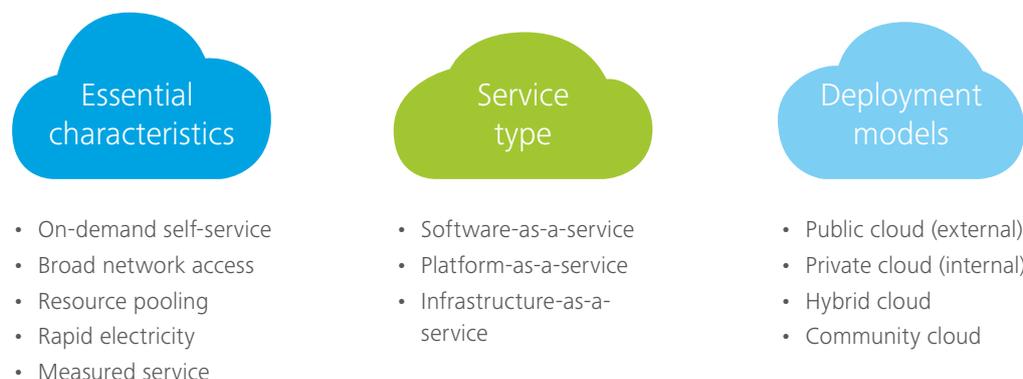
'Cloud solution' is a commonly applied term, despite the fact that it often does not correspond to agreed characteristics. It is therefore worthwhile to set out our definition of 'cloud' for the purposes of this article. This diagram illustrates how NIST defines the cloud,

seeing it as being composed of five characteristics, three service types and four deployment models.

A cloud solution should therefore feature all of the characteristics listed, use one of the deployment models and offer one of the service types. It is worth considering whether your cloud solution(s) (should you already operate or use one) live(s) up to this and whether all of the characteristics are covered.

Cloud solutions are not standing still, and new examples are arriving with ever-increasing pace. Solutions in the SaaS category are particularly myriad. Moreover, older solutions (if 2006 can be considered old) are also maturing and make it likely that suitable solutions can be found.

But why should you go down the cloud route at all? Research indicates that this is currently for the most part to increase IT utilisation rates, change capitalisation models and further optimise operating models. Using the cloud model is not without issues or challenges, however.



### Challenges of the cloud

As it stands, there are numerous possible challenges related to taking the plunge and moving toward the cloud. However, condensing the latest research into a few areas provides us with four main categories: security concerns, data governance issues, management problems and integration challenges.

Security concerns still seem to be the main obstacle to adaptation, but governance challenges follow closely behind. It is worth considering how security is achieved in both the private corporate environment and the public cloud. Companies often believe that if they have not detected an actual breach of their security/defences, then they have been successful in keeping hackers out, and are also frequently of the opinion that a cloud provider is an open door for hostile attacks. Research points to this being a very misleading theory, and suggests that cloud providers are often better at providing up-to-date security and risk management solutions than many corporations' in-house equivalents.

It all comes back to one essential issue: your data management discipline. How well do you know your data and its attributes? How and where is it being used? And how are the associated risks being managed?

While all the above-mentioned challenges are certainly relevant, perhaps even critical, this will not stop cloud adaptation. It must therefore be the role of CIOs to pinpoint solutions to overcome these obstacles and find ways to make cloud adaptation happen. If they do not, someone else in their organisation will!

Cloud operators are also frequently considered to be operating at a lower level of maturity than the organisations themselves, which certainly does not improve the much-needed element of trust in providers. Most companies looking to use cloud solutions—even for private cloud deployment—therefore have difficulty selecting candidates for hosting.



### The capacity cloud as we know it

When thinking of cloud solutions, what often comes to mind these days are Infrastructure-as-a-Service or Software-as-a-Service solutions. This tends to segregate our thinking and drive an all or nothing approach, as well as promote the IT agenda of favouring opex over capex, speed-to-solution and scalability. What it fails to do is consider business results or processes. IaaS, PaaS, and some SaaS are all IT solutions with IT benefits. This is what is now being called the capacity cloud, as solutions offer different characteristics but mainly the same services as existing ones, scaled to changing needs.

Allied Market Research recently estimated that the global cloud services market will grow with a CAGR of approximately 18% to reach US\$555 billion in 2020. During this period it is expected that the private cloud will grow at the fastest pace, but the community cloud is starting to catch on and is gathering momentum.

The Americas remain the early adaptor, with growth strongest in the private sector. The healthcare sector is among the first sectors adopting the cloud.

In the EMEA, spending on cloud infrastructure is expected to reach US\$4 billion by the end of 2014 and will continue growing with a CAGR of 19% through to 2018. 15% of total infrastructure spending is expected to be on cloud in 2014, increasing to 22% by 2018. Investments currently show a relatively even spread between private and public cloud solutions.

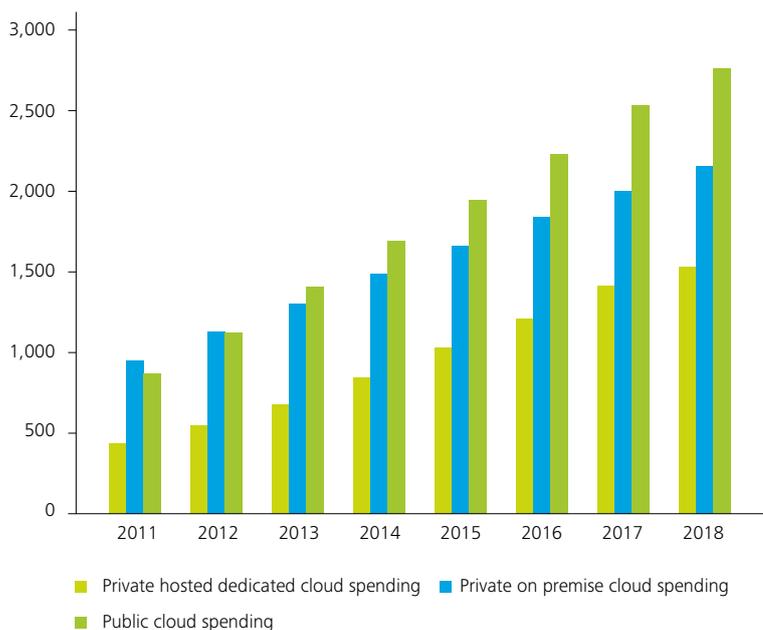
**Capability cloud and cloud orchestration**

The capability cloud promises to focus on the business and not on IT solutions. It promises to look at important business values, shifting the conversation to accelerating time-to-results, innovative functionality and business models. Instead of ‘cheaper and faster’, the debate moves to discussing better services and benefits, which are business related.

The capability clouds are not simple capacity building blocks, but rather offer finished services addressing business objectives, with the wording typically changing to ‘analytics cloud’, ‘sales cloud’ or ‘marketing cloud’, etc. This is where flexibility, adaptability and business processes can be streamlined and/or revised. Here business can be thought through end-to-end, providing a breeding ground for change, innovation and business development.

These cloud solutions and types have matured over the past few years and many enterprise-ready offerings are now available. A look at Salesforce’s latest annual report shows US\$4.1 billion in revenue, up 33% from the previous year, providing companies with an average of 1.5 billion transactions a day.

**EMEA cloud hardware forecast by cloud type, 2011-2018<sup>1</sup>**  
Revenue in US\$M



The complexity of future cloud environments becomes clear when you consider the variety of different services already available. Many services are rapidly approaching enterprise maturity level, and some have already reached this level and are now developing the ability to interface, integrate and interoperate with other services. Organisations are developing their private cloud services while still operating their core back-end solutions, and must integrate all these cloud solutions together to deliver coherent technical services for the business.

However, without orchestration of these different services it quickly becomes difficult for cloud computing to live up to its full potential and to rapidly deliver new services. Orchestration coordinates system resources, workloads and services by aligning a business request with applications, data and infrastructure.

<sup>1</sup> Source: <http://www.cloudcomputing-news.net/news/2014/jul/21/cloud-hardware-spending-passed-4bn-across-emea-2014-idc-asserts/>



Additionally, cloud orchestration has the potential to significantly reduce the resources required to operate solutions with manual intervention and management. Some key traits of cloud orchestration include:

- Integration of cloud capabilities across heterogeneous environments and infrastructures to simplify, automate and optimise service deployment
- Self-service portal for selection of cloud services, including storage and networking, from a predefined menu of offerings
- Reduced need for human intervention to allow lower ratio of administrators to physical and virtual servers
- Automated large-scale provisioning and de-provisioning of resources with policy-based tools to manage virtual machine sprawl by reclaiming resources automatically
- Ability to integrate workflows and approval chains across technology silos to improve collaboration and reduce delays
- Real-time monitoring of physical and virtual cloud resources, as well as usage and accounting chargeback capabilities to track and optimise system usage
- Pre-packaged automation templates and workflows for most common resource types to ease adoption of best practices and minimise transition time

When considering the quantity of financial, human and technical resources that can be re-assigned to higher-value-adding activities within the organisation, it quickly becomes clear that the role of internal IT organisations will change.

It is not a mistake to continue discussing the capacity cloud and solutions—and therefore ‘cheaper and faster’—as these are low-hanging fruit on the cloud-roadmap. But it is time to move the discussion into the business sphere and away from bits and bytes. This can only be done by using terms businesses can relate to and by discussing the outcomes from cloud adaptation as opposed to technical challenges.

#### **Software-Defined Network**

Another technology with the potential to impact cloud adaptation that is gaining momentum is Software-Defined-Network (SDN). It promises to abstract network services from the lower technical levels by decoupling the control plane from the network hardware. Such architecture will enable network services to be directly programmable from the application layer, while keeping the technical layer unaffected.

Company trials to prove this technology have already begun, aiming to find the sweet-spot for where and how it could be deployed. Research shows that 87% of firms currently testing SFN plan to have the technology live in production within the next two years.

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## It is not a mistake to continue discussing the capacity cloud and solutions—and therefore ‘cheaper and faster’—as these are low-hanging fruit on the cloud-roadmap

There is a lot that needs to be finalised before SDN can enter the mainstream, but work is progressing fast. One of the critical components is the OpenFlow protocol, which has gained support from most network vendors, making interoperability possible.

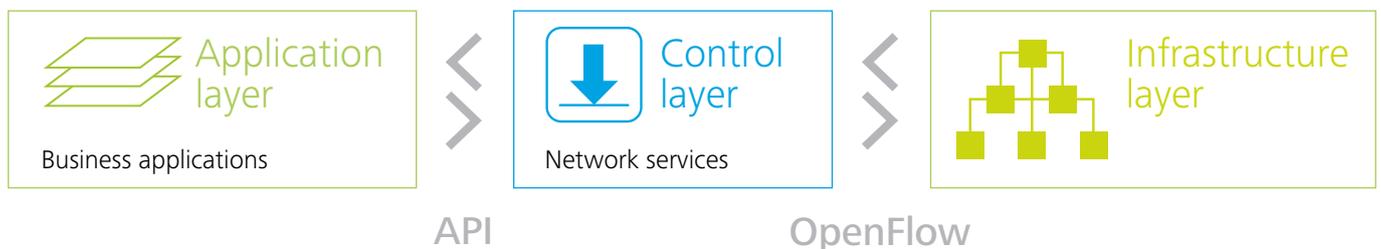
There are also security implications for this technology, however, as it opens up potential control benefits but also new potential network risks. Benefits include the ability to clearly define all allowed and disallowed data flows, based on applications and identification. On the other hand, it poses a considerable risk as any attacker who successfully compromises the SDN controller (appliance service as controller for switches, routers, etc.) could control the entire network.

The drivers for implementing SDN are to improve network management capabilities, enhancing application performance and enabling hybrid cloud architecture solutions. Applications will be able to allocate the necessary resources from an elastic network services layer, which typically is a critical component of a hybrid cloud solution.

### Implications for CIOs (and beyond)

Lower costs for IT operations is a primary IT objective, but is no longer the main or only driver for cloud adaptation. Business strategies offering agility and innovation are often seen as a driver. The rise of cloud computing has already caused many enterprise IT resources to be moved out of IT’s control, as many businesspeople have gone directly to ‘easy-to-order’ cloud services, bypassing IT completely. This trend is not sustainable as businesspeople are not generally equipped to orchestrate, secure and operate complex cloud solutions, let alone cloud orchestration.

The business outcomes offered by cloud adaptation include the ability to enter new markets, reduce complexity, increase employee productivity and reduce overall business costs. The IT benefits from current cloud deployments include the simplification of internal operations, better delivery of internal resources and new ways for employees to work, connect, and collaborate.



So where does this leave CIOs? What should they focus on and what changes must be made? What is IT's mission going to be after cloud adaptation? In this new emerging world of the orchestrated capability cloud, companies must ensure integration, data management and enterprise architecture become core IT disciplines. This provides the ability to ensure effective service orchestration and efficient service delivery.

Keeping security and compliance at the forefront of any integration process in order to deliver reliable, portable and extendable services is also critical. Moving away from pure technology tasks and activities and toward managing business focus and priorities—as well as risks—must be at the very heart of a CIO's agenda.

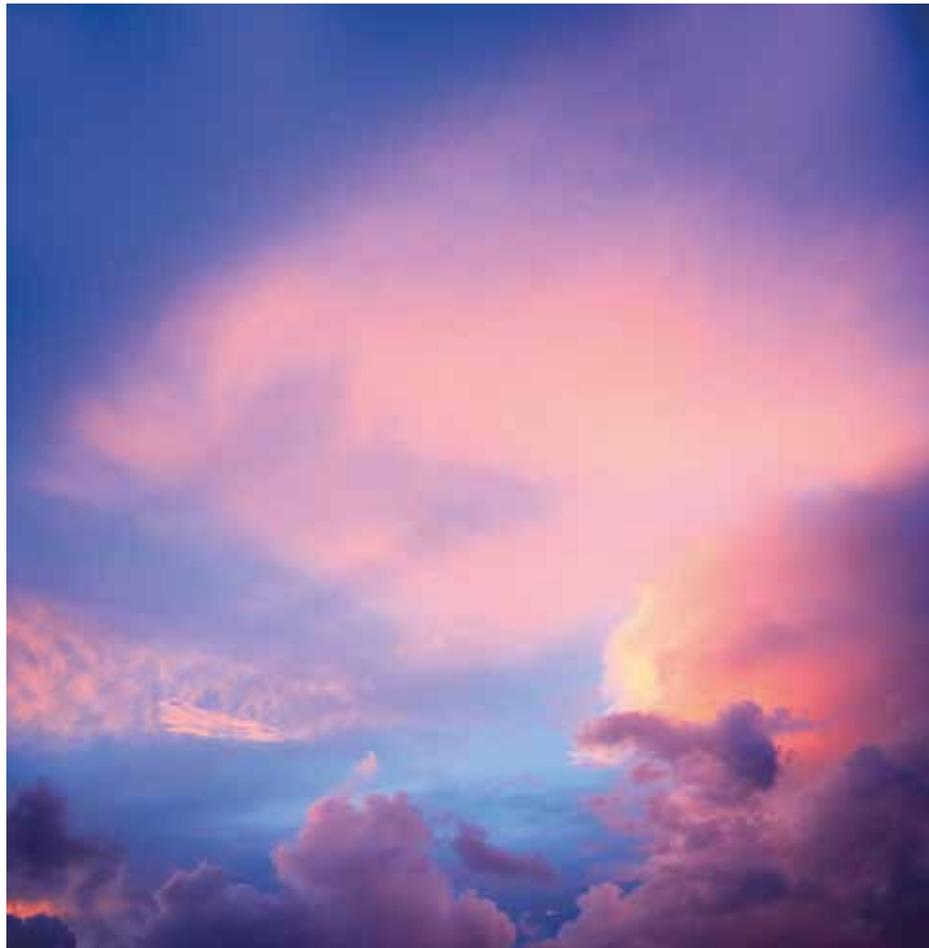
Companies must develop a strategy centred on integration, aggregation and orchestration to ensure the collection of internal and external services are providing effective and efficient value.

#### So, where to start?

The big cloud question is 'how', not 'if'. As with most emerging technology there are potential pitfalls and dead-ends to avoid. Many cloud vendors are making exaggerated claims concerning what their solutions can deliver as well as what their service roadmap looks like. However, the future looks likely to feature a large element of cloud usage and orchestration, with the capabilities discussed above as the secret to success.

More sophisticated models based on a Cloud-to-Cloud-to-Core concept require CIOs to make deliberate changes and new kinds of investment. Taking bold steps will be necessary, which will in turn produce winners and losers.

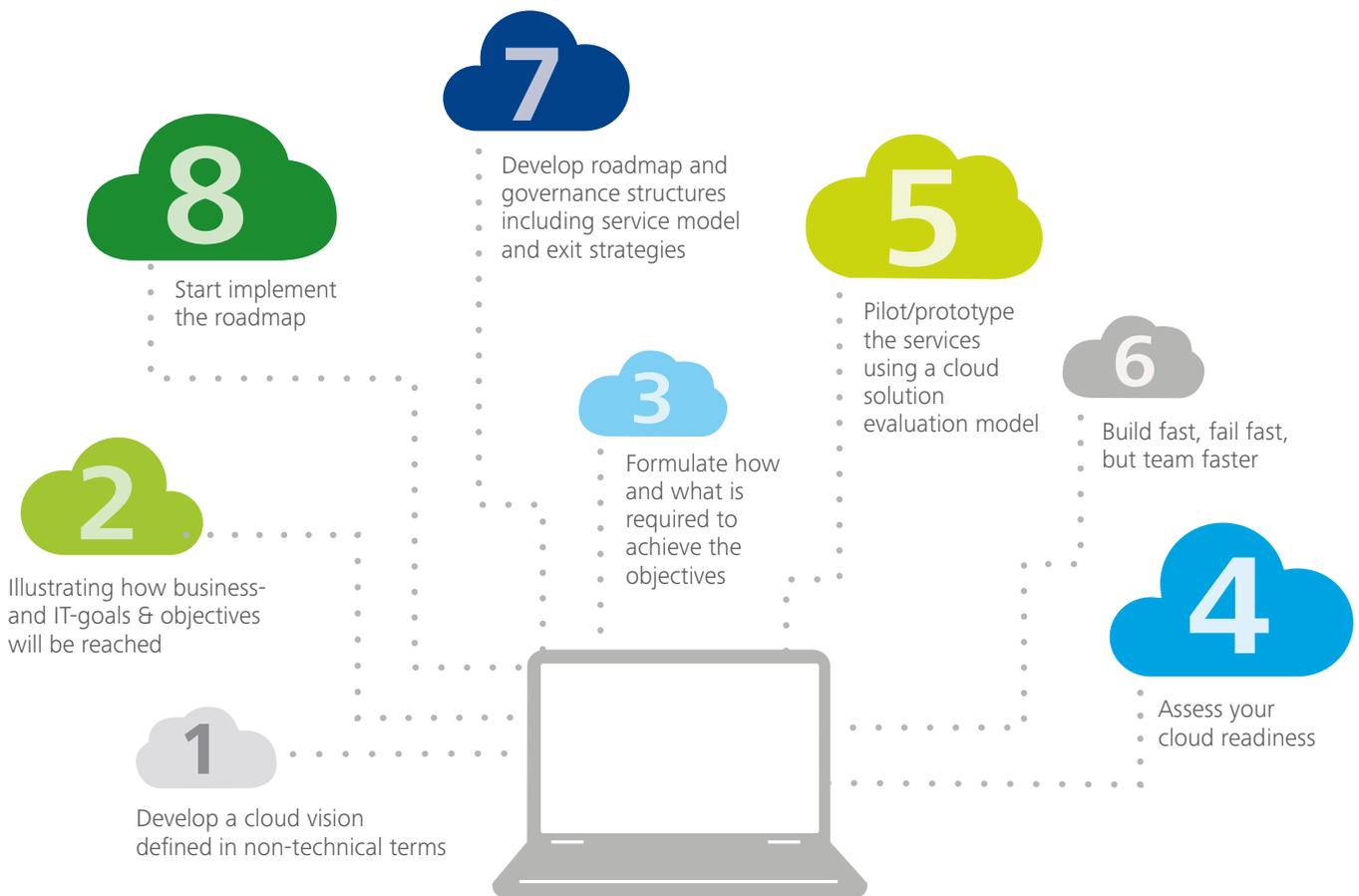
Much advice exists for how to start reaping the benefits of the cloud. There are varying suggestions on steps to be taken, phases, and even objectives and goals, which is why many CIOs are still struggling to select an approach.



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The big cloud question is 'how', not 'if'. As with most emerging technology there are potential pitfalls and dead-ends to avoid

In line with the above challenges and changes, as well as drawing upon many of the existing published guides, the below illustrates a proposal for how to approach moving into the cloud:

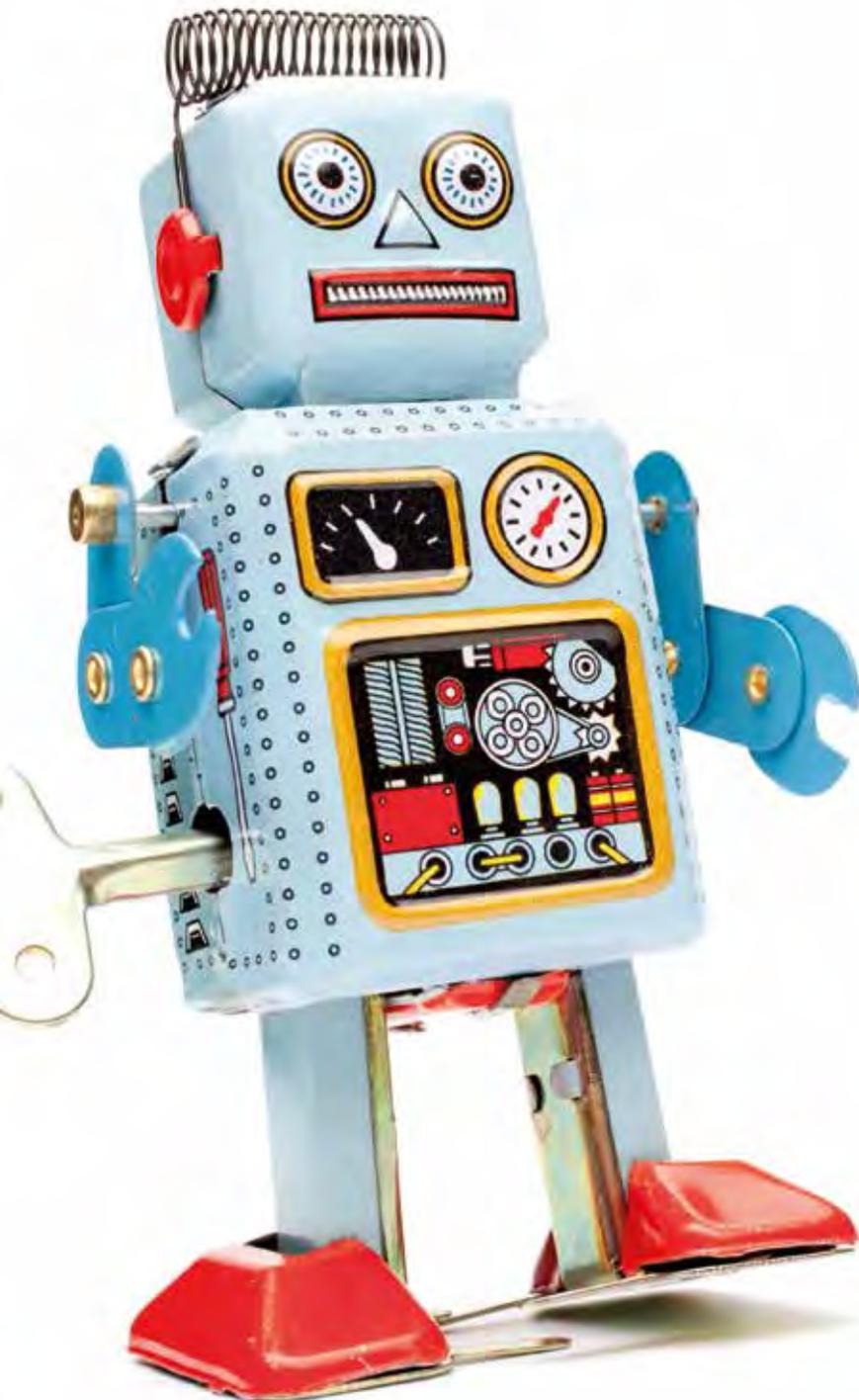


1. Develop a cloud vision, defined in non-technical terms
2. Illustrate how the vision will reach business and IT goals and objectives
3. Formulate how and what is required to achieve the objectives, including the service type and delivery model, covering business impact assessments, cost benchmarking and supplier review processes
4. Assess your cloud readiness and plan how to overcome critical gaps (orchestration, service organisation, skills equation, risk management, compliance, data management, enterprise architecture, business process reengineering, etc.)
5. Pilot/prototype selected services using a cloud solution evaluation model
6. Build fast, fail fast, but learn faster! Gain experience and knowledge of the pitfalls and select a cloud provider or providers
7. Develop roadmap and governance structures including a service model and exit strategies
8. Start to implement the roadmap while continuing ongoing supplier review and business case follow-ups



# Cyber Threat Intelligence

## Move to an intelligence-driven cybersecurity model



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### The evolving cyber threat landscape

The business and technology innovations that organisations are adopting in their quest for growth, innovation and cost optimisation are resulting in increased levels of cyber risks. These innovations have likely introduced new vulnerabilities and complexities into the technology ecosystem. For example, the continued adoption of Web, mobile, cloud and social media technologies has undoubtedly increased opportunities for attackers. Similarly, the waves of outsourcing, offshoring and third party contracting driven by a desire to cut costs may have further diluted institutional control over IT systems and access points. These trends have resulted in the development of an increasingly boundary-less ecosystem within which organisations operate, and thus a much broader 'attack surface' for the threat actors to exploit.

Threat actors are increasingly deploying a wider array of attack methods to keep one-step ahead. For example, criminal gangs and nation states are combining infiltration techniques in their campaigns, increasingly leveraging malicious insiders. As reported in a Deloitte Touche Tohmatsu Limited (DTTL) survey<sup>1</sup> of global financial services executives, many financial services companies are struggling to achieve the level of cyber risk maturity required to counter the evolving threats. Although 75% of global financial services firms believed that their information security programme maturity is at level three or higher<sup>2</sup>, only 40 percent of the respondents were very confident that their organisation's information assets were protected from an external attack. These figures apply to the larger, relatively sophisticated financial services companies. For mid-tier and small firms, the situation may be much worse, especially because resources are typically scarcer and attackers may see them as easier targets. In a similar vein, the Snowden incident has probably increased awareness of insider threats as well.

### **Being secure, vigilant, and resilient is a must**

Organisations have traditionally focused their investments on becoming secure. However, this approach is no longer adequate in the face of the rapidly changing threat landscape. Put simply, organisations should consider building cyber risk management programmes to achieve three essential capabilities: the ability to be secure, vigilant and resilient.

### **Enhancing security through a 'defence-in-depth'**

**strategy:** a good understanding of known threats and controls, industry standards and regulations can help organisations to secure their systems by designing and implementing preventive, risk-intelligent controls. Based on leading practices, organisations can build a 'defence-in-depth' approach to address known and emerging threats. This involves a number of mutually reinforcing security layers which provide redundancy and potentially slow down, if not prevent, the progression of attacks in progress.

### **Enhancing vigilance through effective early detection and signalling systems:**

early detection, through the enhancement of programmes to detect both the emerging threats and the attacker's moves, can be an essential step in containing and mitigating losses. Incident detection that incorporates sophisticated, adaptive, signalling and reporting systems can automate the correlation and analysis of large amounts of IT and business data, as well as various threat indicators, on a company-wide basis. Organisations' monitoring systems should work 24/7, with adequate support for efficient incident handling and remediation processes.

### **Enhancing resilience through simulated testing and crisis management processes:**

resilience may be more critical as destructive attack capabilities gain steam. Organisations have traditionally planned for resilience against physical attacks and natural disasters; cyber resilience can be treated in much the same way.

<sup>1</sup> '2012 DTTL Global Financial Services Industry Security Study,' Deloitte Global Services Limited, September 2012

<sup>2</sup> Survey defines 1-5 levels of maturity of organisation's information security programme. Level 3 – defined (set of defined and documented standard processes, some degree of improvement over time); level 4 – managed (process metrics, effective management control, adaption without loss of quality); level 5 – optimising (focus on continuous improvement, innovation)



### Developing 'actionable' cyber threat intelligence

Executives recognise that becoming a learning organisation where intelligence drives actions is likely to be increasingly important for success across multiple dimensions. The realm of cybersecurity is no different, as real-time threat intelligence can play a crucial role in enabling security, vigilance and resilience.

*"Availability of real-time intelligence can help organisations prevent and contain the impact of cyber attacks: a recent study<sup>3</sup> from the Ponemon Institute revealed that surveyed IT executives believed that less than 10 minutes of advance notification of a security breach would be sufficient time for them to disable the threat. Even with only 60 seconds' notification after the compromise, costs of security breaches may be reduced by an average of 40%".*

By intelligence, we are not only referring to the collection of raw data about known threat indicators, as is provided by many vendors in the form of threat-intelligence feeds. Threat intelligence is also the ability to derive meaningful insights about adversaries from a wide range of sources, both internal and external, through automated means, and through direct human involvement.

To be actionable, threat data should be viewed in a context that is meaningful to the organisation. As a company develops greater maturity in its data gathering and processing capabilities, automation can be leveraged to better filter and highlight information that is directly relevant to important risk areas. In this way, threat intelligence becomes the foundation on which a firm builds its secure, vigilant and resilient capabilities.

So, how can organisations create that dynamism and move to an intelligence-driven cybersecurity model?



<sup>3</sup> 'Live Threat Intelligence Impact Report 2013,' Ponemon Institute (sponsored by Norse Corporation), July 2013

**Experience-based learning**

Just as cyber attackers play on their target’s weak spots, so can organisations develop a sound understanding of the attackers and identify their Achilles’ heels. Organisations can attempt to learn from past intrusions within the individual firm and at the industry level. Many companies can also borrow lessons from other industries, to implement new techniques, playbooks and controls. These lessons include understanding the nature of the attack, tactics and patterns, and containment strategies, and raise some questions that the organisation should consider to safeguard themselves from the onslaught of cyber attacks:

- Who are potential attackers and what are their motives?
- How do these cyber attackers manage such high attack success rates?
- Is it just the attackers’ expertise or are the victims unwitting enablers? If yes, in what way, and how can that be fixed?

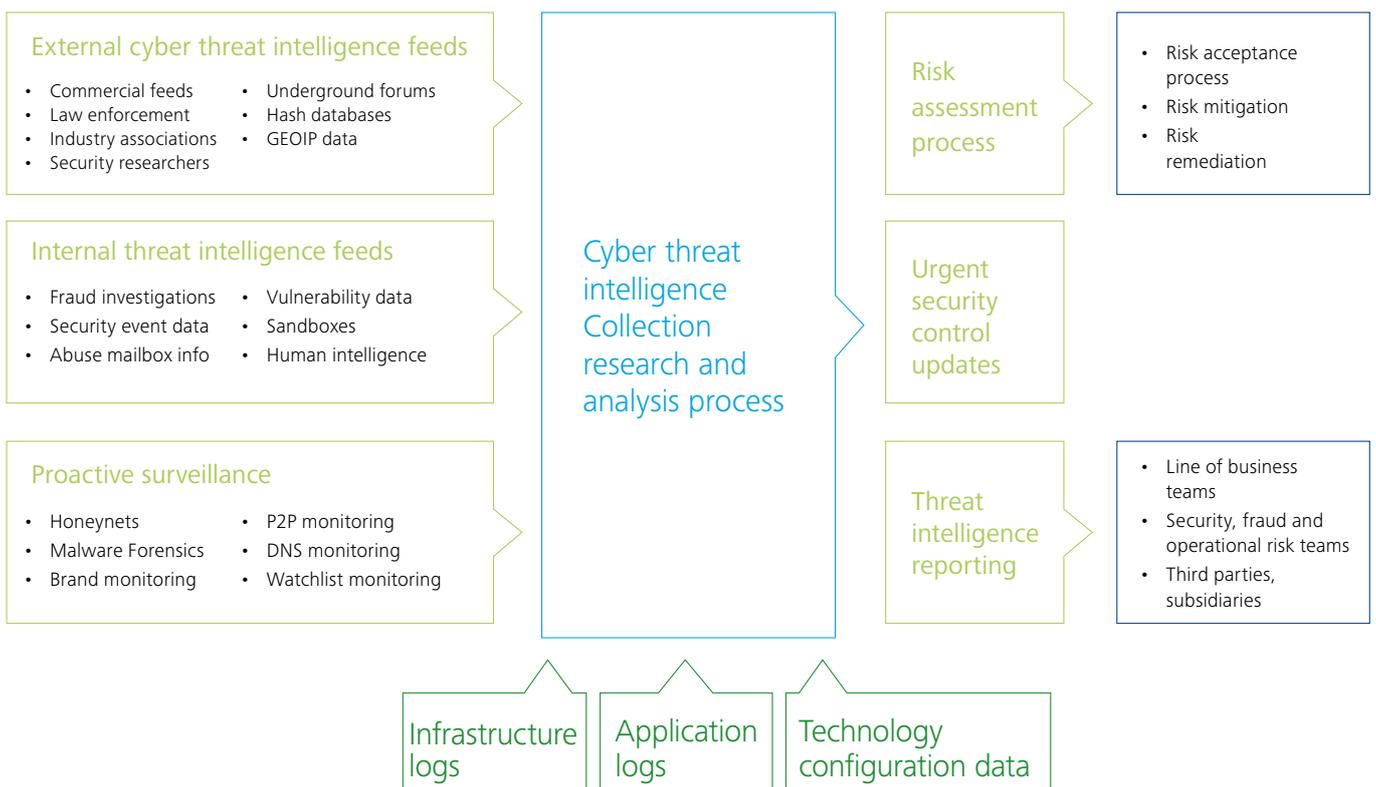
- What are some of the common challenges that attackers face while infiltrating organisations’ systems?
- How are other organisations/industries dealing with such attacks?

**Situational awareness**

Organisations can consider supplementing experience-based learning with a continuous monitoring programme, focused on both external and internal threats. Continuous monitoring can help capture the risk signals and indicators across the ecosystem in order to develop a situational awareness of the threat environment. It assists organisations in identifying attack patterns and moving from being reactive to proactive in their defence and response mechanisms. Continuous monitoring also begins to address the speed-of-response issue that attackers are using against the financial services industry.

**Cyber threat intelligence acquisition and analysis**

The overall cyber threat intelligence acquisition and analysis process can be summarised as follows:



## External intelligence feeds

- Publications
- Law enforcement sources
- Industry associations
- Security vendors
- Underground forums
- Hash databases
- GEOIP data

## Internal intelligence feeds

- Fraud investigations
- Security event data
- Abuse mailbox information
- Vulnerability data
- Sandboxes
- Human intelligence

### Intelligence gathering

Gathering intelligence is a continuous activity. It involves choosing 'promontories' from which to scan the external environment and monitor the internal environment. Another way to think of them would be as 'channels' (akin to radio or television channels) through which you can monitor these environments. Promontories or channels include those that constitute external and internal cyber threat intelligence feeds.

While it pays to cast a wide net, there is always the factor of cost and the danger of sacrificing depth for breadth. So pick and choose your 'feeds' given your industry, needs and capabilities. Not every source will be useful to every organisation, and some will be more useful than others to a given organisation.

Proactive surveillance rounds out the intelligence gathering effort. Resources here include honeynets, malware forensics, brand monitoring, DNS monitoring and watch list monitoring.

A few of the specific technologies on which to focus threat research include the following:

**Internet applications:** online transactions, HR systems, wire systems, websites

**Mobile computing:** smartphones, mobile networks, text messaging services

**Personal computers:** operating systems, third-party applications, USB storage devices

**Banking devices:** ATMs, kiosks, RFID enabled smartcards

**Telephony:** voice response units, VoIP phones and PBXs, voicemail

**Identity management and authentication:** log-on, password, user code and other IAM technologies

Another potential source of intelligence would be the resources that potential adversaries use. Again, the goal should be to focus on devices and applications that expose the organisation's most valuable data, processes, activities and infrastructure to the most risk. Once a rich mix of intelligence is being acquired, efforts turn to analysis.

### Intelligence analysis

The amount of data derived from broad-based intelligence gathering can be staggering. Therefore, analysis includes statistical techniques for parsing, normalising and correlating findings, as well as human review.

Six questions should drive this analysis:

1. How can we improve our visibility of the environment?
2. What new technologies do we need to watch for and monitor?
3. Do we have vulnerable technologies and data?
4. To what extent will our existing controls protect us?
5. Which industries are cyber criminals targeting and which techniques are they using and/or planning to use?
6. How can we identify actionable information?

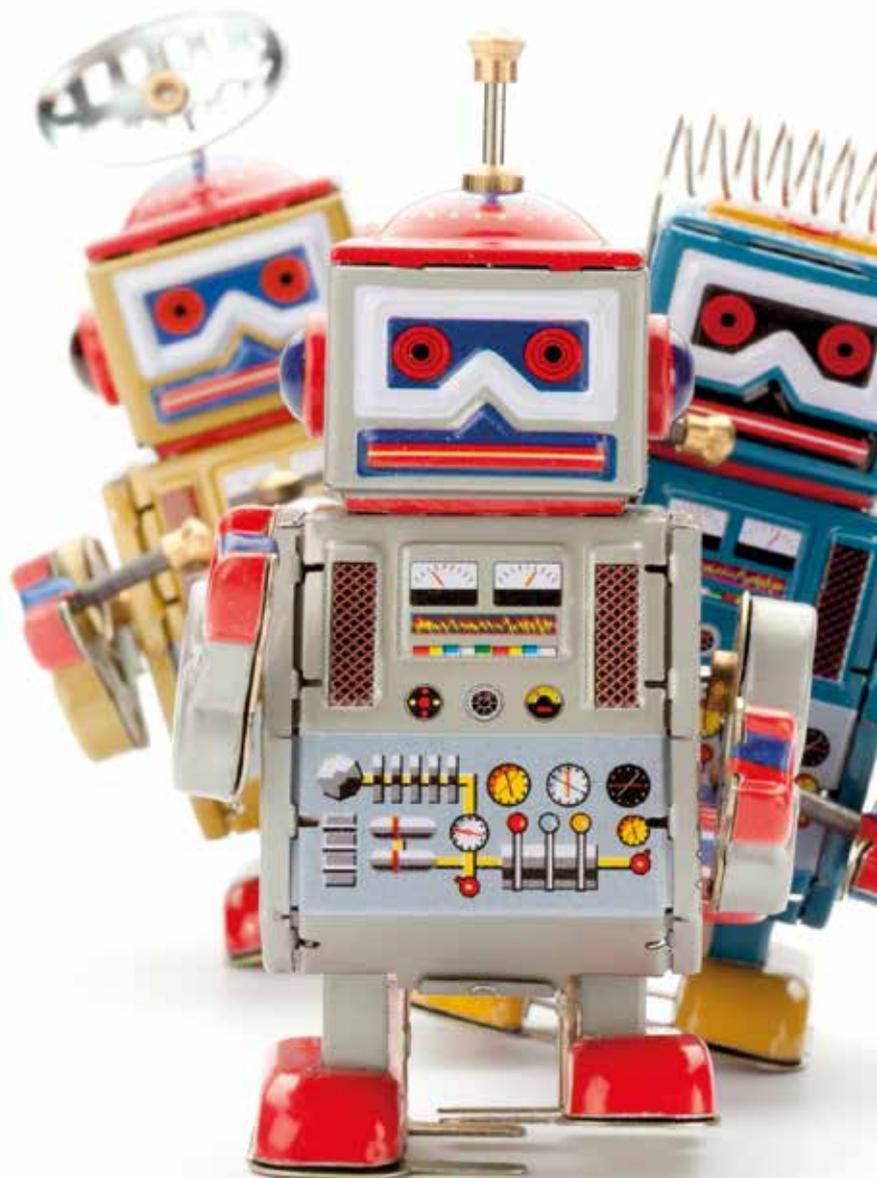
This analysis should be conducted within a risk management process built around well-defined risk identification, prevention, detection, communication and mitigation activities. A cyber risk management process prioritises threats, analyses threats, detects a threat before, during or after actual occurrence, and specifies the proper response. The latter may consist of remediation, control updates, vendor or partner notification, or other actions. Analysis, such as failure modes and effects analysis, provides a feedback mechanism, such as lessons learned, to constantly improve the effectiveness of the analytics being performed.

### **Becoming a learning organisation**

For many firms, becoming a learning organisation implies a need to develop an approach to address weaknesses in understanding their attackers' motives and methods. Learning from each experience and sharing information both within and outside the organisation will likely help many organisations deal with weaknesses in their ability to discover and recover from attacks.

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## Another potential source of intelligence would be the resources that potential adversaries use





# When Digital changes the way insurance works

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The digital economy is here. The world currently has 6.7 billion mobile phone users, 2.7 billion internet users and 1.7 billion social media users<sup>1</sup>. The technology adoption curve is accelerating and mobile data traffic is expected to be 11 times larger by 2018. Compared to 2013, smartphones and tablets are behind 85% of digital traffic<sup>2</sup>. This connected online population forms a brand new cross-border market with a totally different viewpoint on topics such as information access, convenience, choice and communities.

Digital has already changed the rules of the game in the insurance marketplace, and is expected to create additional disrupting over the next few years. Despite its specificities, the Luxembourg market is also impacted by digital trends in various ways.

<sup>1</sup> Euromonitor, Ovum, eMarketer, IDC, EIU, 2014

<sup>2</sup> Cisco VNI Forecast 2014

**From customer experience to operational excellence, the effects of digital can be seen everywhere**

**The most straightforward example** is linked to internet transactions, with customers now able to perform transactions directly online. The main objective for insurers is to create the maximum possible number of touchpoints with customers to increase interactivity. The sales process is already well-supported overall, with customers able to subscribe online. There are differences between insurers in the areas of self-service and after-sales support, such as online claims submission and tracking. On the local market, insurers are continuing to give preference to the brokerage network for quotes and subscriptions, despite demand for mobile apps supporting sales activities (e.g. 360° review or white labelling). However, some local players will soon be releasing one-stop-shop mobile apps for claims management along the lines of what is existing in France and Belgium. These apps allow customers to take pictures of damage to their car, answer a basic Yes/No questionnaire and even add a voice message when submitting a claim.

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## Insurers have applied this to several uses, for example by creating incentives to improve behaviour (car insurance)

**The second example** is derived from the success of social networks. Increasingly, consumers are collaborating and interacting to compare products and experiences. This is also true for insurance services. Social networking services are primarily used by insurers for marketing purposes, where there is growing demand for personalised online services and digital customer interaction. A key way to stand out on the market would be to implement a single point of contact strategy, transforming 'Like' into 'Want'. Examples could be analysing Facebook activities to propose

personalised ads or using the Facebook 'Like' from individuals to promote a company by alternative means and at lower costs. Another example would be the analysis of social media activities to update risk ratings (e.g. for customers practising extreme sports). On the local market, the unique relationship between a client and his/her broker means that social media interactions are not defined as a priority. The closest example found in Luxembourg is related to insurance products provided by a local company that are automatically offered to customers when booking travel with LuxairTours. Customer experience is also a growing trend, in particular through 'gamification', which is the use of game thinking and game mechanics to increase customer engagement and prompt desired behaviour through challenges, incentives and rewards. Insurers have applied this to several uses, for example by creating incentives to improve behaviour (car insurance).

**The impact of digital is not limited to customer relationships; core processes and intermediaries are also affected**

Insurers are implementing a digital supply chain with the objective of achieving operational excellence. Critical processes are being converted to digital (e.g. Straight Through Process, paperless initiatives) and digital is being taken into account when designing new products and defining pricing strategies. For example, in France, some insurers have created car insurance products featuring the installation of a box for sending information back to the company, allowing the driver's premium to be adjusted depending on their driving habits (i.e. 'pay as you drive').

Digital is also impacting the way intermediaries are integrated into the company by equipping sales and distribution networks with mobile tools allowing them to be fully interconnected, in real time, with the company's backend systems. As it stands, this represents a major area for improvement for local players. Offering an app to support agents in their dealings with clients is a clear USP. Using answers to simple questions, the app fetches a list of products from



the company's core system—which can, if needed, be added to records from the CRM—and sends an offer to the customer via email. Electronic signatures can also be used. Additionally, with more and more direct interaction between the company and the customer, intermediaries need to redefine their role, and white labelling provides a possible answer.

**As a final example**, the internet of things involves sensor technology combined with wireless communication, stimulating the growth of devices and objects connected to the internet. The real challenge for insurers is to capitalise on the increasing quantity of additional data that will become available. As an illustration, analysing non-traditional insurance data could reveal new risk factors enabling price differentiation or new value proposals.

#### Conclusion

From a Luxembourg point of view, the main challenge for non-life insurers will be to find the right balance between direct interactions with customers, made possible with digital, and the redefinition of the role of intermediaries. In the context of life insurance, digital will bring improved responsiveness and create additional channels for customers to access information and documentation, as is required by regulations.

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Using answers to simple questions, the app fetches a list of products from the company's core system and sends an offer to the customer via email





# Sales force effectiveness in the insurance industry and the impact of the digital transition

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## **Insurers should embrace new technologies to differentiate themselves in the digital arena**

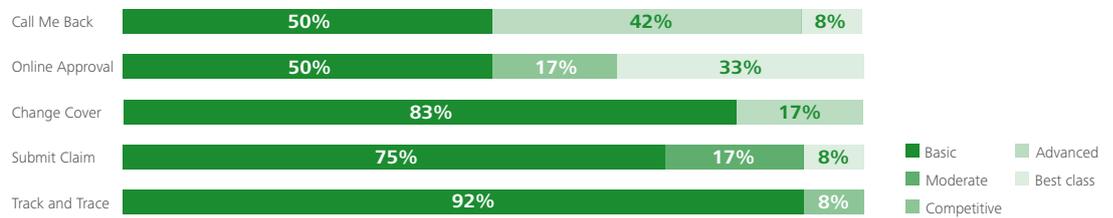
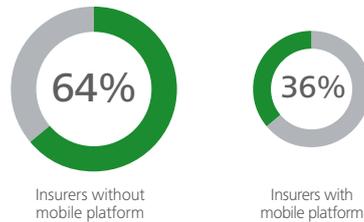
A recent digital benchmark on Dutch insurance companies showed that insurance made good progress in supporting basic internet sales and service transactions and plugging into social networks. Most insurers however struggle with their mobile capabilities as only a few offer more than basic functionalities in the areas of claim notification.

## **36% of surveyed insurers offer a partly mobile website experience, and most apps focus only on claim submission**

Research from the benchmark shows that insurance presence in the mobile world, through mobile websites and apps, is limited and the functionalities currently offered are very basic.

When looking at mobile accessibility, only 36% of the insurers surveyed offer a (partly) mobile website experience. Features provided on the mobile websites of insurers are limited, once again focusing on effective sales (calculations, acceptance) rather than supporting self-service for policy management and claims. Only a few insurers let customers manage their policies through the mobile website.

Moreover, the Track & Trace of claims is hardly supported. This is the biggest difference compared with the best practices of international insurers. Less than 10% of the Dutch insurers in our data set provide Track & Trace functionality through their mobile websites versus more than 40% of international insurers. Health insurers such as Humana, Kaiser and Aetna, provide the option to submit claims bills through their mobile website with advanced Track & Trace capabilities.



With the accelerated adoption rates of new technologies by consumers, insurance companies need to speed up in increasing their digital capabilities to continue to meet the constantly increasing needs of online and especially mobile insurance consumers. However, quickly replicating internet capabilities to mobile will be costly and most likely have low chances of success as it will only create limited differentiation compared with other insurers. Successful use of mobile in an insurance context requires more creativity to deal with the typical low interaction rate between insurers and consumers.

The digital economy is here to stay. Whereas the world today has 6.7 billion mobile phone users, 2.7 billion internet users and 1.7 billion social media users, by 2017 these numbers will have grown to 8 billion mobile phone users (1.2 for every human), 3.3 billion internet users and 2.5 billion social media users. In our countries,

with internet usage already high, the strongest growth is expected in smartphones and tablets. The increased use of these devices and the willingness to rapidly adopt new technologies by consumers will be a catalyst for the development of new functionalities at phenomenal speed. Digital disruption in the insurance value chain is therefore not a possibility, it is a certainty. Insurers should not deny this new reality but should embrace the opportunities these new digital technologies have to offer. In this way, new areas of differentiation in the strongly commoditised and price competition dominated environment can be created. Adopting trends like gamification, telematics and the internet of things offer opportunities to create truly differentiating value propositions, which will enable insurers to regain customer loyalty and at the same time increase profitability. Deloitte is currently helping a major Belgian insurance company in this transition.

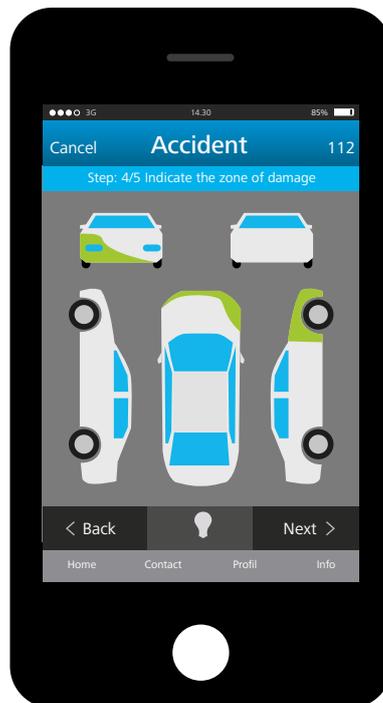
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## Deloitte is helping one of the biggest Belgian insurance companies with their digital transition by implementing Salesforce.com and developing a mobile app for their customers

This Belgian insurer decided to transform their customer relationship management to follow changes in consumer habits and the technological environment. The insurer is now using Salesforce.com as their CRM engine, it has improved customer visibility and enhanced reporting capabilities. Through Chatter—The Salesforce.com collaboration platform—and a mobile access to the platform, it has also enabled effective internal collaboration and communication leading to operational excellence and cost reduction. Similarly, the insurer recently developed a mobile application allowing their customers to execute their car accident report from their smartphone.

With the above-mentioned innovation, this Belgian insurer has taken a big step on its journey to digital customer interaction and will likely benefit from it in the coming years.

**Insurers that have the vision, courage and endurance to take a step forward in the digital arena will be the ones that will truly reap the benefits of the digital megatrend, before others (such as aggregators or Google) take ownership of the majority of customers' digital touchpoints.**



# Chief Data Officer

## Is this seat free?



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Director  
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Businesses are deluged with data. The control of processes and systems handling, dealing with and exploiting that data is no longer a “*nice to have*” but is now becoming a “*must have*” to contain associated costs within reasonable limits. For some market stakeholders, data is a strategic differentiator that can generate additional revenues. The appointment of a Chief Data Officer, as a catalyst to address all these challenges is an emerging trend, which at the same time raises a lot of questions.

#### Setting the scene

Current regulatory, economic and technological changes are presenting the financial industry with unprecedented challenges.

Data management in itself sums up these challenges. Regulators are seeking transparency and impose additional reporting that is a large scale ‘data consumer’ while data acquisition costs represent a significant portion of the budget of financial companies, which have seen their margins eroded since the financial crisis.

Many organisations have launched operational efficiency programmes. However, in most cases they

are not totally implemented or exploited to the full and data is still managed by several departments designated ‘data areas’ and each using its own and sometimes workaround applications. Many of the ad hoc extracts and reports that were built in haste and then declared to be business critical and priority IT developments have remained in their original ad hoc form.

Also, since many companies are investing in building enterprise-wide Service-Oriented Architectures (SOA) and integrating applications and systems across the company, it is no longer efficient to create individual data fiefdoms and have different standards, policies and procedures for each one.



The following table details the challenges related to data management faced by financial industry 'stakeholders':

	Challenges	Impact on organisation
<b>Regulatory</b>	<ul style="list-style-type: none"> <li>Regulatory drivers</li> </ul>	
<b>Business</b>	<ul style="list-style-type: none"> <li>Changing nature of data</li> <li>Data deluge</li> </ul>	
<b>Profitability</b>	<ul style="list-style-type: none"> <li>Competitive pressures</li> </ul>	
<b>Organisation</b>	<ul style="list-style-type: none"> <li>Information and budgeting silos</li> <li>Information centric business &amp; roles</li> <li>Inadequate data ownership</li> </ul>	
<b>Technology</b>	<ul style="list-style-type: none"> <li>Sparse global operation &amp; technology systems</li> <li>Technology evolution</li> </ul>	

Weak    Strong

*Source: Deloitte*

To depict the challenges of data management alone would be a static and overly simplistic view. Companies are becoming increasingly aware of the value of information technology, business intelligence and data integration, as well as the value of data as a company asset. Data management is now perceived as an asset with its own monetary value. This is where asset servicers can step in to build extra services through the gathering, analysis and provision of data and real-time data into new business channels.

The optimisation of data management processes to contain related costs within reasonable limits and the definition and implementation of standards, procedures and business strategies are now on the agenda. This emphasises the importance for financial institutions of appointing a 'voice of data' at the executive level.

**The senior data executive as the 'voice of data'**

The head of the data management function has usually been relegated to a supervisory position. With the management of data becoming more critical and crucial, this function must be filled by a leader with a strategic vision, specific awareness and understanding of the business and a high level of representation at the executive table (the C-suite) in his or her organisation.

Without prejudice to the traditional head of data management and before determining the senior data executive's job title, the job description itself must be placed in the current regulatory, economic and technological context of the financial industry:

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## Regulatory

**Awareness of regulatory environment and its challenges:** Directives and Regulations are no longer solely the preserve of lawyers. Certainly, their understanding calls for strong legal skills, but their operational implementation also requires business and technical expertise. Considering the regulatory landscape overall and not each regulation in isolation is a prerequisite to managing data efficiently. For example, there is a significant overlap (about 40%) on data requested under AIFMD and EMIR reporting.

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## Business

**Business knowledge:** Plenty of business units within a company are creating, using and managing data. Until fairly recently—and this is sometimes still the case—these business units have been managing data on their own, and the risk of redundancy, duplication or unnecessary data acquisition and maintenance have been high. The senior data executive must be able to understand the needs of these different business units and must be familiar with the various disciplines, such as finance, risk management, financial data production and reporting, etc. More broadly speaking, the senior data executive has to align the data strategy with the business governance model and source and implement the necessary tools to manage it, and to extrapolate its availability and relevance into the future.

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## Profitability

**Working to improve the company's financial margins:**

- By reducing or containing the cost of data (acquisition, production and storage) through the adoption of both business and IT measures
- By monetising data: The senior data executive must be guided by a strategic vision and an entrepreneurial mindset by developing new service offerings in the field of data (gathering facilities, analysis, production of indicators, mutualisation, etc.)

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## Organisation

**Negotiation, prioritisation and empowerment:** The senior data executive must be able to negotiate data priorities with different functional groups and business units, and drive, advance and achieve results. The senior data executive must sit at the C-suite table to share and pool strategic orientation and business priorities. This position will bring him or her sufficient authority to drive functional groups and business units.

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## Technology

**Information management skills and technology awareness:** The senior data executive must demonstrate skills and experience in leading major information management programmes, but he or she must also be aware of technological trends and innovative solutions. 'Digital disruption' is ongoing and raises new questions, generates new answers and creates new sources of revenues and organisations need an empowered catalyst to make it happen.

### The Chief Data Officer

In the U.S., the role of the Chief Data Officer (CDO) is quickly emerging. The Chief Data Officer is empowered at the C-level to manage company-wide data administration and data strategies. The job description corresponds to the one described above; our senior data executive has then found his/her job title, the Chief Data Officer (CDO).

A survey conducted in January 2014 by Gartner indicated that the number of large companies with Chief Data Officers doubled in 2013 in the U.S. In Europe, this trend can also be observed but not at the same pace—this is mostly the case for Anglo-Saxon and huge data driven organisations.

There is a lot of internal debate within organisations and frequently asked questions include the following:

- Could the current head of data management assume the CDO role?
- Could this CDO function be performed by the Chief Information Officer (CIO)?

Before addressing any of these questions, we have to acknowledge that they must be considered in the light of the size of a business, the industry segment and the volume of data produced by a company. The emergence of the CDO function is more visible in the financial sector, technology sectors with high value-added and within public authorities.

**Coming back to the frequently asked questions,**

#### *Could the current head of data management assume the CDO role?*

To address this question, reference may be made to practical experience gained through different assignments delivered for EU asset servicers. The traditional head of data management is, in the majority of cases, still acting as a problem solver. To cope with day-to-day demands, the traditional head of data management displays a wealth of imagination in adapting and 'corrupting' processes and core or workaround systems to collect and deliver information to his or her customers, both internal and external. The immediate concern is more organisational and technical. It consists in organising data management as a centric centre of excellence that would run data management processes on its own tool to serve different entities both locally and across borders (branches and/or subsidiaries).



Beyond showing the abilities required for a role destined for change, this situation illustrates that many companies are still seeing data as a business enabler and not as a strategic differentiator.

A skills assessment is therefore complicated if not void at this stage. Nevertheless, traditional heads of data management will have to steer their career plan accordingly by developing skills in the areas of management, technology, regulation and conceptual thinking (if this can be acquired through learning) to fertilise the field of innovation.

#### *Could this CDO function be performed by the Chief Information Officer (CIO)?*

Many organisations face the difficulty of striking the balance between IT and business, technology and strategy. All of these areas are on the CDO's roadmap (with different degrees of involvement) which may also explain why the definition of the role is still ambiguous. In organisations swamped with data, the role of the CDO tends to be prematurely given to the CIO on top of their existing tasks.

In both cases, placing a CDO alongside a CIO or as an extension to the CIO's responsibilities will force the CIO to reconsider the intended job delivery:

- Data management is a common but differentiated responsibility of business and IT. A CDO would be better placed than a CIO to unify these two worlds
- Most of today's CIOs do not have a wealth of expertise in data management
- Data management as a complete and specific discipline is not a priority for CIOs
- CIOs who want to become CDOs should then develop their knowledge in various business areas, namely those where data is gathered and produced and those using and receiving data as a client. This is a prerequisite before defining a data governance model with the business and there is no doubt that CIOs have the necessary skills to further implement

it. In addition, CIOs would have to leverage and further develop their management skills, rallying the different data fiefdoms within their organisation being probably one of the toughest challenges

Referring to the premise that the senior data executive as the 'voice of data', and specifically to the job description outlined, it is clear that CDOs and CIOs are complementary roles in defining, implementing and executing a data strategy. In that respect, the concept is more about information strategy: data is a component of information.

Existing CIOs in place should therefore reconsider their job description, since a colleague may be able to relieve them of a part of their tasks that does not form part of their core activities. In doing so, both should mutually assist and complement each other to scope and examine their activities with one voice: the voice of data, or perhaps more appropriately, the voice of information.

#### **Conclusion**

Financial institutions are drowning in data and defining a governance model and revisiting and streamlining processes are all necessary evils to contain costs. It is increasingly apparent that organisations mastering data outperform their competitors by a direct bottom line impact and many have created, or are working toward creating, a CDO position. The role of the CDO is still under development and is destined to evolve. This will become a mainstream trend and will spread to other businesses, such as energy, transport, pharmaceuticals, and perhaps—dare we say it—even to the government.



# Bring top line growth and cost reduction to your businesses thanks to Solvency II

## Challenges faced by the insurance industry

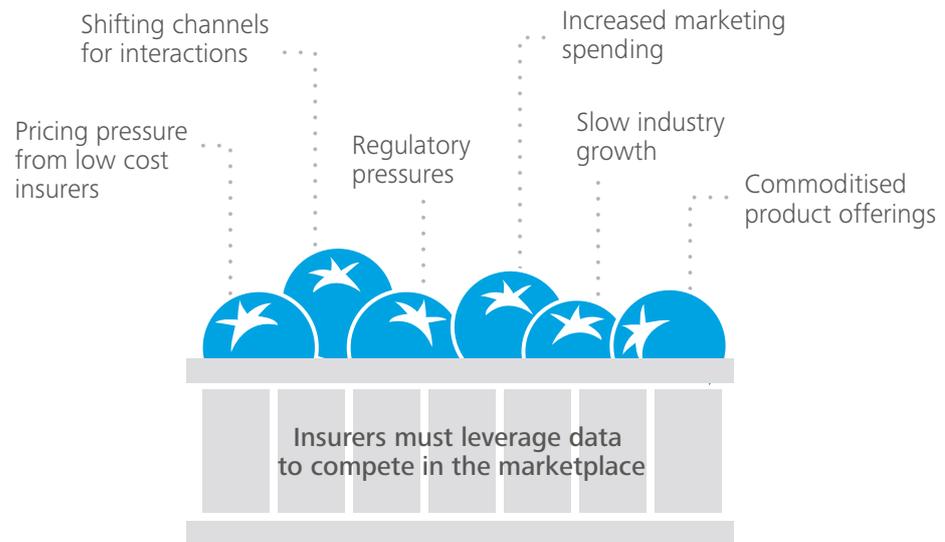
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Now more than ever, insurance companies are facing a variety of forces that make it difficult for them to compete in the global marketplace. These forces include slow industry growth, commoditised product offerings, pricing pressure from low-cost competitors, shifting channels for customer interactions, increased marketing spending, and demand for customer transparency. Insurers need to take action now by positioning for growth, optimising business processes, and managing risk.

To proactively combat these challenges, analytics and information management have emerged as major competitive advantages. **Insurers have gained competitive advantage by learning to use analytics to extract business value from data captured across the value chain:**



#### 1. Underwriting

- Better segmentation of loss risks
- Optimise underwriting categories through better measures
- Increased underwriting efficiency

#### 2. Marketing (lead generation/cross sell)

- Movement beyond traditional, likely to buy models
- Reduce marketing expenses by eliminating offers to those who will be adversely affected by the underwriting decision
- Improvement in loss exposure by selling only to best risks

#### 3. Customer retention

- Identify compounding components of at-risk customers
- Develop, deploy data-driven intervention strategies
- Improved profitability through focusing retention efforts on the best risks

#### 4. Product development

- Develop new, innovative and price-conscious products for selected populations

#### 5. Customer lifetime value

- Deeper understanding of the lifetime value of customers
- Develop an aggregate present value of future profits for all customers across all product lines

#### 6. Producer recruitment

- Analytic rigour applied to subjective process
- Rules-based candidate prioritisation



Despite an abundance of data, most companies are not well-positioned to translate their data into valuable insights.

- Instead of treating information as a strategic asset, many insurers maintain data in separate silos to support their underwriting, claims, billing, and other business functions
- Multiple versions of customer information and disparate data sources may be required to create a coherent, 360° view of the customer
- Disagreements between the business and IT on data definitions can create unwarranted complexities
- Often actuaries and risk managers use a mix of IT extracts from heterogeneous operational systems and various business-managed end-user computing files, causing reconciliation challenges, heavy headaches and lots of other issues. Furthermore, many manual adjustments are performed, often in a decentralised form causing significant losses of traceability. Data quality checks—when performed—are usually informal and data are not stored in consistent sets, making the reuse of a given input set extremely challenging

Finally, we all know how it might be challenging to start such a project in the current economic environment. But that is the case if you only look at the problem from a narrow perspective.

#### How to address these challenges leveraging on Solvency II investments

The insurance industry has, in recent years, been under the mounting pressure of regulations such as Solvency II. In a nutshell, Solvency II impacts on the way in which insurance companies manage their risks. It is a stringent regulation and has numerous repercussions on all company areas, e.g. capital, governance, processes, and systems. Consequently, data is an important and transverse topic in Solvency II. Furthermore, data is directly targeted by the Solvency II regulation as data are required to be accurate, complete, and appropriate, not to mention traceable. Unarguably, this is easier said than done. Especially since regulators will most likely take strict and severe sanctions. For instance, insufficient data quality will result in the insurer being forced to build and maintain additional capital in order to cover and build up a margin for potential errors in capital requirement calculations. As a result, prerequisites for meeting the Solvency II requirements are data governance and data control.

In order to comply with these requirements, different sophistication or maturity levels can be adopted:



Many companies have chosen to respond to it with a Solvency II specific solution (level 3 or below) without looking more broadly at how to benefit the enterprise and make a business case.

Indeed, architectures based on an enterprise data warehouse bring many benefits compared with the additional marginal costs they require:

- **For business lines**, because documented, audited, and high-quality data will be available for business intelligence, performance management and advanced analytics. This set-up will enable the typical ratio to be inverted, meaning that 80% of time is spent in data collection vs 20% remaining time in data exploitation
- **For actuaries and risk managers**, because the data required for Solvency II will be used on an operational basis. This will imply a step-up in quality thanks to the continuous quality monitoring and issue fixing. It will therefore shorten the closing timeline and let actuaries and risk managers focus on their core business instead of collecting data, fixing data quality issues, and documenting all adjustments carried out because of lack of data or of data quality
- **For IT**, because it will reduce the numerous and repeated requests for data extracts from all departments. It will also enable the decommissioning of old data extraction processes and therefore allow companies to reduce their technological debt

For insurance executives, it may be easy to believe that if something can be done with analytics, their organisation has probably already done it. After all, insurers are the original pioneers of analytics. But analytics expands beyond the walls of actuarial and pricing and is now playing strategic roles in risk management, marketing, product development, distribution, claims, and customer service. Finally, the industry now has access to the tools, technologies, and processes to make it all happen with Solvency II as an enabler.

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# AXA Luxembourg

**Olivier Vansteelandt**  
Director IT & Organisation  
Member of the Executive  
Committee  
AXA Luxembourg

**Q: What are the benefits delivered by your Enterprise Data Warehouse to your company?**

Our objective is threefold: to support growth initiatives, improve operational excellence, and reduce operational risks.

From a growth perspective, companies that will make a difference in the future will be those offering exceptional service to clients through adapted products available at the best price. In concrete terms, achieving this objective requires an in-depth knowledge of our clients. This knowledge starts by having sound master data and goes all the way up to collecting behavioural data from connected devices. The Enterprise Data Warehouse (EDWH) will be the foundation of the company's information management and will serve the product innovation, marketing, sales, and customer relationship stakeholders in their day-to-day business.

From an operational excellence perspective, the new architecture will of course favour a data analytics and reporting self-service culture. It will be a unique opportunity to review and optimise our processes.

During this transformation, data governance will be the key pillar to achieve the objectives. We will use this momentum to define the key terms used across the company and to acquire a common understanding of the data and the data architecture. These elements combined will reduce significantly the time spent acquiring and reconciling data, and therefore increase the time available for analysis to support decision-making.

From an operational risk perspective, the project is also the opportunity to decommission data extracts that have been built—sometimes long ago—and were not aligned with the company technology and documentation standards.

It is in this context of global information management that AXA Luxembourg has decided that the implementation of an EDWH will be a key factor for future success.

**Q: How did you connect the dots between your EDWH and Solvency II projects?**

Solvency II has very stringent requirements in terms of data quality and traceability. Furthermore, the amount of data to be reported is extremely substantial for a diversified company like AXA. Based on this, we estimated the additional workload that would be required—and therefore the resources to be hired—to perform Solvency II data processing. This exercise showed us very quickly that investment was required to support our actuarial and risk management teams in this process. At this stage, two options remained: the Solvency II specific and the EDWH solutions. Based on all the added value that we have just seen, and given the additional cost, AXA Luxembourg decided to start the EDWH project to deliver business value on top of regulatory compliance.

**Q: What are the main lessons learnt from your project?**

We learnt two main lessons related to the opportunity to review the existing processes and IT landscape:

1. The opportunity to reduce the technological debt, especially for data extracts from the source systems, is wonderful. It is therefore essential to start with a blank sheet and not from the legacy. Involving the architecture team in this process is also key to ensure that the newly developed extracts are aligned with best practices and the company's IT roadmap.
2. Even though reviewing the existing processes is important, it is also vital for the project team to keep the focus on delivery. Strong project management is therefore required to govern discussions and make sure the project delivers according to plan. Closely linked to this, setting up the change management activities early and sponsoring them appropriately will also be required. It is the only way to ensure that users adopt the new solution and leverage it in their day-to-day tasks to obtain the value planned in the business case.

# Crédit Agricole Life Insurance Europe

## *Q: What are the benefits delivered by your Enterprise Data Warehouse to your company?*

The objective of the project was to deliver the following three business benefits on top of supporting Solvency II compliance:

1. Improve performance management and particularly management of the distribution network. The data warehouse will provide CALIE with an automated, centralised, and trusted source of information to produce the required Key Performance Indicators and activity reports.
2. Support the reporting process in a fast-closing context where the group reporting deadlines are shortened year after year. The data warehouse will be a key enabler in this process by automating multiple steps of the closing and by bringing traceability and controls on top of efficiency gains.
3. Support the marketing and sales process, but also more broadly prepare the company for the future in terms of information management. The data warehouse will deliver to the sales and marketing team the data required in its analysis.

## *Q: How did you connect the dots between your EDWH and Solvency II projects?*

Crédit Agricole Assurance (parent company of CALIE) always strongly drove and structured the path to Solvency II compliance. Firstly, in terms of planning; indeed, the first dry run for the Pillar III disclosures was already performed more than a year ago. Secondly, in terms of technology; the group formulated strict guidelines on the packages to be used or deployed. Achieving Solvency II compliance while respecting the group guidelines represented a significant investment for CALIE. Having built the business case for different scenarios, we therefore decided to seize the Solvency II opportunity to build at the same time the information management backbone of the company and deliver business value on top of regulatory compliance.

## *Q: What are the main lessons learnt from your project?*

Delivering that kind of project requires specific skills and expertise. Obtaining external advice on the design of best practices, regulatory compliance, and technology expertise was a strong enabler and key success factor for us. Still in the human resources area, the profile of our project manager, who combined business and technology expertise, was instrumental in the realisation of our objectives on time and on target.

As is the case with many projects, it was especially important to involve users from the outset to secure their buy-in and adoption of the solution in their day-to-day tasks. A key element in this involvement was the inclusion of flexible methodology and prototyping in our approach. This enabled users to quickly visualise results based on data they know and allowed us to get them immediately on board.

Finally, the project plan must make provision for a first delivery early in the overall timeline. This delivery must then be used directly in production mode with a reduced set of users to identify areas for improvement, which can be integrated in the solution before the complete rollout.

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# The Single Supervisory Mechanism

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The Single Supervisory Mechanism (SSM) is a new system of financial supervision that will be enforced from 4 November 2014. On this date, the European Central Bank (ECB) will take over the supervision of Systemically Important Banks (SIB).

The main purpose of the SSM is to centralise and harmonise the supervision of the banking system in order to ensure financial stability of the eurozone and participating countries. The SSM will cooperate with the National Competent Authorities (NCA) of participating EU countries to perform this supervision. In particular (according to ECB/2014/17), “a joint supervisory team shall be established for the supervision of each significant supervised entity or significant supervised group in participating Member States”. Each joint supervisory team shall be composed of staff members from the ECB and from the NCA.

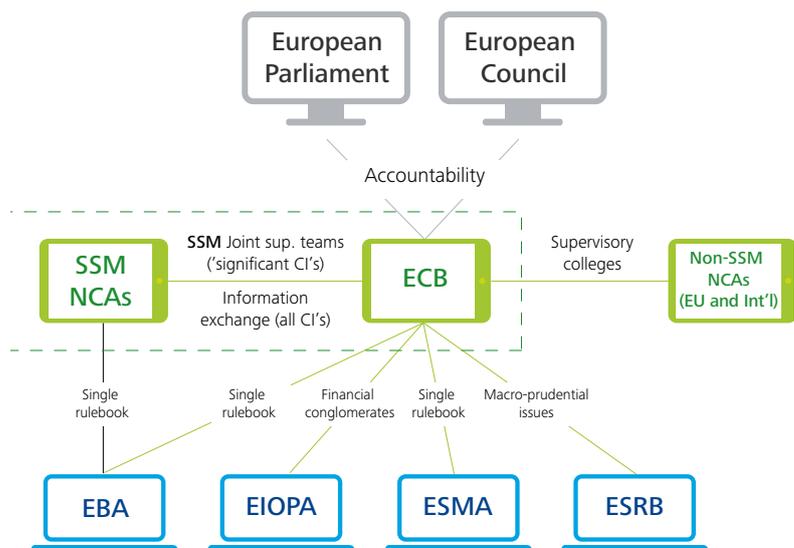
On the one hand, the setting up of the SSM demonstrates the European Union’s determination to supervise financial institutions at the European level so as to restore confidence in European financial institutions and their stability. On the other hand, it emphasises the trend toward data intensive regulation, requiring more—and better—data from regulated entities.

### Trend towards data intensive regulation

The regulation not only requires financial institutions to demonstrate their capability in terms of processes and governance but will increasingly focus on their ability to provide proper, accurate data in a timely manner.

For example, the Single Supervisory Mechanism gives the ECB the possibility to require legal or natural persons to provide all the information that it needs to perform the tasks assigned to it by the SSM Regulation. This means that financial institutions will have to be able to answer ad hoc requests with the appropriate level of data quality and in a timely manner. On top of this, the Asset Quality Review (AQR) exercise shows that the level of detail required in the data to be provided could be rather granular. Indeed, the ECB will have the capability to assess more detailed, granular data that banks will have to provide consistently and quickly. The Basel III regulation is also contributing to this trend. Indeed, BCBS 239 introduced the “Principles for effective risk data aggregation and risk reporting”. Part of these principles focus on the processes and controls

### SSM in practice: How will the ECB work with the existing supervisory network?



put in place prior to risk calculation. Specifically, it focuses on data quality monitoring and administering evidence through procedures and documentation, taking into account most aspects of data quality from accuracy to timeliness. As the supervisor will have more data, reconciliation and comparison will be easier. This will enable the supervisor to identify gaps and measure the reasonableness of data.

Finally, as this provides a unique opportunity for the SSM to compare institutions from different countries, analytics capabilities will certainly be put in place to allow significant volumes of data to be processed—not only in response to problems but also in anticipation of them. This means that we can expect a standardisation of data structure and definitions, to make data volumes manageable, which is essential if the ECB is to achieve the sought-after harmonisation of supervision across the eurozone. On top of this, given the ECB’s improved data capabilities, banks will have to be able to provide data more often in response to ad hoc requests.

**What is the answer to this trend?**

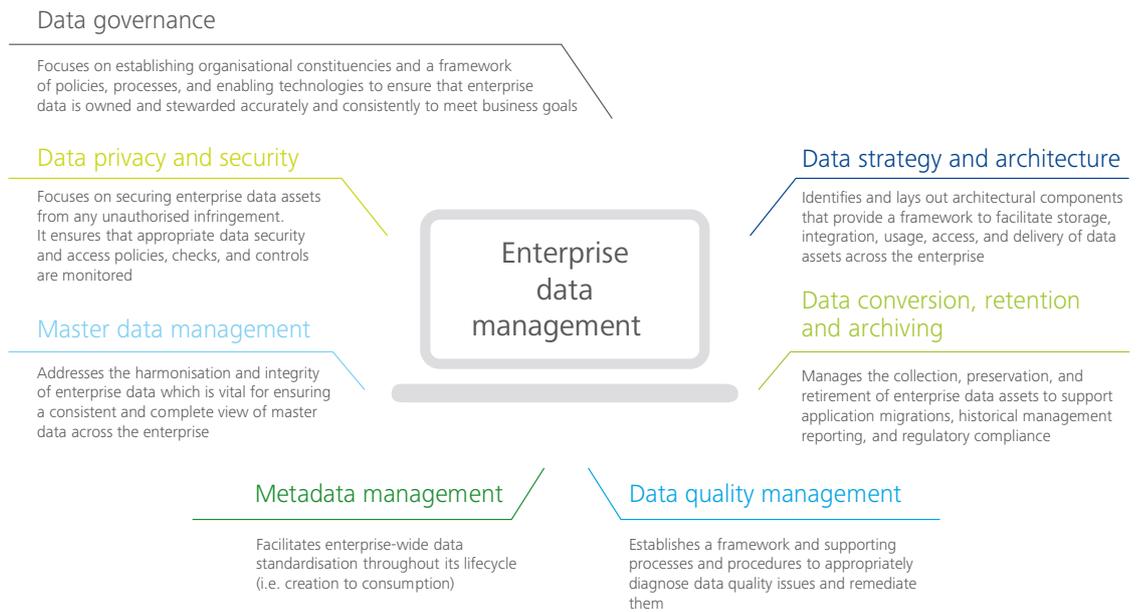
Meeting these requirements and challenges will involve comprehensive data management capabilities using a data management framework.

**What has been done in the insurance industry?**

By 2016, insurers will have to comply with Solvency II—which has strong requirements in the area of data management. For example, undertakings must

implement processes, procedures and responsibilities to ensure the appropriateness, completeness and accuracy of data. Insurers are also expected to regularly assess the performance of IT systems and of the channels used to collect, store, transmit and process data. In order to comply with these requirements, different sophistication or maturity levels have been adopted.

We have classified them from 1 (less mature) to 4 (more mature) with the following characteristics:



Source: Deloitte's EDM (Enterprise Data Management) methodology

Such data management discipline nonetheless enables organisations to meet regulatory challenges as well as leverage operational gains.

The Asset Quality Review (AQR) exercise shows that the level of detail required in the data to be provided could be rather granular



Level	Name	Description
1.	<b>Process approach</b>	This level consists of the reengineering of the process by adding manual operations (quality check, traceability, auditability). This requires less investment but also offers fewer benefits. Also, it does not relieve the business of operational burdens which can be a serious issue in larger organisations.
2.	<b>Document management approach</b>	This level proposes a reengineering of the process with manual operations for quality and file traceability and storage automation. This is a first initial compromise for small portfolios or less material risks.
3.	<b>Solvency II central repository</b>	This level enables reengineering of the process with automation of the quality processing auditability and traceability throughout a central repository architecture designed using the existing file layout. This is a good solution for larger portfolios of organisations that have no data management in place.
4.	<b>Enterprise Data Warehouse (DWH)</b>	This is the most mature level proposed. It offers reengineering of the process with automation of the quality processing auditability and traceability throughout a DWH architecture designed using a standard data enterprise model. This should be reserved for companies that already have strong management disciplines or a willingness to set one up.

In the implementation of such projects, the insurance industry can also be regarded as an interesting source of lessons learned. For example, it shows that technology enables repeatability and saves business resources, but can quickly become a financial nightmare. This means that the Total Cost of Ownership (TCO) approach must be adopted from the outset. We also observe that the data quality business case can be achieved by considering the whole organisation.

Indeed, taken alone, data quality will be just a regulatory cost—yet it can benefit many areas across the organisation if implemented correctly from the beginning. Notably, the main lesson is that governance is key. Using a thermometer will give you the temperature but not the remedy; data governance and data management skills must be put in place to make sure issues are monitored and fixed.

# Regulatory reporting

## Are you only seeing the tip of the iceberg?

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The financial crisis that shook the world early in the new millennium obliged governments to rethink their approach to controlling and regulating the financial system. However, how can you control something without a clear understanding of what is going on? The answer is simple: you can't. This is why a push for greater transparency has begun.

#### Availability and accuracy of data

The primary challenge centres on data, which may be spread all over the organisation. It might be stored on legacy mainframes, hidden on the internal hard drives of employees, lost in a newly created private cloud or even kept outside of the company. The good news is that an increasing number of organisations are investing in data warehouse projects to streamline and rationalise data management, storage and archiving processes. Organisations must ensure that reportable data is accurate and up-to-date. For instance, a valuation of a derivative contract based on outdated market figures will cause the company's real exposure to be inaccurate and result in a misstatement of information to regulators. Failure to report accurate data may lead not only to financial sanctions, but also to legal and reputational risks if auditors and authorised inspectors reveal the inaccuracies later. The quality of reportable data therefore needs to be organisations' number one priority. A good practice for quality assurance would be to establish internal control policies and introduce the principles of accountability and data ownership to the business lines involved in reporting.

#### Outsourcing versus in-house reporting

Making accurate data available for reporting is extremely important, but it is only the first step in our reporting journey. The next step is to decide which reporting mode to use, i.e. whether to perform the reporting in-house or to outsource it to a third party. Unless the company provides reporting services to other firms, the costs associated with reporting are not recoverable, as reporting activity does not generate any income for the organisation.

If providing reporting services to others is not on the agenda, companies need to analyse whether these additional reporting costs can be absorbed using existing human and technological resources. From a human resources perspective, this includes the availability of current employees and their ability to take on the additional responsibility of extracting, preparing, approving and submitting the data. Companies should clearly understand that submitting a report is rarely the last step of the reporting process, as repairs and reconciliation may be necessary. From a technological viewpoint, a careful assessment of software/hardware capabilities is required to understand whether the complete reporting value chain is covered. In technical terms, this involves the ETL (Extraction, Transformation, Loading) software configured and adapted to the specific needs of the report in question.

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## Companies should clearly understand that submitting a report is rarely the last step of the reporting process, as repairs and reconciliation may be necessary

Good candidates for in-house reporting would be companies with well-established IT processes and procedures, as this would foster a smoother integration of new reporting services. Companies performing one type of reporting can investigate the possibility of reusing existing in-house reporting services for another type of reporting. For instance, global banks with entities in the US and Europe might seek to mutualise Dodd-Frank Act and EMIR reporting related to their derivative contracts in view of their relative similarity. Likewise, nearly 40% of the data provided for EMIR and AIFMD reports is the same, including standardised identifiers (LEI, Broker ID, Product ID, etc.), valuation data, clearing details and product taxonomy.

On the other hand, companies should consider outsourcing opportunities. Time constraints often dictate the choice of an outsourcing option, as companies usually do not have enough time or resources to prepare the full reporting value chain. We also see some companies attracted by an 'easy' outsourcing solution, thinking that no further involvement from their side is required. This is a false assumption. Regardless of whether reporting is performed in-house or outsourced, the company still needs to extract and prepare the raw data. However, an analysis of available outsourcing offerings is worthwhile from a cost perspective.



### Selecting an outsourcing provider

Offerings can be broken down into companies specialised in providing one type (or a very limited number) of reports and those providing a much broader spectrum of reporting services ('all-in' reporting providers), including reporting within multiple jurisdictions and for multiple industries.

### Specialised reporting providers

Specialised firms might offer more flexibility in terms of data formatting and may provide a more responsive and proactive client relationship. On the other hand, they may not cover every step of the reporting value chain, leaving the company to deal with additional activities internally. Among these are certain steps to data transformation, reconciliation, and error handling. In addition, should your company be subject to multiple types of reporting, you would have no choice but to look for another reporting provider or to perform the reporting in-house, which means additional costs, new interfaces, supplementary communication channels, vendor relationships, etc. It is fair to say though that most specialised reporting providers are becoming 'all-in' players over time, offering additional types of reporting.



#### **'All-in' reporting providers**

These companies offer a broad spectrum of reporting services, usually covering a full reporting value chain and in some cases including additional services such as derivative valuation, thresholds or capital requirement calculations, and other data preparation and transformation services. Certain providers may offer analytical and data mining services. In addition, 'all-in' providers usually cover reporting for multiple jurisdictions and different regulatory bodies within each jurisdiction (for instance, the regulatory reporting solution for banks provided by Moody's covers more than 50 countries and offers around 3,000 reports). These providers often have offerings for different industries, which might be of interest for holding companies covering multiple business sectors. While companies might benefit from contracting an established and recognised reporting provider (potentially in the eyes of a regulator), they might suffer from certain restrictions and a lack of flexibility in terms of raw data formats. Poor responsiveness from the provider as a result of a large number of other clients is also possible.

#### **Conclusion**

Today's financial institutions are overwhelmed with regulatory obligations and have to face multiple challenges, including timely and accurate reporting to regulators. Ensuring that reporting data is available and accurate is the first and most critical step of regulatory reporting. The choice of whether to perform the reporting in-house or to outsource it depends on the business profile and internal capacity of the company to absorb these regulatory costs. When selecting outsourcing providers companies should explore the opportunities of mutualisation, especially if they are subject to multiple types of reporting. In this case, companies may see it as more cost-effective to work with 'all-in-one' reporting providers offering a wide spectrum of services. Regulatory reporting is an activity that should be taken seriously, especially in our increasingly regulated world.

# Will IT be one of the biggest hot topics for the private equity and real estate industry in the years to come?

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This article focuses on the IT requirements of asset managers and service providers in the private equity and real estate sectors and appropriate business solutions, taking into account market practice, regulations and legislation, as well as reporting standards—which have already been covered elsewhere in this magazine. It also takes a closer look at the industry challenges from an IT perspective and potential opportunities for software developers and other market players.



### **The wind of change impacting private equity and real estate**

The Private Equity (PE) and Real Estate (RE) sectors, and more generally, the alternative funds market, are now caught in the regulatory spotlight and have not escaped tighter scrutiny and pressures for transparency from regulators and investors alike. In a similar way to the global transformation of the retail fund industry in recent decades; new operating models covering the front/middle to back office operations of PE and RE asset managers and their service providers, have emerged—and these are not just necessary to adapt to current legal and industry guidelines, but are prime requisites for business viability, service marketability and expansion.

Major regulations that have triggered essential change in the asset management industry include the Dodd-Frank Act and FATCA in the United States, and Europe's AIFMD. Many PE and RE structuring vehicles and investment strategies need to make changes to comply with this new wave of laws, directives and their implementation requirements. Moreover, investor and industry standard-setting bodies such as the Institutional Limited Partners Association (ILPA), INREV,

EVCA and IPEV, are likewise influential in clamouring for industry reforms and standardisation of the highly fragmented, inadequately automated and vastly diversified PE and RE sectors.

### **An aggregated approach is the way forward for portfolio and risk management at GPs and asset managers**

The technology supporting investment managers has generally evolved tremendously over the last decade, to offering holistic front to back solutions, mostly for traditional and regulated funds. More and more alternative asset classes are being supported, with geographic spread and local characteristics factored in. In the PE and RE spheres, portfolio and risk analytics and valuation modules are becoming a standard, while to a lesser extent, dedicated tools have been developed or enhanced to accommodate new market demands.

There is no doubt that IT infrastructure, comprising portfolio and risk management, as well as accounting and administration systems, is key to an asset management firm. PE and RE players are facing more and more challenges, which are hard to handle without advanced technology.

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## PE and RE players are facing more and more challenges, which are hard to handle without advanced technology

The variety of applications and modules related to portfolio management, risk exposure evaluation, partnership accounting and data administration, deal flow management or due diligence support, require continuous enhancement to be able to cope with traditional PE and RE business requirements, such as deal sourcing, investment due diligence, investment selection and management or investor/partner relationship management, and more particularly, with regulatory and investor-driven reporting needs.

Some of the key issues and challenges in portfolio and risk management for GPs and PE/RE asset managers include:

- **Deal management:** investment pipeline tracking, term sheet reviews, due diligence and investment structuring
- **Fund raising and investor services:** CRM, investment terms, commitments handling and reporting
- **Portfolio analytics and management:** transaction handling, asset maintenance and record-keeping, accounting, revaluations, waterfall calculations, exits and liquidations
- **Risk management:** liquidity assessment, investment restrictions, portfolio concentration and exposure to investment type, geography or structures, leverage calculation and monitoring
- **Reporting:** financial, regulatory and investor specific reporting, which requires consistency of data and various granularity levels

A lot of the time, asset managers struggle to keep up to speed with their obligations and choose the right tools or service providers. These firms have to

manage integration issues, due to legacy systems, and new software implementation offering additional functionalities such as exposure and portfolio return calculations, deal flow management, consolidation of reporting and investor communication. Fragmentation of systems and a lack of interconnectivity, as well as big data related to investment deal opportunities, evaluation and structuring, are taking their toll on the process, adding operational complexity and the need for manual handling of information flows and reporting production, which increases the risks and costs of production.

The increase of systems used, pose additional issues for PE and RE asset managers and GPs, and these relate to the compatibility of data used to evaluate an investment and the differences that often arise due to variations in calculation methodology. For example, marketing teams, accounting and risk departments can obtain different values for the same investment, due to differences in the parameters of their respective systems and a lack of integrated data.

A consolidated and unified view provided in a GP or PE/RE investment firm's reporting to its internal stakeholders, regulators, shareholders and clients is key in order to reduce confusion and misinterpretation of data among the different parties. Many firms experience the negative effects caused by system reporting shortfalls, which mainly relate to additional reconciliation workload. Clarity of reporting is another important factor, especially in view of multi-layered PE and RE structures and their complex valuation methodology.

The specific characteristics of the asset class and the complexity of investment financing, structuring and management impose various challenges for the PE and RE industry especially in terms of reporting. However, these aspects offer software developers an opportunity to enhance their product offering. The urgency to address these needs has been confirmed by the large number of PE/RE asset managers, GPs and asset servicers looking for a comprehensive solution or set of solutions.

However, the platforms need to provide a high degree of flexibility in order to be compatible with the unique success factors of each PE or RE asset management firm and fulfill the reporting challenges e.g.:

- **Deal appraisals**
- **Completeness of portfolios**
- **Portfolio analytics and performance analysis:** tracking of multi-jurisdictional SPVs and subsidiaries, timely reports
- **Risk reporting:** exposure presentation, exceptions handling and escalations
- **Accessibility:** online and real-time reporting, content customisation

### PE and RE asset servicers rising up to the challenge

With more GPs and PE and RE firms looking for outsourcing partners in the current business environment, the implications of new regulations has cascaded down to service providers, triggering operating model changes, IT upgrades and business process optimisation projects to accommodate clients' numerous and increasingly complex requirements, while also managing operational risks.

In a recent survey of the largest asset servicing entities in Luxembourg, we asked respondents about their main investments relating to PE and RE services. 'Technology' ranked second in terms of investment priorities for the majority of our respondents, while the top priority was 'staff development and recruitment', which reflects the Luxembourg market's growing interest in this business, following in the footsteps of the more established PE and RE markets in the United States and Europe. The growing number of service providers making technology one of their top business priorities reflects a generally observed global industry shift from manual or limited automation to more sophisticated and integrated systems for asset maintenance, accounting and reporting, much like the current service provider systems for the regulated investment fund industry.

Most PE and RE asset servicers, however, are currently using multiple (at least two) asset servicing systems, either vendor or in-house platforms or platforms



developed for certain activities, which are processed manually using MSExcel. This seems to be the norm—not just in Luxembourg, but across the global PE and RE asset servicing landscape. It also implies that at present, there is no single vendor solution in the market that is able to support the end-to-end processes and complexities of each PE and RE client.

### Investor reporting by asset servicers

In the asset servicing value chain, one of the key requirements of asset managers or GPs is investor reporting. Service provider systems must be able to handle specific investor reporting needs ranging from technical requirements—layouts, file formats, and delivery methods either by post, email or web access, to data content such as investment positions, performance data, fee and income allocation, and tax related information. In the PE and RE industry, however, this is still largely performed on a tailor-made basis, as opposed to the more standardised investor reports for regulated retail funds such as UCITS. But with international standards such as INREV, IPEV, EVCA and ILPA increasingly being used by the industry, and with technology providers catching up with investor requirements, more standardised reporting will eventually be achievable.

The key IT-related challenges for PE/RE service providers can be grouped as follows:

- **Limited or costly PE/RE systems and PE/RE IT expertise:** there are very few platforms that cater to PE and RE, and thus are quite costly to acquire, implement and maintain. Developing an in-house platform can also be a massive and costly endeavour given the specific characteristics of PE/RE IT set-ups, which require both operational and industry expertise
- **Limited system flexibility for user-initiated changes:** in general, use of third-party developed platforms is covered by a software licensing fee arrangement between the technology provider and the service provider. Such arrangements usually include a standard number of users, pre-defined parameters and functionalities. Any user-initiated additions or modifications usually entail additional vendor fees. Other costs may include service fees for more intricate parameter set-ups, including carried interest, waterfall calculations, high volume cash flow monitoring, asset valuation, (re)financing and interest calculations or adjustments, customised reporting, consolidations, etc.

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## Data standardisation, transparency, frequency and completeness is key to success

- **Limited functionalities:** most asset servicing systems do not cover the entire PE/RE lifecycle. Additional modules, functionalities and extensive customisations are required but can be very complex, and vendor development or procurement costs can be exorbitant
- **Multi-system management and limited automation and interfaces:** where there is more than one system used and with limited system integration, service providers' IT team budgets and workload could be challenging to manage, given increased client requirements for fast and/or real time reporting

## Opportunities and competition among service providers and technology providers

PE and RE service providers recognise that integrated, multi-functional, flexible and customisable systems are critical to their business requirements, which are aligned to client demands ranging from standard balance sheet, income statements and NAV reports, to customised portfolio and risk analytics supporting exception reports and escalations. In addition, clients are increasingly opting for online access to web portals for real-time or on-demand reporting on portfolios, cash flows, etc. Such reports are essential for asset managers or GPs to properly manage their investment fund portfolios, risks and liquidity in a timely manner. The ability of each provider to offer these business solutions using a robust platform is imperative for business expansion as well as client retention, given that systems are one of the key selection criteria for GPs and asset managers when scouting for asset servicing partners.

For PE and RE asset servicing, the competition is intensifying, with smaller vendors offering a vast array of market intelligence and analytical tools for accounting and financial reporting solutions joining the most recognised and dominant platforms catering to these sectors. The business and marketing models of technology providers have also evolved from the traditional practice of selling software under a perpetual licence with an upfront cost and ongoing support fees to the more sophisticated software as a service architecture, and data management and cloud computing services.

The intensifying business competition, along with extensive regulatory reporting requirements, has been a challenge (and an opportunity) for both asset servicers and PE and RE software vendors. Improved data quality and transparent and timely reporting are only a few of the many advances observed in the PE and RE spheres. With more rigorous regulation, more demanding investors and evolving best market practices, these challenges are not expected to ease anytime soon. However, this competition is welcomed by market players as pivotal and necessary for the continued development and overall progress of the industry.

Undoubtedly, technology has become the backbone of new or upgraded operating models at service providers. Having the right platforms is essential for asset servicers to enhance the appeal of their services and optimise their client servicing and delivery models. Some service providers have also acquired or developed tools for an expanded product offering beyond the more mature and traditional domiciliation, accounting, transfer agency and reporting services. They now encompass front office support and middle office functions that could yield higher margins and further commercial influence by having end-to-end, one-stop-shop business solutions.

### Speaking the same language—integrated systems are key to efficient data management for PE/RE asset managers and service providers

The main concerns of asset management companies (similar to those of asset servicers) relate to the quality of data required for portfolio and risk management, compliance and reporting needs. Data standardisation, transparency, frequency and completeness is key to success. Continuous upgrading of platforms to improve connectivity, streamline data management and ensure accurate reporting is becoming a must. However, the development of consistent, reliable and efficient data management standards is still a challenge in the PE and RE industry, where a variety of data sources and formats are at the centre of this difficult task.

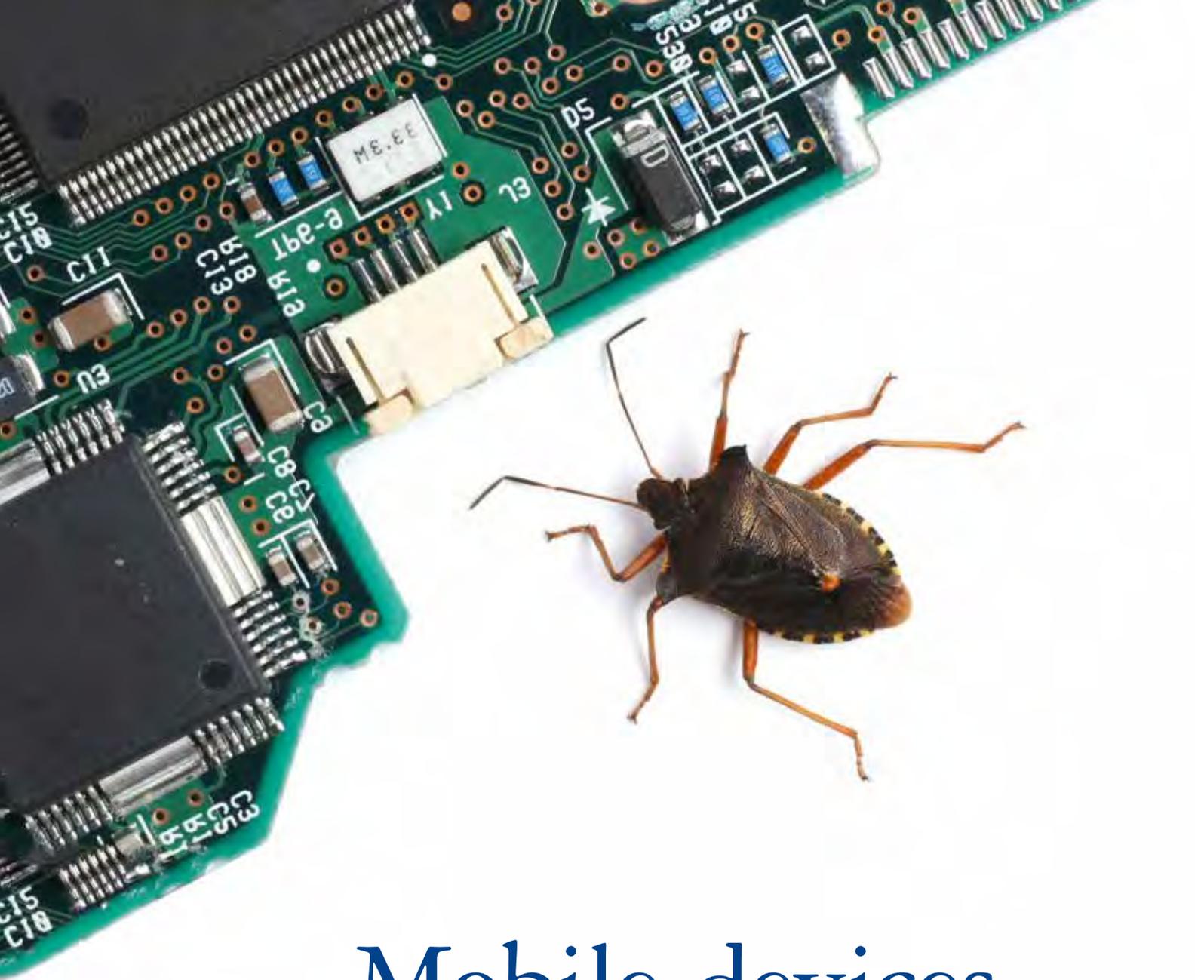
Fragmentation of systems, whether for legacy reasons, or owing to the complexity of the PE/RE sectors or the geographical complications of having several international jurisdictions for investment structuring and holding company domiciles, is the primary cause of the inability to integrate multi-location and multi-system data. On the other hand, increased reporting obligations, multiple audiences and granularity requirements require additional effort to collect, analyse and consolidate available information.

It comes as no surprise that the majority of PE/RE firms and their service providers are concerned about IT infrastructure, adaptability to changing regulations, its flexibility to expand and its capacity to handle more complex and increased data volume management from

multiple systems in various asset locations. Investments in data quality and management, as well as data warehousing, alongside comprehensive portfolio and risk management systems, are a top priority, which is why appropriate systems offering an integrated and efficient data management approach are highly sought after. Both asset managers and service providers want to limit time spent on data collection and reconciliation by implementing a comprehensive solution that meets their internal, regulatory compliance and client requirements.

#### Conclusion

- Fully integrated and comprehensive systems are still uncommon in the PE and RE industry, representing significant challenges for PE/RE firms and asset service providers, as well as opportunities for the technology providers that can supply more developed platforms
- Streamlined data management systems are vital for the portfolio and risk management of PE/RE firms
- Automation is increasingly sought after in the PE/RE asset servicing world to meet increased and more complex client requirements
- The capability to support various alternative asset classes and enhanced risk metric functionalities are becoming key criteria for PE/RE asset managers and servicers when selecting new systems
- Increased reporting requirements and a drive for higher transparency require solutions that offer data consistency, the flexibility to handle needs relating to multiple audiences (e.g. management, regulators, shareholders), the application of industry standards and compliance with various regulations



# Mobile devices

## A security perspective

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BYOD (Bring Your Own Device), COPE (Corporate Owned Personally Enabled) or CYOD (Choose Your Own Device) are often used as the names for projects ultimately aiming to put corporate data on mobile devices used by employees, even if those names only describe the provisioning approach of an often more complex mobile devices management project.

**How to ensure that security threats will not jeopardise your mobile strategy**

Recent mobile devices such as smartphones and tablets enable employees to work anytime and anywhere, and are powerful enough to handle most business activities and data, including email, documents, contacts and agendas. They are also used extensively for social media and access to cloud-stored data. This intermingling of access to business data and use of personal software applications in one device makes mobile devices a prime target for hackers and provides new entry points for attack, in addition to being easily lost or stolen.

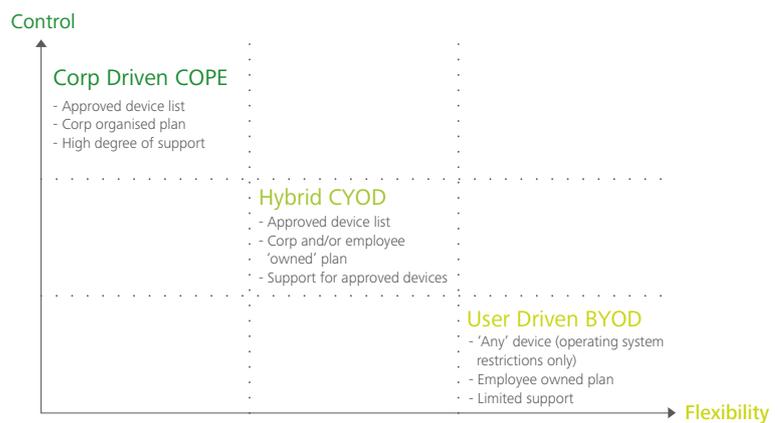
Mobile devices are a good example of the new information security paradigm resulting from the de-perimeterisation of IT, where IT assets, users and data are moved outside of the traditional Information System boundaries.

Many Luxembourg organisations across all industries are currently dealing with this type of project (either as a new service or as the migration of an obsolete system) and are facing the new security challenges presented by IT de-perimeterisation.

**Understanding the threat landscape**

According to the Norton Report 2013<sup>1</sup>, 38% of smartphone users have experienced mobile cybercrime in a one-year timeframe, while 27% of adults have lost their mobile device or had it stolen.

**Figure 1: 'Provisioning' approaches for mobiles devices: a trade-off between flexibility and control**



It is not surprising that, for instance, TMT organisations now consider mobile devices to be their second biggest security risk, with 74% rating it as a 'high' or 'average' threat<sup>2</sup>.

Considering that 57%<sup>1</sup> of users are not aware that security solutions exist for their mobile devices, it is easy to understand that security is an important topic when dealing with a BYOD project, especially when you examine the following threats<sup>3</sup>, which are for the most part specific to mobile devices:

- **Lack of physical security controls:** mobile devices are not protected by the physical boundaries of the company's premises. Furthermore, because of their mobile nature, they are more likely to be lost or stolen than other devices

<sup>1</sup> Symantec, 2013 Norton Report: [http://www.symantec.com/about/news/resources/press\\_kits/detail.jsp?pkid=norton-report-2013](http://www.symantec.com/about/news/resources/press_kits/detail.jsp?pkid=norton-report-2013)

<sup>2</sup> Deloitte, 2013 TMT Global Security Study: <http://www2.deloitte.com/content/www/global/en/pages/technology-media-and-telecommunications/articles/2013-tmt-global-securitystudy.html>

<sup>3</sup> NIST, Special Publication 800-124 Revision 1, Guidelines for Managing Security of Mobile Devices in the Enterprise: <http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-124r1.pdf>

- **Use of untrusted mobile devices:** unless properly secured and continuously monitored, mobile devices should be considered as untrusted (jailbreaking, rooting, etc.).
- **Use of untrusted networks:** public Wi-Fi connections generally used by mobile devices are often a vector of choice for eavesdropping or man-in-the-middle type attacks. Organisations should therefore assume that the networks between the mobile device and the organisation cannot be trusted
- **Use of untrusted applications:** end-users can easily install applications – potentially with advanced rights – directly from various application stores containing malicious applications (by 2013, more than 42,000 apps in Google’s store contained spyware and information-stealing trojan programs according to RiskIQ<sup>3</sup>)
- **Interaction with other systems:** mobile devices are often connected to personal computers, which may be vulnerable and infect them. In addition, mobile devices are generally configured to automatically back-up their content on a cloud storage solution, which may lead to data leakage
- **Use of untrusted content:** Quick Response (QR) codes have been designed especially for mobile devices. Unfortunately, such QR codes are increasingly being used to direct mobile devices to malicious websites
- **Use of location services:** the GPS capabilities of smartphones can provide valuable information to attackers when planning a targeted attack. Uncontrolled use of location services may also lead to a privacy breach

The above threats and vulnerabilities have been grouped into four risk categories in the table below:

Figure 2: Overview of the main risks related to mobile devices

<b>Operational risks</b>	<ul style="list-style-type: none"> <li>• End users (including corporate executives) are increasingly driving decisions concerning devices</li> <li>• Highly diverse mobile ecosystem due to multiple mobile OSs and carrier specific implementations</li> <li>• Lack of ‘mobile-ready’ support and operational processes, infrastructure</li> <li>• Lack of resources, skill sets and technical capabilities in-house</li> </ul>
<b>Legal &amp; regulatory risks</b>	<ul style="list-style-type: none"> <li>• Potential privacy issues due to personnel activity, device use (location services), data exposure, etc.</li> <li>• Ethical and legal issues around monitoring, device wiping, securing devices and data upon employee termination, etc.</li> <li>• Regulatory requirements regarding e-discovery, monitoring and data archiving need to be considered</li> </ul>
<b>Technology &amp; data protection risks</b>	<ul style="list-style-type: none"> <li>• Lack of native encryption on devices, memory cards and at OS level (for certain OSs)</li> <li>• Unauthorised and unapproved installation of applications by end users; control is challenging</li> <li>• Interaction with other systems (cloud storage, personal computer synchronisation, etc.)</li> <li>• Lack of mobile OS patching and update enforcement</li> <li>• Usage of untrusted devices: end-users modifying or bypassing device security controls (root or jailbreak)</li> </ul>
<b>Infrastructure &amp; device risks</b>	<ul style="list-style-type: none"> <li>• Sophisticated and varying attack vectors targeting mobile users and devices (including untrusted network and untrusted content such as QR codes)</li> <li>• Diverse mobile ecosystem can result in an expanded attack surface or enterprise risk profile</li> <li>• Third party application vulnerabilities, applications with questionable motives</li> <li>• Lack of physical security controls (remote wipe is not a universal solution as attempts frequently fail for lost and stolen mobile devices)</li> </ul>

<sup>3</sup> RiskIQ report: <http://www.riskiq.com/company/press-releases/riskiq-reports-malicious-mobile-apps-google-play-have-spiked-nearly-400>

### What are the key controls?

The first step to take in the early stages of every mobile device management project is a dedicated information security risk assessment. This assessment should take into account the specific threats targeting your business and context, and consider the resources to be accessed through the mobile devices.

In addition to the specific controls resulting from the risk analysis, the following controls should be considered on every occasion:

- **Use a centralised system to manage mobile devices:** there are generally two approaches to doing this, either by relying on messaging server management capabilities or by implementing a dedicated Enterprise Mobility Management solution (formerly known as Mobile Device Management solutions). The latter approach usually has more advanced features and is able to support devices from multiple vendors with different operating systems. Such a solution should be used to enforce the controls detailed in the mobile device security policy
- **Implement a dedicated mobile device security policy:** such a policy should define which of the organisation's resources may be accessed via mobile devices and the types of mobile devices allowed (and provisioning processes), as well as cover how the organisation's centralised mobile device management solution is administered

Moreover, the policy should detail the controls to be enforced to cover:

- User and device authentication (password policy, mobile lockout, etc.)
- Application security (applications permitted, etc.)
- Data and communication security (Wi-Fi and Bluetooth restrictions, data encryption, remote wipe capabilities, etc.)
- Device and operating system security (patch management, etc.)

Consider security for the whole lifecycle of mobile devices:

- Consider security during product selection (mobile device and management solutions)
- Fully secure each device before allowing a user to access it
- Regularly maintain mobile device security (security updates, applications updates, etc.)
- Fully wipe the device before any reallocation or decommissioning

### Conclusion

As is the case for every sensitive IT project, security should be considered in the early stages of your mobile project. You should also ensure that the business has been involved in defining an approved mobile strategy in order to assess whether your security approach is in line with the organisation's long-term mobile roadmap.

One of the most pragmatic approaches to reducing the risk of allowing users to have both personal and professional data on a single mobile device is to rely on a dedicated security container. This container should be managed by an Enterprise Mobile Management solution.

Considering the provisioning option, a hybrid approach is the most suited to reducing operational risk by allowing the end-user to have a degree of freedom while limiting the number of supported devices.



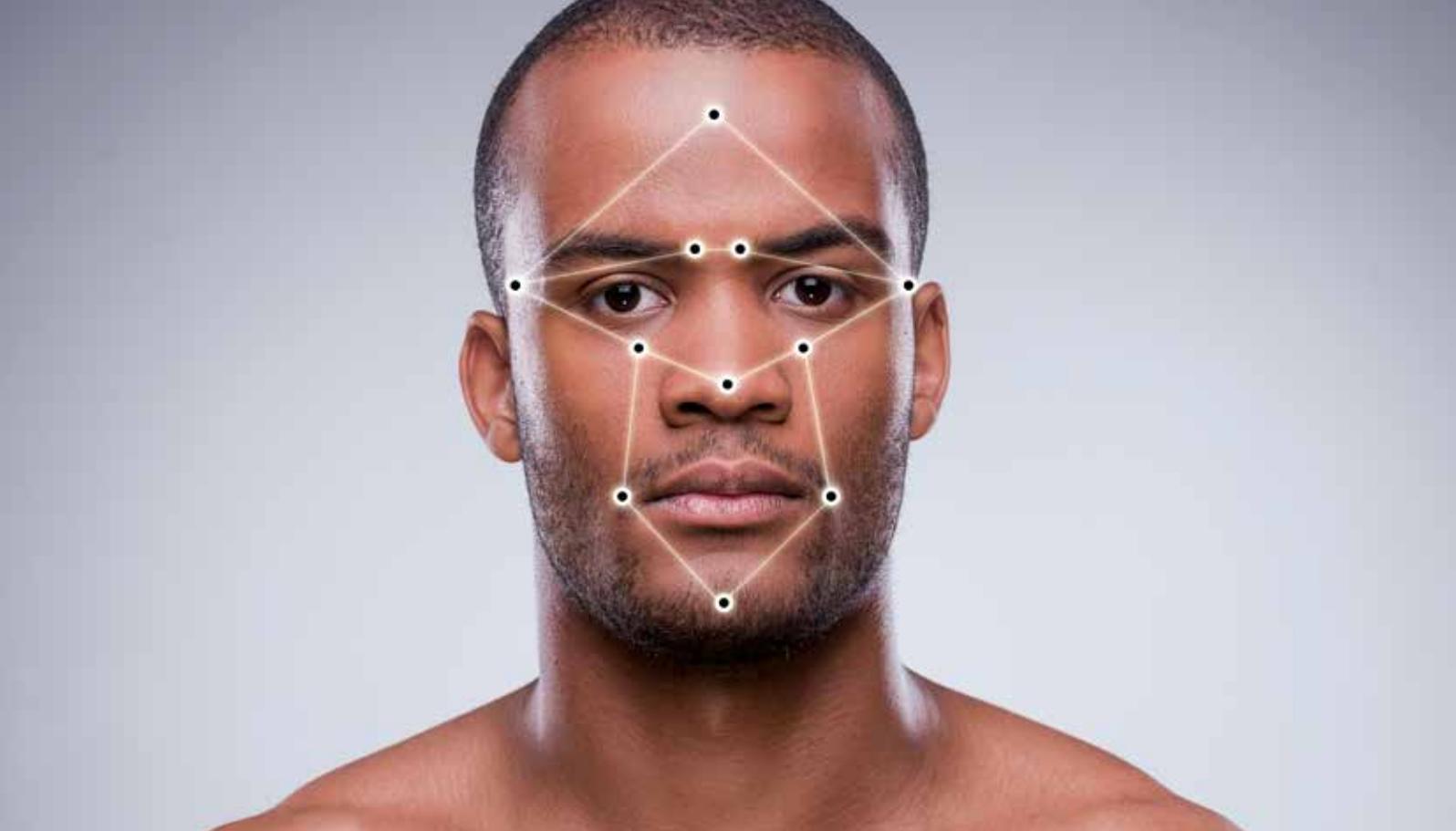
# Challenges and trends in identity matching

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Today we have come to accept the fact that our identity is checked for nearly every transaction we make. Among the checks performed by banks, shops, customs and airports, etc. a large number of them involve checking names against lists of sanctioned entities or high-risk persons. If you opened a bank account recently, your name will have been checked against these national and international lists before the account usage was authorised. The same applies whenever you take a plane, sign a mobile contract or even book a concert ticket.



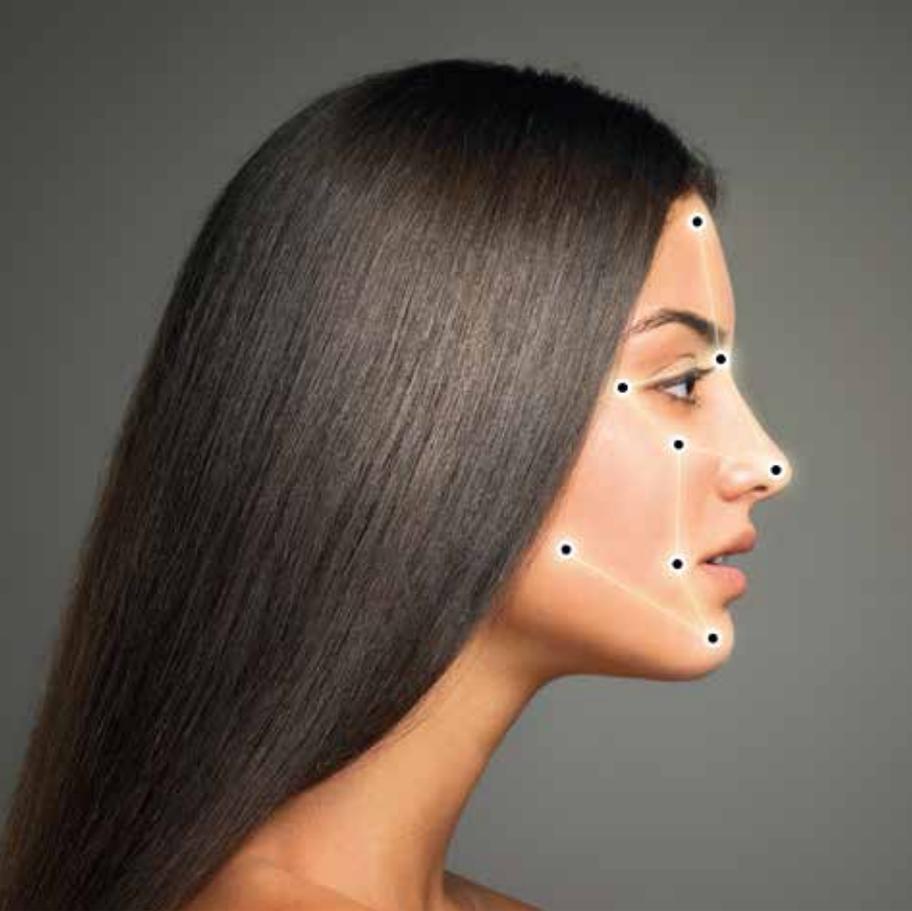
With regulations becoming increasingly strict, name screening has to be conducted in a growing number of sectors and against a growing number of lists. In the nineties, when electronic name screening was introduced (mainly for the purpose of enforcing the embargo on Cuba or blocking transactions for drug traffickers) the sanction lists barely contained a few hundred names. Following the terror attacks that marked the dawn of the 21<sup>st</sup> century, sanction programmes were boosted to detect terror funding and money laundering. As a result, there are now hundreds of lists worldwide, totalling millions of names, from 'political persons' to 'state-owned companies' to 'dual-use materials'. The sanctions on Libya during the Arab Spring, on certain African leaders, and more recently on Russia, clearly demonstrate that sanction programs now form an integral part of governments' foreign policies, replacing military action wherever possible. Within the current world context, it is clear that this trend will continue and probably accelerate in the future.

With regard to the practical implementation of sanctions, banks are de facto gatekeepers of the financial system. As such, they have been enrolled by authorities for their essential role in checking identities, either at account opening or when transactions are made. More recently, large corporates have understood that, even if they could delegate the screening of their relationships to the banks, their reputation is probably worth implementing their own preventive checks.

### Challenges

The complexity of identity resolution, and particularly name matching, is often underestimated. A common opinion is that it is 'just' a case of finding a name on a list of names. Obviously, this is a huge oversimplification, as there are many technical challenges specific to this particular activity.

First, names are not just any string of text: names have a structure and typology that are influenced by many cultural and regional factors. As humans, we instantly recognise a French, English, Arabic or Chinese name, but teaching this cultural distinction to a machine is very hard. Simple algorithms that were developed to handle name matching rely on statistics to compute similarities and linear thresholds to trigger alerts or not. These simple approaches fail to produce correct results and often result in many 'false positives' (alerts that are triggered but not relevant). More sophisticated approaches use algorithms based on linguistics and machine-learning techniques to ensure no relevant hits are missed on the one hand, while controlling the operational costs of manual alert reviews on the other. Techniques based on linguistics also include translation and transliteration. 'Translation' is used to store variations that mean the same thing in different languages, such as "*Jean*", "*John*" and "*Juan*" or "*Germany*", "*Allemagne*" and "*Deutschland*". 'Transliteration', on the other hand, is the ability to compare names in different alphabets (such as finding an Arabic name, written in the Cyrillic alphabet, on an English list). This capability is more useful than ever with the introduction of the latest sanctions resulting from the crisis in Ukraine.



The sheer quantity of data to be processed presents another challenge: comparing millions of listed names with millions of counterparties and/or transactions requires processing capacities that are several orders of magnitude higher than what was required ten years ago. During this period, we went from comparing a few thousand names with the U.S. sanction list (e.g. around 5,000 names for OFAC) to comparing full client databases (potentially tens of millions of counterparties) with Political Exposed Persons (PEP) lists that range anywhere between 1 and 3 million names. This means that the potential comparisons have grown from 10,000 x 5,000 to  $10^7 \times 10^6$ , excluding simple search techniques that come to mind first. Specialised search techniques, together with parallel processing, are needed to address these volumes.

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In just a few years, Central Europe's geography has changed significantly, the political landscape in the Middle East has been dramatically upset and changes in Africa have affected millions of people, to name but a few

A third element to consider is that over time, screening systems have become completely embedded within the operational flows, making them a critical component. Today's screening solutions are 'screening hubs' that must be capable of processing checks and providing a reliable result in milliseconds. These solutions are implemented at the heart of the financial institutions' business functions and connected to all data streams, running on high-availability clustered platforms in order to share the computing load and offer sufficient scalability to handle volume peaks. Moreover, the global trend towards virtualisation provides yet another layer of flexibility to these architectures.

#### Trends

Innovations in name matching are focused on solving the major issues that will arise in the years to come: the operational cost of compliance, the volatility of the sanctions environment and the complexity of geographical sanctions.

The fact that processing power is available to do the number crunching for the screening process for large volumes of data has shifted research and development to the post-matching process. It is one thing to compute all possible matches, it is another to handle them. If the matching process yields a (very acceptable) 1% to 5% of detected records and the customer database is 10 million, it still means there will be at least 100,000 alerts to process manually. Therefore, the next algorithmic challenge is to reduce this to an acceptable number. Recent examples of multi-billion fines have demonstrated that regulators take sanction breaches seriously. This leaves financial institutions squeezed between the risk of huge penalties and the unbearable cost of manually investigating hundreds of thousands of alerts.

In order to solve this difficult equation, the current trend of innovation is focusing on assisting humans in the investigation process by partially or completely automating the decision process. Artificial Intelligence (AI) techniques, and particularly machine-learning, that have been evolving since the 1960s have acquired a degree of maturity that make them currently suitable for the use of false positive reduction and auto-resolution.

It is reasonable to predict that within five years more than half of the decisions on alerts will actually be taken by robots that have acquired their knowledge from the human investigators, letting the latter focus on complex cases requiring more experience.

The volatility of the global political situation has been a defining feature of recent history. In just a few years, Central Europe's geography has changed significantly, the political landscape in the Middle East has been dramatically upset and changes in Africa have affected millions of people, to name but a few. Consequently, sanctions and embargoes can be enacted and enforced in a matter of days, then lifted as quickly as they came if the situation improves. The level of reactivity required from screening solutions to allow financial institutions to be compliant with the latest regulations is dramatically higher than it was in the past. This means that the whole cycle of reference data updating, validation and implementation must be a robust, streamlined and fully automated process. Here again, automated agents can help by monitoring regulatory websites for changes, triggering automated processes that download, test and replicate reference data, warning users about changes and possible impacts and cross-checking multiple sources to assess the quality of the update. The reference data management of screening systems will likely move from the more or less static configuration used today to a large set of possible configurations—pre-set to respond to different crisis scenarios—that can be enabled on demand and activated instantly.

Lastly, the increasing complexity of the sanctions landscape is a major issue and solutions are implementing more and more sophisticated mechanisms to handle this. The first complexity that appeared was the move from fully sanctioned countries (e.g. Cuba) to targeted sanctions (i.e. specific entities, specific transactions and specific materials, etc.). This forced financial institutions to deploy complex rules in order to determine if a match on a name had to be considered or not. Recently, the situation has become even more complex: typically, the screening process

only had to (efficiently) compare names in signaleptic databases or transactions against sanctioned names present in a Watchlist. Any name not on the list is not sanctioned, and therefore not detected.

This changed with the last wave of sanctions against Russia: OFAC stipulates that entities where sanctioned persons have more than 50% direct or indirect ownership are also off-limits (even though these entities are not in the list).

This extension of sanctions to these indirect entities will require future solutions to incorporate ways to collect information from different online sources and implement 'big data' components that will retrieve, store and analyse data in order to detect relationships between listed and non-listed entities. This is clearly an exciting field of research, encompassing information gathering, data correlation and visualisation.

## Conclusion

As sanctions are evolving from a minor political tool to an extension of foreign policy, underlying technologies have to adapt to address these challenges in our fast evolving world. The solutions for identity matching have only been in existence for 20 years and the changes made during this period have been remarkable. As regulations are expanding, we expect even more investment in research during the next five years. Banks have been alarmed by the immense cost of fines and have become extremely risk averse, but the operational costs associated with strict compliance policies are huge. Advances in technology are their only hope to balance these costs with their risk appetite.



# Additive manufacturing

## The effects of 3D printing

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Additive manufacturing, or 3D printing as it is often called, is a manufacturing process that has been developing steadily since 1984. Founded by Charles Hull, the process allows three-dimensional objects to be printed from digital data.

The process begins with a 3D model of the object, usually created by Computer-Aided Design (CAD) software or a scan of an existing product. Specialised software slices this model into cross-sectional layers, creating a computer file that is sent to the 3D printer. The 3D printer then creates the object by adding layers of material on top of each other until the physical object is created. 3D printers work like inkjet printers. Instead of ink, 3D printers deposit the desired material in successive layers to create a physical object from a digital file.

The technology that supports additive manufacturing, or 3D printing, is more than 30 years old. Its recent popularity has been fuelled in part by patent expirations which are driving a wave of consumer-oriented printers. Prices have fallen, putting the technology within the reach of early adopters. 3D printing is democratising the manufacturing process and bringing a fundamental change in what we can design and what we can create.

### Applications of 3D printing

Since 3D printing allows users to develop and revise products rapidly before undertaking the costly processes associated with traditional manufacturing, the applications for the technology are vast.

Due to the inimitable manufacturing processes of 3D printing, people now have the ability to innovate

products from the inside out. The process cannot be mimicked using traditional manufacturing methods, since 3D printing is an additive process. This means that individuals and businesses alike can create internal skeletal structures and unique shapes within an object.

As 3D printing becomes more accessible on a global scale, consumers have begun to innovate across a diverse range of industries. As a result, the process of additive manufacturing is beginning to create industry disruptions, causing new businesses to emerge and stagnant, yet well-established businesses to fail. Navigating this disruption and embracing this new technology requires strategic foresight to profit and prosper over the next 10-20 years. The question is, *“How many businesses will be ready?”*

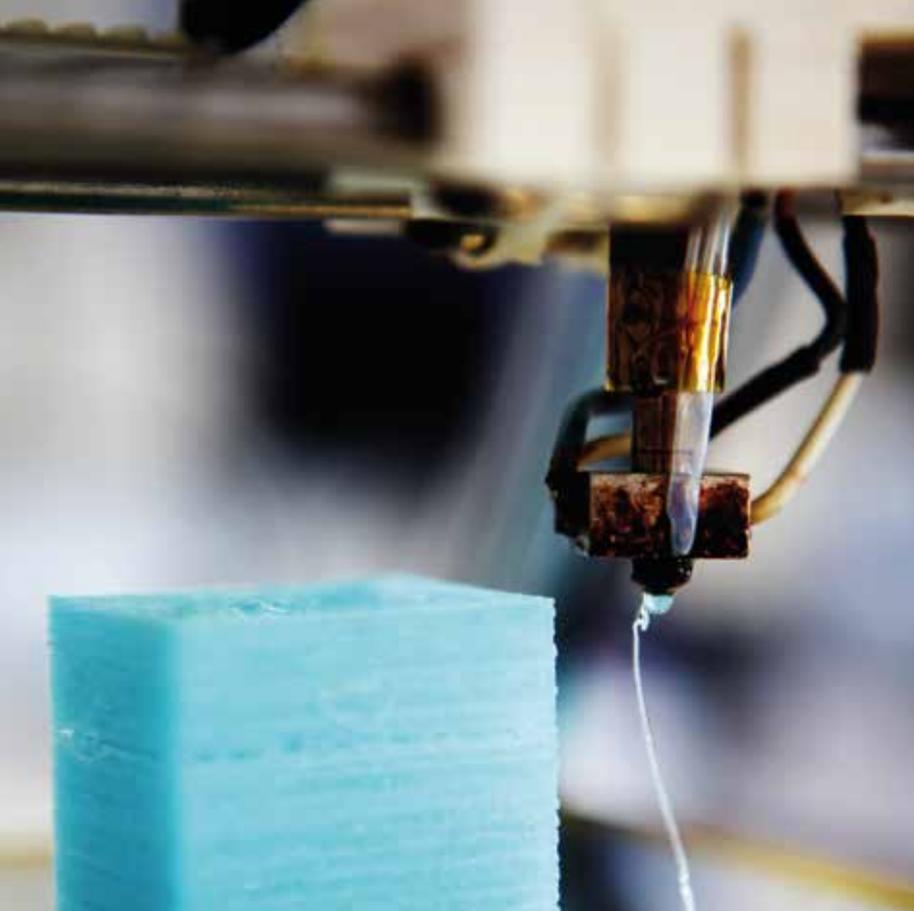
More specifically, the process of 3D printing spans many industries, including the automotive, manufacturing, aviation and medical industries. Although the capabilities of 3D printers improve exponentially each year, a diverse range of materials can already be printed using these devices.

These include urethane, metal, human tissue and even food products. As shown below, Figure 1 illustrates the global opportunities arising for 3D printing across many different industries.

Figure 1: Global opportunities: 3D printing

Target user			
	Consumer	Small to mid-sized business	Corporations
Printer readiness			
<b>In need of further R&amp;D</b>		• Organ replacement, \$30B	• Furniture, \$20B • Consumer electronics, \$289B
<b>Nearing commercial use</b>	• U.S. prepared food, \$23B	• Bicycles, \$6B • Guns and ammo, \$11B • Global apparel, \$1T	• Life sciences R&D, \$148B • Home building and improvement, \$678B • Power tools, \$22B
<b>In use</b>	• Craft and hobby, \$30B • Animation and gaming, \$122B	• Medical prosthetics, \$17.5B • Retail hardware, \$22B • U.S. auto parts stores, \$40B • Toys, \$80B	• Industrial R&D (for Prototyping), \$23B • Aircraft and defense R&D, \$9B

Source: Forbes



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Objects are built one layer at a time, depositing material as small as 100 nanometres exactly where and when needed

In essence, 3D printing makes manufacturing complexity free of charge, allowing otherwise impossible designs to be realised. Objects are built one layer at a time, depositing material as small as 100 nanometres exactly where and when needed. Mechanical items with moving parts can be printed in one step—no assembly required. Interlocking structures mimicking nature’s design laws are possible with nearly unlimited geometrical freedom—no tooling, set-ups, or change-overs. Moreover, objects can be built just in time where and when they are needed. The capability unlocks business performance in a highly sustainable manner by reducing inventory, freight, and waste. 3D printing’s value is not limited to complex objects. On-site creation of investment castings or construction moulds can supplement traditional manufacturing techniques.

3D printing is not just for prototypes and mock-ups. Many sectors already use the technology for finished parts and products. In the aerospace industry, jet engine parts such as manifolds require more than 20 pieces that are individually manufactured, installed, welded, grinded and tested to come a finished product. The 3D printed alternative is easier to build and service and also reduces overall system weight. Medical devices use 3D printing to customise and personalise everything from dental crowns to hearing aids to prosthetics. The potential does not end there. More fantastical use cases are starting to become a reality, such as mass customisation of consumer goods, including personalised products ranging from commodities to toys to fashion, with ‘print at home’ purchase options.

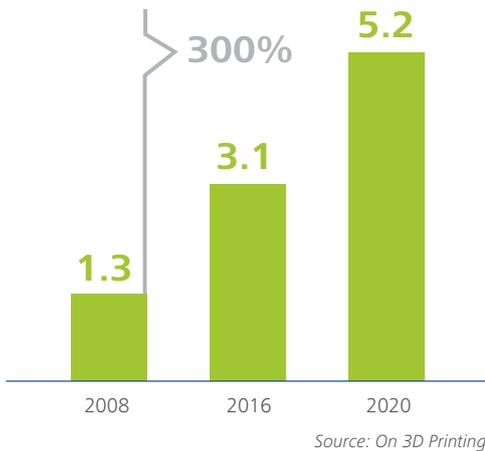
Even food printers are entering the market, starting with chocolates and other sugar and starch staples, but moving toward meats and other proteins. Organs, nerves and bones could be fully printed from human tissue, transforming healthcare from clinical practice to part replacement—and even life extension. Leading thinkers are exploring self-organising matter and materials with seemingly magical properties. One example is already here: a plane built of composites with the ability to morph and change shape, ending the need for traditional flaps and their associated hydraulic systems and controls.

#### Industry growth

Since the mid-1980s, 3D printing has changed drastically. As the Consumer Electronics Association noted, *“Sales of 3D printers will approach \$5 billion in 2017, up from \$1.7 billion in 2011, as demand expands for everything from consumer applications to markets such as automotive, aerospace, industrial and healthcare.”*

As Figure 2 shows, 3D printing is forecasted to grow by 300% from 2012 to 2020. As stated by the website On 3D Printing, *“The 3D printing industry is expected to change nearly every industry it touches, completely disrupting the traditional manufacturing process. As a result, the projected value of the industry is expected to explode in the near future.”*

Figure 2: Growth of 3D printing in US\$ billion



### Embracing 3D printing: a new medium for innovation

#### Benefits and challenges of 3D printing

Although 3D printing offers many benefits, there are also challenges associated with using this technology, as compared to traditional manufacturing.

These benefits and challenges arise in relation to the uses and applications 3D printing offers for consumers and businesses across many industries. These include rapid prototyping, rapid manufacturing, mass customisation and mass production, among others.

#### Benefits of 3D printing

#### Challenges of 3D printing

<b>Rapid prototyping</b>	Single items can be produced inexpensively without incurring the mould and tooling costs of traditional manufacturing	Entry-level 3D printers produce goods that are often inferior to those produced using traditional methods
<b>Reduced lead times</b>	Lead times can be reduced as a result of being able to produce goods relatively quickly	N/A
<b>Rapid innovation</b>	New innovations can be created and revised quickly since 3D printing is an iterative process	N/A
<b>Rapid manufacturing</b>	Just-in-time inventory can be easily managed and created	Depending on the type of printer, it can be slow to produce large volumes of products
<b>Reduced overhead</b>	Overhead required to invest in inventory, and warehouse, is reduced since items can be printed as needed. Traditional manufacturing methods typically require larger volumes of inventory to be produced and warehoused at one time	N/A
<b>Mass customisation</b>	Products can be customised for a single purpose or created in small and economical production runs	Limited materials can be printed through 3D printers for commercial production
<b>Mass production</b>	Unique products that cannot be made using traditional manufacturing methods can be produced for mass production	While traditional manufacturing can produce extremely large products, such as pipelines for transporting natural resources, most 3D printers cannot
<b>Use of unique materials</b>	Materials, such as human tissue, can be printed using 3D printers	N/A
<b>Economies of scale</b>	N/A	The cost of producing large volumes of some products can be high using 3D printers



### Cost of using 3D printing to produce a product

The cost of producing large volumes of goods through 3D printing is not always economical. However, depending on the materials used to print an object, it can be inexpensive to produce low volumes of goods when economies of scale are not required.

Since 3D printing is still foreign to many businesses, it can be difficult to align all the elements required for programme success, such as strategy and operations, human capital, technology and financial advisory. To avoid missteps, it is important to adopt a well thought-out 3D printing framework.

### Establishing a 3D printing initiative: creating value through innovation

#### Adopting a 3D printing framework

Before businesses can capitalise on these emerging opportunities for innovation, they need a framework for success.

The framework below includes five key steps:

## 1 Establish the initiative > 2 Invest in technology > 3 Create a network > 4 Change the organisation > 5 Implement the innovation

- How can 3D printing directly affect our company or industry?
- What are the future implications for industry disruption?
- How can we establish 3D printing within our organisation?

- What technology (hardware and software) is required to set up a 3D printing initiative?
- How much should we spend on technology, based on our size and capabilities?
- Where can we source the technology?

- What key partnership should we establish to ensure 3D printing success?
- Are there any public sector grants or benefits we can access?
- Who are the key stakeholders in the 3D printing industry?
- Do we need to change any of our governance controls to protect our intellectual property?

- What key skills and abilities do we need to start and run a 3D printing initiative?
- Do we need to change our organisational structure?
- Do we need to create new business units?
- Who are the key stakeholders expected to manage our initiative and help create value for the organisation?
- What new jobs and roles must we create to manage the initiative?

- How will we take 3D printing innovations to market?
- If we need to scale up, should we produce products through 3D printing or traditional manufacturing?
- Are the innovations new products for an existing market or a new market?
- How do these products fit within our existing product range?
- Who is the target market and how will we present this product to the market?

### Future implications of 3D printing: industry outlook moving forward

3D printing will potentially have a greater impact on the world over the next 20 years than all of the innovations from the industrial revolution combined.

3D printing has developed significantly over the past 30 years and now allows consumers and businesses to conduct rapid prototyping and even produce individual items at a profit. A new industrial revolution is coming as commercial 3D printers become smaller and more portable. As the costs for 3D printers decreased drastically in recent years, the technology has become accessible to businesses across many industries. This price decline is making high-end 3D printers accessible to the mass market. As a result, general consumers are using 3D printers to create unique items from the comfort of their own homes. In fact, consumers are even creating new innovations without financial, technological or human capital support from large organisations.

In the future, 3D printing will have a wide range of applications extending from healthcare to construction and beyond. In healthcare, for instance, 3D printing represents a truly disruptive force, particularly as costs rise and resources for transplant surgery remain scarce. Once bio-printing or the 3D printing of human organs and tissue becomes commercially viable, patients will have access to single organs, printed using the size and organic structure they need. As surgical lead times and healthcare costs drop, these innovations will be important for both emerging and developed economies.

In order to benefit from the applications and opportunities of 3D printing moving forward, companies in virtually every industry must be fast, flexible and capable to understand the implications that 3D printing will have on the nature of their businesses. Failing to do so will lead to a potential loss of market share, due to increased competition from new companies that create market changing, disruptive innovations. And competition won't stop there. As more and more individual consumers gain the ability to engineer and produce their own goods, and 3D

printing becomes a more efficient and cost-effective way to produce goods, there will be an opportunity for individuals to create new innovations, disrupt industries and potentially generate new sources of wealth. As long as the technology is accessible, new businesses will continue to emerge.

Although traditional manufacturing will likely still hold a place in the competitive landscape in the years to come, the next 10 to 20 years promise to reveal a rapid increase in the innovations made possible by 3D printing. To fully capitalise on these opportunities, governments may choose to make 3D printing widely accessible within free public service locations, such as schools and libraries. For its part, the private sector will want to continue working towards embracing this technology as a platform to create new businesses, business models, products and services that push society forward by spurring the creation of new sources of global wealth.

#### Conclusion

3D printing is a powerful technology, but it is no panacea. To capitalise on its potential to achieve specific business and operational outcomes, business leaders need to answer these questions:

- How can products and components be redesigned using 3D printing to reduce material and assembly costs?
- Can 3D printing improve product performance and/or reduce production quality issues?
- What supply chain challenges, such as speed to market, can 3D printing help overcome?

The competition is certainly asking these questions. Thus, although 3D printing will not change everything right away, its impact is growing and time is of the essence.



# Continuous integration

## End of the big bang integration era

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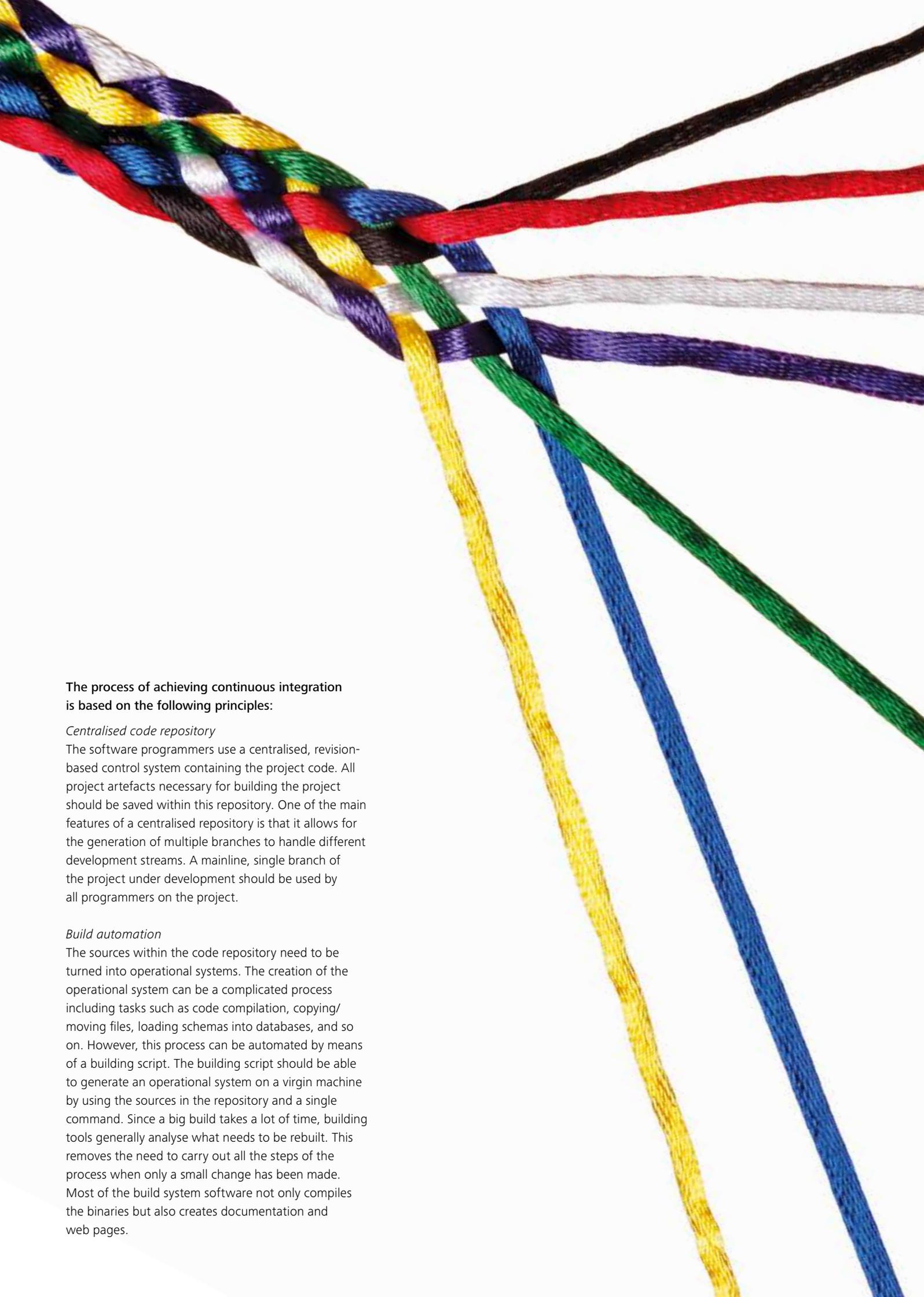
The integration of software systems is often a long and painful process that is in most cases postponed until the different components have been built and delivered separately. This does not necessarily have to be the case. Integration can also be performed in an iterative way as from the start of the project, rather than via ‘big bang integration’ where software modules are developed in isolation and integrated at the end of the project.

#### What is continuous integration?

Continuous integration is a software development practice intended to reach a high level of integrated and continuous development activity. Its goal is to reduce the scope of integration problems. The term ‘continuous integration’ comes from the Extreme Programming development process, where it was one of 12 original practices. The practice was intended for the automation of unit testing, verifying that all unit tests have been passed before committing to the mainline. Later expansions of the practice included the use of build servers to automate the code build process each time a developer checked in a change before

unit testing was launched. By continually applying automated quality control (with each modification of the source code), organisations aim to improve the quality of the software and its delivery time.

While the concept of continuous integration has been around for several years, experts in the software industry believe it will become increasingly vital in software development in the current business environment. The cost of computing is continually declining, but human resources costs remain more or less constant. Continuous integration intends to shift the effort from developers to software to reduce overall costs.



**The process of achieving continuous integration is based on the following principles:**

*Centralised code repository*

The software programmers use a centralised, revision-based control system containing the project code. All project artefacts necessary for building the project should be saved within this repository. One of the main features of a centralised repository is that it allows for the generation of multiple branches to handle different development streams. A mainline, single branch of the project under development should be used by all programmers on the project.

*Build automation*

The sources within the code repository need to be turned into operational systems. The creation of the operational system can be a complicated process including tasks such as code compilation, copying/moving files, loading schemas into databases, and so on. However, this process can be automated by means of a building script. The building script should be able to generate an operational system on a virgin machine by using the sources in the repository and a single command. Since a big build takes a lot of time, building tools generally analyse what needs to be rebuilt. This removes the need to carry out all the steps of the process when only a small change has been made. Most of the build system software not only compiles the binaries but also creates documentation and web pages.

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## While the concept of continuous integration has been around for several years, experts in the software industry believe it will become increasingly vital in software development in the current business environment

### *Making the build self-testing*

The best way of efficiently identifying bugs faster, is to include automated tests within the build process. These automated tests are executed with the help of self-testing code, where tests are automated within the software. These automated checks must be able to check large parts of the code for bugs. The tests need to be able to be launched with a single command, and it should be self-checking. If the tests performed result in failed test cases, the build should also fail.

This way of working integrates all pieces of software from the various development teams from the very beginning of the project, where they would traditionally be working in isolation until the integration phase.

### **Benefits of continuous integration**

- **Builds are becoming artefacts:** a new build is created each time new code is added to the mainline and passes all tests; not only when the developer manually checks in. This process allows new builds to flow until the project is ready to be delivered
- **Test automation:** automated testing is a good way of checking the quality of a build. It helps developers detect and fix integration problems continuously, avoiding last-minute chaos on release dates (when everyone tries to check in their slightly incompatible versions)
- **Team collaboration:** it results in an improved team dynamic, with the software team, code testers and developers all responsible for writing and executing test cases. Under this system they work together in dynamic teams, rather than against each other
- **Automated test reporting:** automated reports generated by the continuous integration tool will lead to better communication of the testing progress
- **Use of version control becomes standard:** as continuous integration servers rely on version control to build and run tests, development teams now have access to a version control tool which was previously only available to large companies and teams
- **KPIs:** KPIs are generated from automated testing (e.g. code coverage, code complexity and number of features complete), helping developers focus on the delivery of quality code and helping develop the momentum in a team

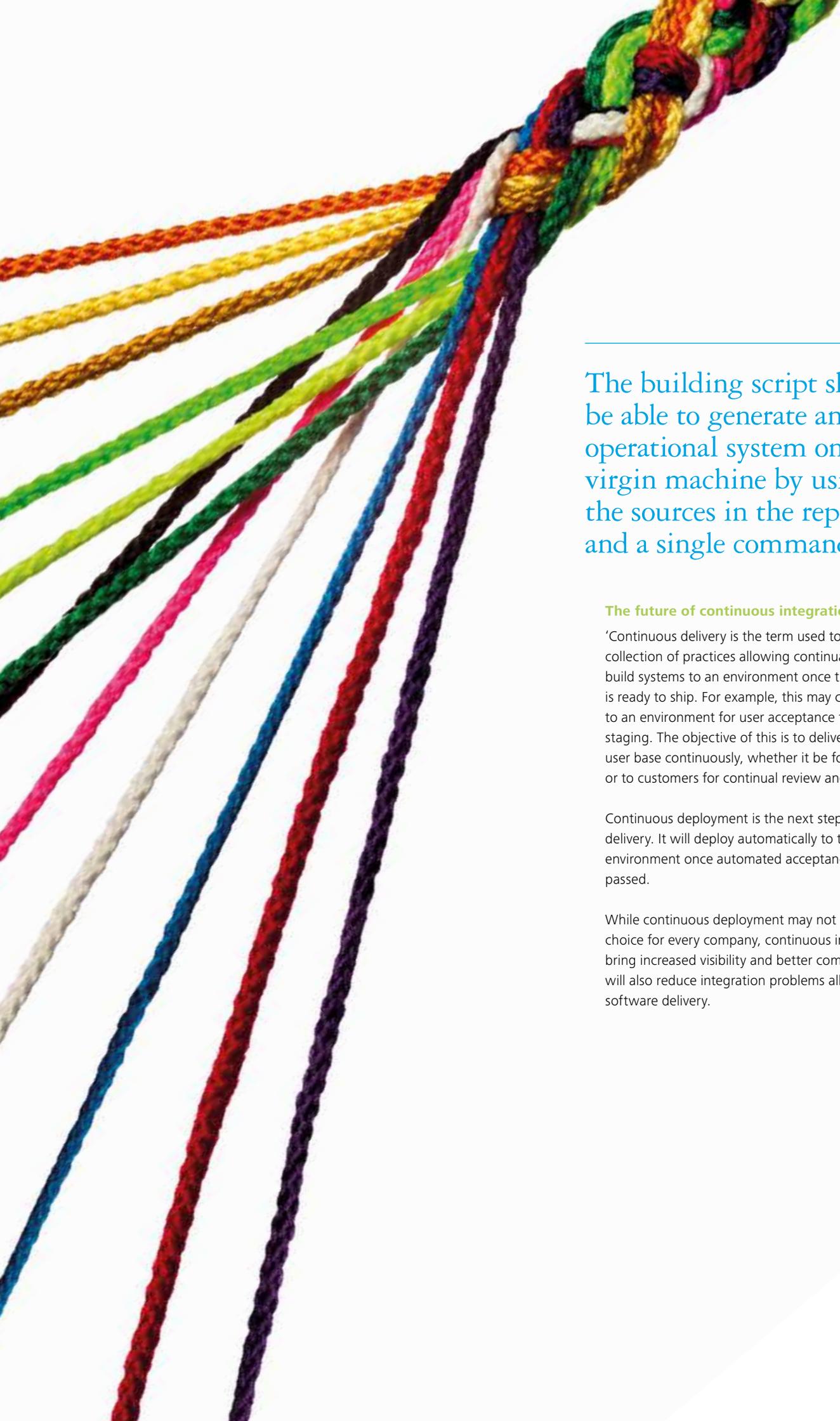
### A continuously evolving trend

Since its original introduction, there have been some improvements in the underlying technologies of continuous integration, especially in the field of branching and merging and within distributed development. As it stands, each branch is tested before it is merged back into the mainline, reducing the risk of having broken builds. Developers now also make use of 'feature' branches where all feature development should take place in a dedicated branch instead of the master branch. This separation allows multiple developers to work on a particular feature without disturbing the main codebase. This means that the master branch will never contain broken code, which is a huge advantage for continuous integration environments.

Distributed version control is a peer-to-peer approach to traditional source control management allowing developers to run their own repositories locally, without any connection to the central server. This will speed up the development process as developers will no longer have problems with slow connections.

Changes to integration servers and their underlying version control system mean that continuous integration is continuing to progress quickly, providing further improvements to release frequency and project stability.





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The building script should be able to generate an operational system on a virgin machine by using the sources in the repository and a single command

#### The future of continuous integration

'Continuous delivery is the term used to describe the collection of practices allowing continual delivery of build systems to an environment once the development is ready to ship. For example, this may cover a delivery to an environment for user acceptance tests or for staging. The objective of this is to deliver builds to a user base continuously, whether it be for QA purposes or to customers for continual review and inspection.

Continuous deployment is the next step of continuous delivery. It will deploy automatically to the production environment once automated acceptance tests are passed.

While continuous deployment may not be the right choice for every company, continuous integration will bring increased visibility and better communication, and will also reduce integration problems allowing faster software delivery.

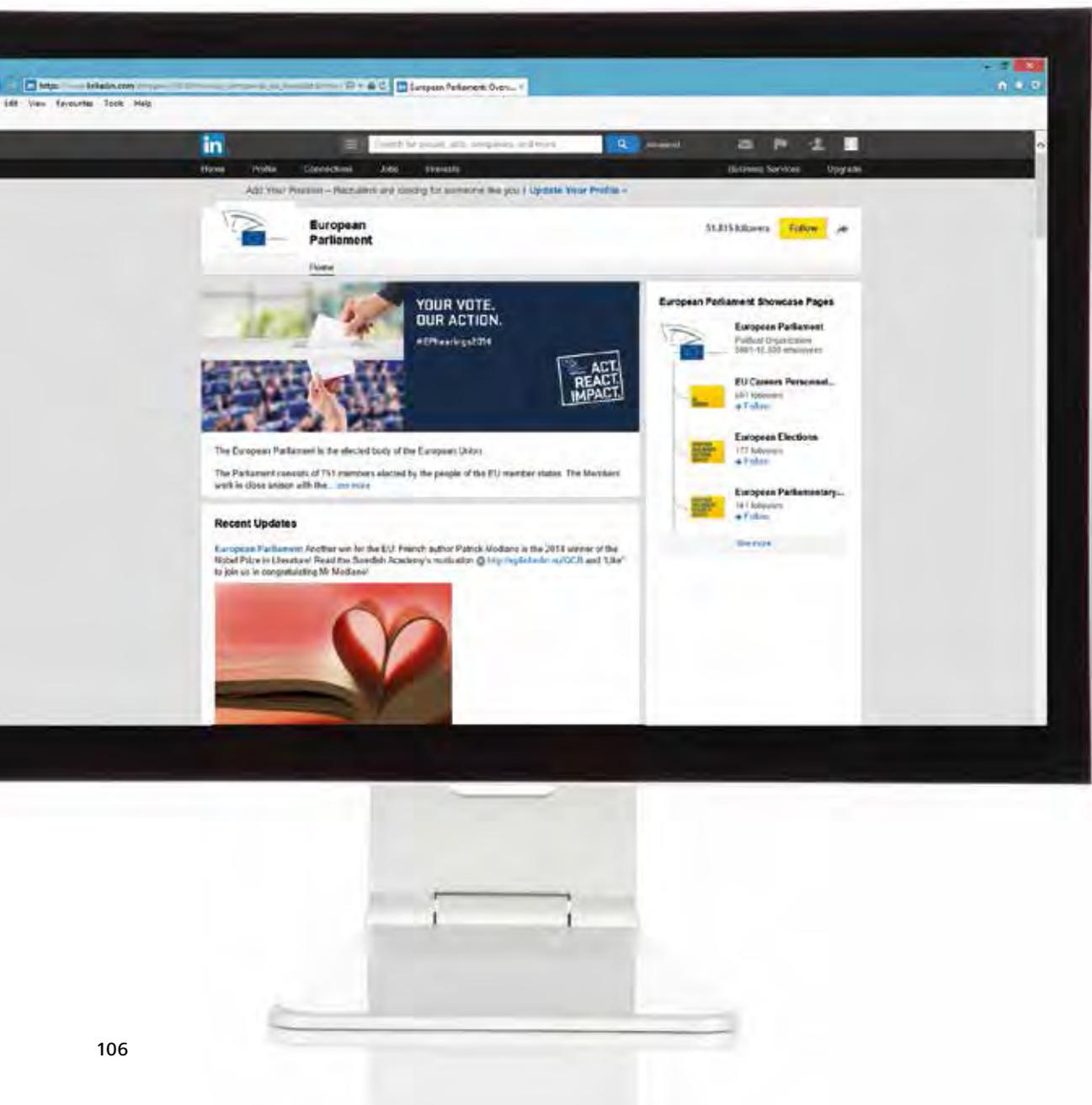
Typical Continuous Integration process



# From social media to social activation in the EU

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“The digital economy is growing at seven times the rate of the rest of the economy”; this statement comes from the EU’s Digital Agenda for Europe (DAE). The DAE aims to “reboot Europe's economy and help Europe's citizens and businesses to get the most out of digital technologies. It is the first of seven flagship initiatives under Europe 2020, the EU's strategy to deliver smart sustainable and inclusive growth”<sup>1</sup>.

But how about European institutions and their use of social media tools? Do they see social media as traditional media they can use to broadcast key messages? Are they weaving social media tools and interactions into their everyday, global operations? In the context of increasing euroscepticism, can social media contribute towards bringing Europe closer to all citizens? Indeed, given that *“the power of social activation is unleashed when others advocate an organization's message in their own words to their network”*<sup>2</sup>, can European institutions leverage social media tools in a way that inspires EU citizens to advocate European institutions’ messages in their own words to their peer networks? The latter is particularly important in light of citizens’ increasing disillusionment with ‘traditional’ marketing messages.

To succeed in the years ahead, European institutions will most likely need the right balance of global reach and a local footprint. They will require heightened awareness of problems when they arise and the flexibility to quickly reconfigure their operations in response. Leading European institutions will innovate by collaborating among and with others. An increasing number of senior staff members now recognise that ‘social business’—the concept of using social media processes and methods inside traditional business models—offers a promise of progress across all of these dimensions. The European institutions are part of this evolution towards social business, a social media strategy that puts people at the heart of its operations—developing digital communities around important themes, drawing on the knowledge and skills of experts and engaging citizenry on the things that matter.

<sup>1</sup> <http://ec.europa.eu/digital-agenda/digital-agenda-europe>

<sup>2</sup> Deloitte University Press (2014). *Tech trends 2014: Inspiring disruption*: [http://d2mtr37y39tpbu.cloudfront.net/wp-content/uploads/2014/02/Tech-Trends-2014\\_FINAL-ELECTRONIC\\_single.2.24.pdf](http://d2mtr37y39tpbu.cloudfront.net/wp-content/uploads/2014/02/Tech-Trends-2014_FINAL-ELECTRONIC_single.2.24.pdf)

Beyond this, social media represents a significant data opportunity for European institutions. Mining social data in combination with big data will help institutions understand citizens' priorities and interests, allowing the institutions to become more responsive. But there is more to it than that. Mining internal social data (that is, deriving social data from social media communication among European institution employees, including across different European Union agencies) can offer European institutions deeper insight into their organisational processes, strengths and weaknesses. Which areas are institution employees collaborating on? What type of 'real world' change does this virtual collaboration spur? What silos remain and how are they reducing the institutions' effectiveness? Which of the institutions' employees are engaging with citizens online, how are they doing it and how much of it is effective? By making "formerly invisible patterns of interaction visible"<sup>3</sup>, social analytics generate insight that can be harnessed to boost operational performance, identify areas for reform and open up possibilities for innovation both in the way that institutions interact with citizens, as well as in the ways they interact and work among themselves.

Deloitte analysts have noted how in the business world, the "convergence of social software platforms and big data analytics is creating new avenues to explore the factors driving business performance." The same is true for European institutions seeking insight into the drivers behind their operational performance and effectiveness.

#### What is behind this trend?

The foundational change driving the European institutions' social media strategy is the explosive growth in social media over the past decade, and most recently, on mobile devices. In just one year, between 2012 and 2013, the total global social media audience increased by an estimated 18%, from 1.47 billion to 1.73 billion—meaning that nearly a quarter of the world's population is now online using social media networks<sup>4</sup>. Facebook and YouTube are the largest social media platforms, while China's QZone is in third place<sup>5</sup>. An important consequence of this proliferation is the connection of people globally. North America and western Europe are the regions with the highest social media penetration on a percentage basis. This offers a huge opportunity for European institutions to become closer to their citizens.

#### What are European institutions and member states doing right now?

Increasingly, governments are interested in harnessing new social media to increase involvement and participation in policy development and evaluation. Social media is evolving from old notions of 'broadcasting information' to 'contributing and interacting'. The use of web-based and mobile social media to turn communication into interactive dialogue

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**“There is no separate ‘digital economy’ today; rather we have an economy that is digital.” Neelie Kroes, vice-president and commissioner for the digital agenda at the European Commission**

<sup>3</sup> Deloitte University Press. *From invisible to visible... to measurable: Social analytics extends enterprise performance improvement*: <http://dupress.com/articles/from-invisible-to-visible/>

<sup>4</sup> Deloitte University Press. *From invisible to visible... to measurable: Social analytics extends enterprise performance improvement*: <http://dupress.com/articles/from-invisible-to-visible/>

<sup>5</sup> Cooper Smith, 'The planet's 24 largest social media sites, and where their next wave of growth will come from,' *Business Insider*, November 29, 2013, <http://www.businessinsider.com/a-global-social-media-census-2013-10>, accessed January 22, 2014. Back to article

<sup>6</sup> Eurobarometer Qualitative Studies (2012). 'Journalists and Social Media.' Aggregated report, pp.5. Available at: [http://ec.europa.eu/public\\_opinion/archives/quali/journsm\\_en.pdf](http://ec.europa.eu/public_opinion/archives/quali/journsm_en.pdf)

<sup>7</sup> Eurostat (2011). "Social media in statistical agencies." Working paper, pp. 4. Available at: [http://epp.eurostat.ec.europa.eu/portal/page/portal/pgp\\_ess/0\\_DOCS/estat/Social\\_Media\\_Guidelines\\_Sep\\_2011\\_SpComm.pdf](http://epp.eurostat.ec.europa.eu/portal/page/portal/pgp_ess/0_DOCS/estat/Social_Media_Guidelines_Sep_2011_SpComm.pdf)

can take many different forms including internet forums, weblogs, social blogs, wikis, podcasts, photographs or pictures, video, rating and social bookmarking. The most commonly used social media include Twitter, Facebook, Myspace, Flickr and YouTube.<sup>6</sup>

One of the best examples of public sector leverage in this area (though perhaps not one that we might immediately associate with the dynamic world of social media) has been in the area of statistics. According to Eurostat, use of social media by national statistical institutes has been developing quickly in recent years

and will almost certainly continue to evolve in the years to come. The Office for National Statistics (UK) is introducing YouTube videos discussing key statistical publications and explaining them to users vocally and visually to enhance understanding, while the United Nations used various platforms such as Twitter, Facebook and YouTube to raise the profile of World Statistics Day.<sup>7</sup>

The trend is by no means limited to statistical authorities, as the table below shows. Each of these European institutions has active Facebook accounts and all registered positive growth in just one month in 2011.

Representative	Description	'Likes' July 2011	'Likes' August 2011	Change (absolute)	Change (%)
Council of the European Union	27 EU governments making decisions together	2,765	2,888	+123	+4.45%
European Commission	The European Commission is the civil service of the European Union	13,215	13,268	+53	+0.4%
European Parliament	The European Parliament is the only directly-elected EU body	166,578	166,634	+56	+0.03%
President of the European Parliament		42,852	42,913	+61	+0.14%
European Economic and Social Committee	The European Economic and Social Committee (EESC) is a consultative body of the European Union (EU) established in 1958. It is a consultative assembly composed of employers (employers' organisations), employees (trade unions) and representatives of various other interests. Its seat, which it shares with the Committee of the Regions, is the Jacques Delors building on 99 Rue Belliard in Brussels.	145	147	+2	+1.38%
European External Action Service	The European External Action Service (EEAS) is the EU's independent foreign policy department	3,210	3,298	+88	+2.74%
Hungarian Presidency of the Council 2011	Between 1 January and 30 June 2011, Hungary holds the presidency of the Council of the European Union for the first time	2,342	2,561	+219	+9.35%
EU careers	Career opportunities in EU institutions	51,289	52,874	+1,585	+3.09%

Source: Oberer, B., Erkollar, A., Sersc.org (2012). 'The European Social Media Gov. Board: How to connect with the European Union on Social media.' *International Journal of Education and Learning*, vol. 1, No. 1, pp. 21, March 2012. Available at: [http://www.sersc.org/journals/IJEL/vol1\\_no1/2.pdf](http://www.sersc.org/journals/IJEL/vol1_no1/2.pdf)



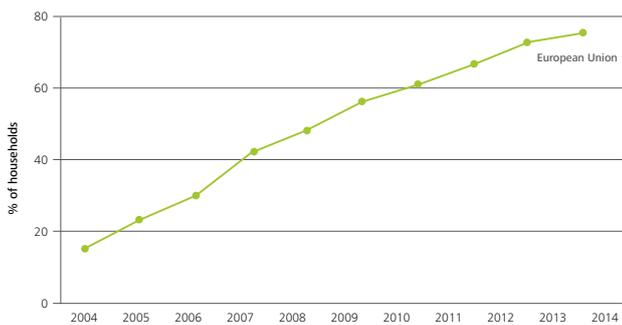
Another social media tool that offers opportunities for stimulating social media is EUTube. EUTube offers itself as an EU channel on YouTube that shares “the sights and sounds of Europe” in English, German and French. It currently has over 26,000 subscribers, with a massive 23,000,000 views so far.

Coming back to statistics, the European Union has even found a way to make the key policy statistics accessible, useful and even fun for everyday users. On the Digital Agenda website, citizens can review the complete list of statistics related to the EU’s Digital Agenda and create new charts on demand.

Source: EuTube, <http://www.youtube.com/channel/UCMPavijxybo1RTdzvYcU91A>

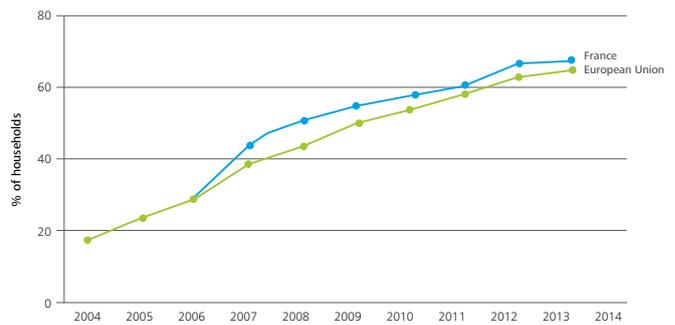
## To make progress, organisations will need to institute a strategy, a governance structure and an education process for aligning their social media efforts

Households having a broadband connection, by all households European Union



Source: Reuters, Bloomberg

European Union and France



Source: Reuters, Bloomberg

### A process of maturation

Despite the explosion of social networking taking place all around them, it takes time for European institutions to adapt as the traditional structure and hierarchy does not always foster or accelerate innovative trends. Meanwhile, however, ordinary people have embraced the full range of activity available through social media networks. They have used them to engage in rich interaction, to share content from others they like, to deepen relationships, to express themselves, and to take collective action. Despite having excellent global coverage, the European institutions still have room to exploit social media in a major way. Cumulatively, the European institutions have some of the world's largest human networks and the deepest histories of interaction through traditional communication channels such as in-person, telephone, email, and web, yet at the same time (just like other large organisations) are still outpaced by their own employees and citizens in terms of tapping social media networks for value.

In a recent global study, Deloitte and MIT researchers concluded that organisations progress through three stages in their use of social media tools:

- **Early stage:** organisations have established a social media presence, such as a Facebook page, a Twitter account, and/or participation in other platforms, and use it to share marketing messages or basic product information and respond to customer concerns and complaints. Over 50% of the organisations surveyed fell into this category
- **Developing stage:** organisations monitor the social media networks in which they participate, listen to their audience's conversations and compile data to identify patterns. They measure returns on their social investments and identify new ways to address business problems and improve processes with social media tools and approaches. About 30% of the organisations surveyed were at this stage

- **Maturing stage:** organisations build social capabilities into many aspects of their operations. They not only track what is being said, but actively engage with ongoing conversations about their products, partners, industries and issues. Their approach ensures that the marketing group is not the only part of the organisation engaging with outsiders via social media. Of the organisations surveyed, 17% fell into this category

In a nutshell, most organisations experience a social evolution from 'listening' to 'conversing' to 'collaborating', getting better at managing each of these activities along the way.

### Increasing levels of collaboration

The jump in enthusiasm, and more expansive thinking about the power of social media networks, is likely the result of managers and leaders gaining more experience from participating in them.

A growing number of EU citizens are active on social media networks. The European Commission therefore uses social media platforms to reach out and connect with citizens and stakeholders in addition to the communication taking place through more traditional channels, such as written press, broadcasters and EU publications and websites.

Most organisations began their social journey by using the new toolkit in limited, linear ways. By now, many have graduated to connections that are more rich and creative. In most European institutions today, there are innovative leaders whose experimentation with social media is paying off, and with every smart, social move they make, their following grows. The European Commission, for example, is present on several social media platforms. As stated on the DG Communication website, *"you can keep track of the latest policy developments and what the European Commission and its Spokespersons, the President, Commissioners and Representations are doing"*<sup>8</sup>.

<sup>8</sup> [http://ec.europa.eu/dgs/communication/services/journalist/social-media\\_en.htm](http://ec.europa.eu/dgs/communication/services/journalist/social-media_en.htm)

The European Commission distinguishes social media use for the following purposes: communication on political priorities, stakeholder and campaign communication (with the purposes of this type of communication varying from informing citizens, sharing experiences, promoting policies or campaigns and engaging with stakeholders) and use of social media in staff members' own capacity.

Today's European institutions have hundreds of different forms of social media presence comprising multiple blogs, platforms and sites. This large digital footprint presents challenges in terms of striking a balance between image consistency and practical value. Institutions may not be getting the right information to the right audience or may lack the resources or infrastructure to monitor the social interaction effectively.

### Implications

European institutions will encounter common barriers as they venture further into social business. These challenges will include developing a more specific strategy, security concerns and training employees and management in the possibilities and risks of social media. Understanding how to accurately measure the effectiveness of social campaigns and to determine the true return on their social media investments will also be necessary.

To make progress, organisations will need to institute a strategy, a governance structure and an education process for aligning their social media efforts.

There are already some key opportunities which could be pursued. The European institutions could envisage capturing the information gained from social media conversations between citizens and civil servants—from personal interests to experiences with other institutions' offerings to usual habits and expectations—and link it to the enterprise data contained in Customer Relationship Management (CRM) systems. When the dots are connected, a dedicated force can gain the insight it needs to anticipate citizens' needs, enhance service and support and even automate the delivery of tailored content.

In HR, social media can be very practical as a network of connections to talent markets as opposed to citizens. Social media tools are now used heavily by recruiters in the private sectors and also play an increasingly important role in employee engagement and retention. How about its application by European institutions and Member States to assist in finding the best candidates for projects, positions and expert roles?

### Measures of success

What should European institutions be doing in order to effectively harness the opportunities of social media? The European Union at least appears to be doing quite well in terms of its global communication, but what about the different institutions and their specific needs? The best return on effort that can be envisaged is when social media progresses beyond interactive communication and evolves into satisfying more functional needs of the organisation, i.e. social media becomes part of the organisations' day-to-day productivity. Taking the three stages mentioned above (early, developing and maturing stages), we can see how an institution can evolve from reactive, proactive through to professional in their social media strategy.



Source: Youtube video on the Digital Agenda, <http://www.youtube.com/watch?v=R24Tk69hr6Q>

Early stage	Developing stage	Maturing stage
<b>Objectives</b>		
<ul style="list-style-type: none"> <li>• To establish a presence</li> <li>• To attract an 'audience' of followers and members</li> <li>• To commit to developing interesting content and messages</li> </ul>	<ul style="list-style-type: none"> <li>• To maintain interaction</li> <li>• To measure usage</li> <li>• To start addressing organisational challenges</li> </ul>	<ul style="list-style-type: none"> <li>• To embed social media directly in business processes</li> <li>• To solve rather than support organisational challenges via collaboration such as crowd sourcing</li> </ul>
<b>KPI areas</b>		
<ul style="list-style-type: none"> <li>• Presence on platforms</li> <li>• Number of followers</li> <li>• Growth of followers</li> <li>• Interaction (likes, posts and re-posts)</li> <li>• Engagement (discussions)</li> <li>• Time investment</li> </ul>	<ul style="list-style-type: none"> <li>• ROI tracking based on time spent vs interaction gained</li> <li>• Number of basic business needs supported by social media (e.g. recruitment, tendering, event management, FAQs, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Business challenges solved by social media</li> <li>• Process formally utilising social media (customer service, issue resolution, etc.)</li> <li>• Research and data received from social media (CVs, data, expert opinions)</li> </ul>

## Conclusion

There are ever mounting expectations in our society for engagement, transparency and accessibility. Leadership hierarchies featuring rigid roles and relationships with stakeholders will be re-examined with a focus on the need for greater flexibility and communication.

Although all organisations will need to define appropriate governance structures for managing their social activities, the European institutions will find this challenge to be even greater, since they experience the most significant challenges in terms of scale, culture, language and business processes due to their work across countries and regions.

We anticipate that the European institutions will continue to find ways to work more effectively as social businesses. They will likely become more collaborative and open in their innovation, more empathetic and responsive in their citizen service, more adept in crisis response, more

transparent in social responsibility and more directly engaged with member state citizens, even on controversial matters. For example, the President of the European Commission recently posted that he had spoken to Vladimir Putin on diplomatic issues.

Social business encourages transparency and distributed innovation, where anyone is empowered to create value. By breaking down functional, organisational and global barriers, it will upend the nature of work. Interactions no longer involve bilateral conversations with co-civil servants or citizens, but rather entities with an ongoing dialogue with the world. In the years ahead, social business will likely lead to remarkable shifts in how we define European institutions, their productivity and even their future place in the world.

# Dematerialisation and document collaboration



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Letters, contracts, invitations, invoices, advertising—an avalanche of paper documents that need to be managed according to their importance, the legal requirements, the approval workflow, the distribution list and also the time it takes to archive them.

In the last few decades IT has put a lot of effort into structuring data to better manage processes. Many companies improve their processes using Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Enterprise Content Management (ECM), Master Data Management (MDM) or whatever other software can manage unstructured data. But the processes supporting the production of structured data also generate a lot of unstructured data exchanges such as emails, photos, videos, letters, claims, phone calls, etc. IT efforts have also changed to better manage unstructured data, but this has often happened separately from changes in the above process-driven software. Analysts estimate that 90% of data produced is unstructured. Reconciling the worlds of both structured and unstructured data is the next IT challenge. Using workflows, the data content of both structured and unstructured data can be mutually enriched.

Today, business transformation can be achieved by giving content, and the interactions this content enables, a bigger and more central role. Although our data exchanges are becoming increasingly electronic, the entry of paper documents is still one of the main starting points within an organisation. Switching from a paper document flow to an electronic document flow is where dematerialisation starts, though paper documentation will probably never disappear. Everybody speaks about dematerialisation but how can it be achieved? What are the impacts? What should be taken into consideration?

Let's focus our attention on the different aspects that would be considered important when designing or re-designing an electronic document flow. This includes physical organisation, legally compliant paper archiving governance and process flows as well as the IT organisation surrounding it all.

### Physical organisation: paper flow

Dematerialising documents is not just about scanning the document. If everyone scans their own documents, dematerialisation has no benefits. Such a decentralised approach is acceptable in small offices that are spread throughout cities and geographical locations. Dematerialisation starts by centralising a specific function within one physical building, which is often easier to organise. This is especially relevant in the case of global shared services locations.

The person/team processing incoming papers will first have to prepare the different documents (by removing staples, etc.), check if the document is single-sided or double-sided, separate the main document from its attachments (annexes) and sort the documents according to their nature. There might be purchase orders, invoices or reminders, but also advertising, invitations or information, etc. Based on the nature of the documents, different batches of documents are managed by accounts payables, by simple electronic document flow or by additional data case.

Preparing the different batches for scanning involves separators and assigning a unique sticker number to each document. The different invoices need to be separated by something like a blank sheet of paper so the system knows it is a new supplier/PO. Other techniques can be used such as patch codes or blank pages. But, a barcode presents the advantage of containing information that can be reused later on in the process. The scanning team is responsible for preparing the hard copies for scanning and launching the scanning batches.



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## Dematerialising documents is not just about scanning the document

The scanner differentiates between the different types of documents (using separators) in order to store the scanned document in the correct content management system. This first step consists mainly of pdf or image storing. The sticker numbers are then used to ensure synchronisation between the scanned image and the physically archived document. With legally compliant archiving, you can also dispose of the paper version, which should be the ultimate goal. At this stage, the scanned document can simply be stored in a network location. More process steps follow however.

Operators can flow the digital document to the sender via email. This step can be automated using a simple workflow and minimum metadata per document. In order to fill the metadata, scanners are usually linked to Optical Character Recognition (OCR) software that recognises minimum sets of data. This software is trained to retrieve specific information depending on the type of document (e.g. invoice number, VAT rates, bank accounts, etc.).

Some documents require an additional process workflow; therefore, the OCR must be customised to extract additional metadata in order for the workflow to be initiated.

The original document must be physically archived in good storage conditions (correct temperature and humidity). The costs of storage can be very high as the following factors need to be taken into account: space, storage conditions, the management of in and outflows, the destruction after a certain expiration date, the confidentiality and sensitivity of the content.

A global policy or procedure regarding physical archiving must be established internally to avoid physically archiving paper when it is not legally required. As for master data governance, paper governance concerning physical archiving is a good way to avoid storing tons of unnecessary paper.

### Certified scanned documents

Presently, Luxembourg cannot destroy legal/original documents after scanning. Unlike Luxembourg, other countries allow this practice and the actual trend on the market is to minimise physical archiving in favour of more and more certified scanned documents. Destruction is only possible if the scanned image can be approved or certified by an external organisation or procedure. The certification of scanned documents is not yet enforced for legal documents. This topic

requires some additional legislative changes and certified labels. Even though the technology is improving constantly in this area, the law is still under discussion by the Luxembourg government.

For further information on this topic, please refer to the draft law that can be found on <http://www.chd.lu/wps/portal/public> and then go to 'Travail à la Chambre' -> Recherche -> Rôle des affaires.

**Structured and unstructured data**

Apart from paperwork, records include emails, phone calls, paper documents (internal and external), videos, images, etc. The management of structured and unstructured data requires several characteristics. An electronic content message avoids scanning and saves processing time. The workflow of these documents should be controlled by a robust procedure and/or an operational clerk that sorts and guides the workflow.

As these documents have different formats, they also have different sources: EDI, emails, xml, web service queues, etc. These sources are the most common types of entries, but other formats exist and can be supported. Even if the paper documents are centralised, the record management collects data from different

legacy systems like ERP, HR, CRM, Access, SharePoint, Oracle, PeopleSoft, Navision, etc. The content management system should therefore be able to have flexible and standardised interface from/to most of the common systems on the market. Content management systems should be able to keep the data structure from and to legacy systems synchronised without complex and additional steps.

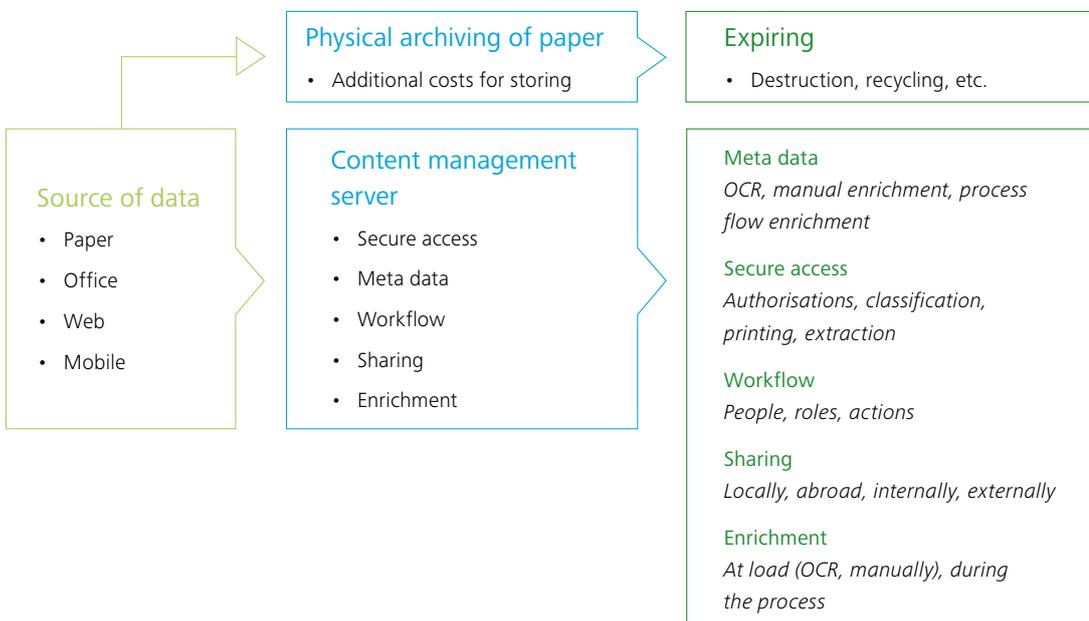
Offerings from existing software providers on the market are improving daily in this area. To illustrate, let us mention the new 'OpenText Extended ECM' software<sup>1</sup>.

OCR metadata collected or entered by the content clerk are used to structure the record and the document link within the content management system. Sometimes metadata can be enriched by additional data for further processing or are enriched as the flow is processed.

**Legal and brand risks**

Recent media attention surrounding large data leaks or brand risks demonstrates that centralised data storage must be protected against unauthorised or undesired access. Appropriate data management, including access authorisation, management of the expiration date and

**Key elements for the process flow**



<sup>1</sup> Source: <http://www.opentext.com/what-we-do/products/opentext-suite-for-sap/opentext-extended-ecm-for-sap-solutions>

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## For a business to run smoothly decision-makers need accurate and up-to-date data

destruction of confidential data after the retention period, reduces the risks of legal 'incompliance' and of sensitive data leaks.

New technologies such as cloud can be accessed from everywhere. Consequently, our data are exposed to malicious attacks. Secured links, encryption, downloading into a temporary location with deletion when logging off and avoiding updates to documents from unsecured connections are key points to take into consideration. This is a real barrier for companies when deciding whether to move to the cloud or keep documentation on the premises.

### Process impacts

Once paper documents are digitised, any additional emails, videos, words and pictures are grouped together into a record with similar metadata. These collections of documents are not there just to centralise the information. Most of them are linked to a business process or are the initiator of it. The record will be enriched with other documents throughout this business process and the metadata will be adjusted.

With the pace of business picking up, decision-makers need accurate and up-to-date data. This is crucial to ensure efficient and top-of-the-range business processes in our accelerating world. Collaboration and workflows are key elements that should be introduced to reap the benefits of an innovative process.

Before starting the process it is important to correctly describe the business process, including system definition, role management, workflow, etc., like you would for any BPM process description. Even if good software exists on the market, process changes should not be underestimated and the workflow definition should be integrated into the IT landscape.

### Collaboration

Given the fact that collaboration between people located around the world is of utmost importance, the processes should be designed to provide secure access from everywhere using user-friendly software (web browser or similar). Access to cloud content management must be secured, and encrypting every document is advisable.

Open shared document databases are regulated by terms and conditions. They can be owned by your organisation or be part of a cloud offering. General terms and usage conditions are important, but in reality who really reads them—especially in this new era of social media? In this respect, before choosing any external open shared document database, take the time to read the terms and conditions and seek advice from your legal department. You need to be clear about IT issues but also about the public usage of your own data. Some good tools exist on the market to exchange data, but most of them take ownership of the content once it is uploaded. These tools even go so far as to use the content without your authorisation. As mentioned above, there are legal and brand risks, so you need to be careful!

Processes create and/or transform content, move it through a workflow, use it or trigger new processes, maintain and store existing content or new documents (structured) or unstructured data. The potential to build new processes based on content is tremendous. The benefits for the new technology, workflow, content management and collection of unstructured information are potentially huge if you can find an innovative solution. Not using this new technology will mean that you are left behind as 21st century business is transformed.



## Workflow

Once the process is implemented, a workflow is launched which facilitates interaction between people using the workflow. Documents are linked with stored metadata. A typical workflow is the incoming invoice check. Even though expected invoices should be correct in terms of the quantity ordered and the price, experience shows that invoices generate a lot of extra work when prices and quantities differ, or if general terms and conditions vary.

Legacy systems for checking invoices need to be supported by the scanned image of the vendor's invoice. Processors of the assigned invoice are still required to check the invoice before approval or rejection, and request additional information from the vendor, or issue a credit note.

Workflows are defined to accelerate and optimise document processing and actions to be taken as well as to address questions that might crop up during the process flow. This is especially important in the case of invoice verification. Automatic but flexible routing, collaboration between the different people involved in the process and eliminating risks using business rules is a must when it comes to invoice process automation. To give an example, let us mention SAP Vendor Invoice Management by OpenText<sup>2</sup>.

As this process will probably include different email exchanges, phone calls, word documents, letters and additional documents, the complete invoice processing record must be enriched during invoice verification to ensure a complete and accurate audit trail.

Metadata are then used to drive the full validation workflow.

## Conclusion

The dematerialisation journey can be complex and addresses many aspects of organisation, processes and IT. The system architecture, business processes, data access control, hardware and software will also be impacted. Rather than reinventing the wheel, existing software on the market can help automate processes and use best practice processes through integration with existing vendor specialists. Software providers have already contributed to IT integration so you should concentrate on the tools and the benefits you can derive from them to innovate in new legally compliant, structured and unstructured processes where collaboration and efficient document routing are key.

<sup>2</sup> <http://www.opentext.com/what-we-do/products/opentext-suite-for-sap/opentext-vendor-invoice-management-for-sap-solutions>

# Islamic Finance

## A technology perspective

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Modern Islamic finance effectively began in the 1960s but it only came of age in the last 20 years when banks started to offer sophisticated Islamic products and finance arrangements.

Today Islamic finance technology solutions have matured and there is a concerted effort across the industry to standardise Sharia-compliant products. We will look into the various challenges a financial institution might face when considering opening a fully-fledged Islamic bank or just a window operation, i.e. a conventional bank offering Islamic products.

But let's first start with some background information on Islamic finance for the readers who might not yet be familiar with the concept.

### Understanding Islamic finance

Islamic banking is governed by the Islamic law known as Sharia that was formed some 1,400 years ago. It aims to provide banking services while staying within the Sharia boundaries. The law has been specifically formulated to eliminate malpractice and exploitation while encouraging healthy trade and commerce. While Sharia is a complete set of laws that are to be followed by every Muslim, only a restricted portion pertaining to banking transactions applies to Islamic finance.

### The basic rules to be followed are:

- The prohibition of **riba**, commonly translated as interest. Interest in any form is forbidden as it is considered unearned income and therefore unjustly gained. Any risk-free investment or guaranteed income is considered usury
- Money is **not a commodity** and cannot be traded as such because it has no intrinsic value if not used to buy tangible assets
- The prevalence of **justice at all costs**; financiers are not allowed to exploit entrepreneurs in any way
- Uncertainty or **gharar** of any form is prohibited. Therefore any contract which involves an element of speculation or gambling is forbidden. For example futures and options or derivatives are not permissible as the returns from such investments rely on events in the future which may or may not take place. Both parties have to agree on the terms of a particular contract and Sharia law forbids transactions where the subject or price cannot be fixed and agreed upon in advance



## Islamic banking is governed by the Islamic law known as Sharia that was formed some 1400 years ago

- A percentage of the bank's net revenue will be paid as a charitable tax called zakat to the community, usually used to finance community projects
- Investments are based on a risk-sharing principle where profits and losses will be shared based on a previously agreed ratio. Although an IFI cannot charge or pay interest, its main purpose is profit. An Islamic bank invests in businesses, industries and real estate and shares the profit as well as any losses with the owners and investors. As the bank's profit is linked to the success of the business, the risk of exploitation is greatly reduced
- There are certain businesses and contracts that are prohibited by Sharia as they go against the teachings of Islam. For example, it is prohibited ('haram') to gamble or to trade harmful substances like alcohol and drugs, contracts based on interest rates, contracts based on high volatility, debt contracts at a discount and forward foreign exchange transactions

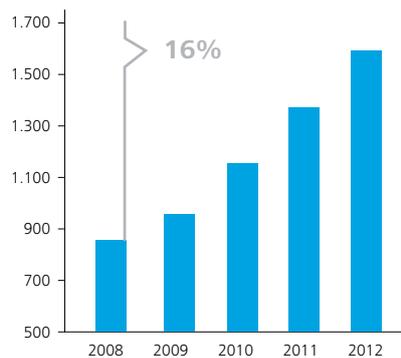
Although Islamic countries have followed Sharia law for financial transactions for a long time, applying them to form a feasible banking system is a trend that has picked up momentum only in the past two decades.

Naturally, several methods and forms of Islamic banking have evolved as institutions constantly reform rules to cope with economic changes and customer expectations.

### Overview of today's Islamic finance market

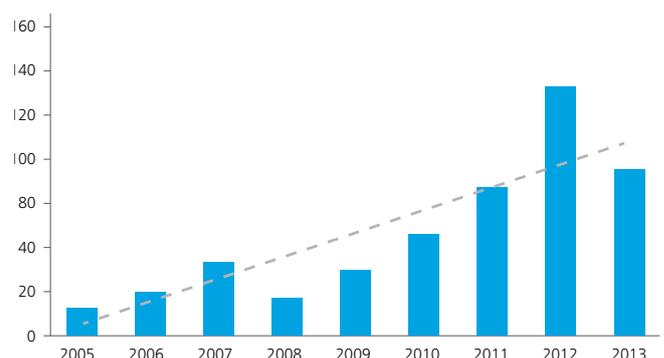
- Islamic financial assets are estimated at US\$ 1.6 trillion. Considering that there are over two billion Muslims in the world and an increasing interest from non-Muslim investors, the Islamic banking potential is massive
- Sukuk issuance, a product equivalent to bonds in conventional banking, has been increasingly successful since 2005
- Islamic finance is growing at a rate of 15% to 20% every year, spanning mostly Asia and the Middle East but starting to make inroads into the West. For the most part, and mainly due to the underlying guiding principles, the industry has remained unaffected by the global financial meltdown
- More than 700 Islamic financial institutions operate worldwide in some 75 countries, of which 75% are full-fledged Islamic finance institutions and 25% are window operations as part of conventional banks

Global Islamic assets (US\$b)



Source: Central banks

Issued Sukuk volume (US\$b)



Source: Reuters, Bloomberg



- After the latest financial meltdown, an increasing number of non-Muslim customers and investors are looking for more socially responsible banking alternatives, which have proven to be much more resilient due to the restrictions on risk taking
- 56 Islamic countries are members of the Islamic Development Bank (IDB)<sup>1</sup>
- The leading Islamic finance centres are Bahrain, Dubai/UAE, Kuala Lumpur, Riyadh, Qatar, Singapore, London and Luxembourg
- Top management of Islamic banks is not confined to Muslim countries but spread across Europe, the United States, the Far East and the Middle East

#### Conventional finance vs Islamic finance

Islamic finance is not so different from conventional finance since approximately 80% of competences overlap and the same business, regulatory and technology requirements prevail.

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## Several methods and forms of Islamic banking have evolved as institutions constantly reform rules to cope with economic changes and customer expectations

Islamic banks perform the same function as conventional banks: they attract financial resources from individuals and institutions and invest these funds in businesses that need external finance to support their activities. However, they share the profit and loss of the business activities and do not rely on interest payments from the borrowers.

<sup>1</sup> Based in Saudi-Arabia, the purpose of IDB is to foster the economic development and social progress of member countries and Muslim communities individually as well as jointly in accordance with the principles of Sharia

Nevertheless there remain some fundamental differences between the two types of banking:

Conventional banking	Islamic banking
Creates value by maturity transformation and pricing of money	Prices goods and services that represent real economic activity
Is based on fixed return on both sides of the balance sheet (difference being banks 'spread' profit)	Is based on sharing profit and risk
Does not involve itself in trade and business directly	Actively participates in trade and production
Depositors receive a fixed rate regardless of the bank's profitability, thus insulating them from the bank's true performance	Profit is shared with the depositor: the higher the bank's profit, the higher the depositor's income

#### Challenges faced by Islamic finance

- Since Islamic products are contract based, these contracts will be enforced under local country laws and regulations which might conflict with Sharia law and may incur additional costs
- Due to the fact that Islamic financing is comprehensively based on Sharia compliance, any misconduct or wrongly processed transaction could have severe consequences
- Late payment fees, penalties, overdrafts, debit interest and overdrawn accounts do not exist in Islamic banking, which may lead to lower returns
- If there is any doubt about whether a specific transaction complies with Sharia, all the profits must be given to charity, which is an additional risk for the bank and could impact returns
- Due to a lack of comprehensive interbank Islamic financing (lending), Islamic financial institutions may face short and medium-term liquidity issues
- There is no or limited standardisation in the vocabulary, financial instruments, documentation and pricing formulas used in Islamic finance

- Generally speaking the bank acquires the goods on behalf of the customer; if the customer pulls out of the contract the goods need to be returned to the supplier (for example in the case of car loans), which has implications on cost and risks and also calls for a possible change in business practices and commercial laws

#### Implications for financial systems

There is no set of globally applicable Islamic banking standards that allow banks to prove compliance with Islamic banking principles in a straightforward way or to assess whether a banking application is Sharia-compliant. Instead, an independent Sharia advisory board, the members of which are trained and certified in Islamic and Sharia law and the interpretation thereof, will serve on the IFI's Sharia committee. The advisory board determines whether the bank's products and services respect Sharia.

Vendors and their systems have to align with the products and the guiding principles of Sharia.



As stated earlier, Islamic banking and conventional banking differ in many respects but the same business, regulatory and technology requirements prevail. Both use similar customer channels and offer what are, functionally speaking, the same products.

Banks today deploy core banking systems to support their business processes, improve operational efficiencies and abide by regulatory requirements. Any core system transformation requires enterprise-wide planning, commitment and resources and it can possibly be even more complex for Sharia-compliant systems due to the customisation required to align with the financial products. The difficulty stems from the lack of product standardisation throughout the Islamic finance markets and the interpretation of the Sharia board.

This is especially true in the case of Islamic window operations where conventional core banking systems are tweaked to support Islamic banking activities. In these cases, the banks are required to maintain separate entity books for customers and reporting, and ascertain a segregation of funds.

Islamic banks are always seeking to innovate and come up with new products and services in personal finance, wealth management, bank cards, insurance and corporate financing. This requires core banking solutions that allow banks to build new products rapidly and ahead of the competition.

#### **An Islamic banking solution must:**

- Cover all lines of business such as investment, financing, payments, bank cards, treasury management, trade finance and AML services
- Have a **profit distribution engine** which provides flexibility in pool definition, profit-sharing schemes, revenue reserves allocation and distribution, alongside the ability to perform 'what if' scenarios prior to the distribution of profits

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## The advisory board determines whether the bank's products and services respect Sharia

- Comply with **Sharia law** as well as with **Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI)** and international or local accounting standards
- Support the basic functionalities of **Islamic products/contracts** such as murabaha, musharaka, mudarabah, istisna, ijarah, etc.
- Involve stringent **treasury management** to reduce liquidity risk, since, as previously mentioned, taking potentially interest-based loans on the market to fulfil short and medium-term liquidity needs is not permitted
- **Provide for zakat calculation** and holiday treatment as per the lunar calendar, both of which are mandatory under Islamic principles
- Provide a **strong and flexible workflow** to enable the bank to redefine or copy and customise the existing products/processes and aid in new product launches



- Provide or customise reports which help the Sharia board during their routine audits
- **Segregate funds:** this is especially important in the case of window operations. It is intended to maintain the moral purity of all transactions as funds stemming from Islamic banking cannot be mixed with funds from conventional banking that may involve riba, gharar or haram activities. This sometimes proves difficult, especially if an Islamic finance layer has been added to the conventional core banking system; it is therefore common for banks to choose to use different core systems for each type of banking
- **Screen funds:** the concept of screening companies before investing in them comes from the Sharia principle that Muslims should not partake in an activity that does not comply with the teachings of Islam. There are two types of screening involved:
  1. Business activity screening where the company must show that at least 95% of its gross revenue is generated by activities which are considered compliant with the Sharia
  2. financial ratio screening to exclude companies that do not comply with a minimum acceptable level of leverage, receivables and interest income. It is now possible to automate the screening processes through third party applications

The implementation of an Islamic and conventional core banking system must transform information technology into an enabler of business by providing an agile platform to achieve corporate objectives.

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## From a technology perspective, the market share will always be inclined towards vendors whose system will provide flexibility, scalability and is more customer-centric

It often forms an integral part of a business transformation programme addressing key banking issues such as:

- Increasing market share through unique positioning
- Reducing Total Costs of Ownership (TCO)
- Providing a single customer view and the related activities, portfolios, products, etc. while providing customers with a single view of the bank's products and services
- Delivering a consistent customer experience across multiple channels and providing full visibility to the bank's sales and servicing agents, enabling 'anywhere, anytime' banking
- Providing enterprise-wide information relating to regulatory reporting and risk management
- Creating less dependency on IT and more flexibility for business users

Islamic core banking vendors are typically divided into two groups: conventional system vendors that have transformed their existing products, and vendors that offer only Islamic banking systems.

Most of the conventional global core system vendors (Temenos, Avaloq, SAB, Sopra, Misys, Oracle, TCS, etc.) have successfully created Islamic banking systems based on their conventional platforms to fit the Sharia requirements. The other segment is mainly comprised of vendors that have only Islamic banking systems and operate mostly in the GCC region and East Asia (ITS, BML Istisharat, Path Solutions, etc.).

There are about 30+ vendors offering Sharia-compliant systems and with the constant development of financial products the maturity of those systems will improve.

Given the different requirements and needs, it is important to select the right technology supplier from the start and to provision for sufficient time and effort for the vendor's due diligence and to undertake a comprehensive RFP process.

A vendor that provides an Islamic banking model, which can also be easily modified through configuration, will maintain high rankings in vendor evaluations. Furthermore it is crucial that the vendors have local presences with knowledge of the local regulatory requirements, local support as well as to maintain skilled Islamic banking experts. It obviously does help if the vendor and his resources have been involved in several implementations.

### The future of Islamic finance

With new markets opening their doors to Islamic finance, the sector is expected to achieve unprecedented growth. Tapping into those markets will yield great results. Although, it may take some time as local regulators and legislation need to adapt the laws and regulations to accommodate the specific needs of Islamic finance, e.g. double stamp duty on mortgage loans in the UK, etc.

Major Islamic finance organisations are striving to form a set of standardised regulations that can be implemented globally across all Islamic finance institutions.

From a technology perspective, the market share will always be inclined towards vendors whose system will provide flexibility, scalability and is more customer-centric.

# The automatic exchange of information era

## Moving towards global tax transparency

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Aiming to reduce tax evasion, the automatic exchange of information is increasingly becoming the standard system of exchange between tax authorities, with a rapidly growing number of countries participating in initiatives such as the OECD Common Reporting Standard. Financial intermediaries (in a broad sense, so not just banks but also including funds, insurance and non-supervised investment structures) worldwide need to implement pre-existing automatic exchange of information frameworks (such as under the FATCA Intergovernmental Agreements), and anticipate upcoming additional exchange of information obligations (such as under the OECD Common Reporting Standard).



This article will first outline the global context of rapidly evolving initiatives, then focus on the impact of these changes in Luxembourg.

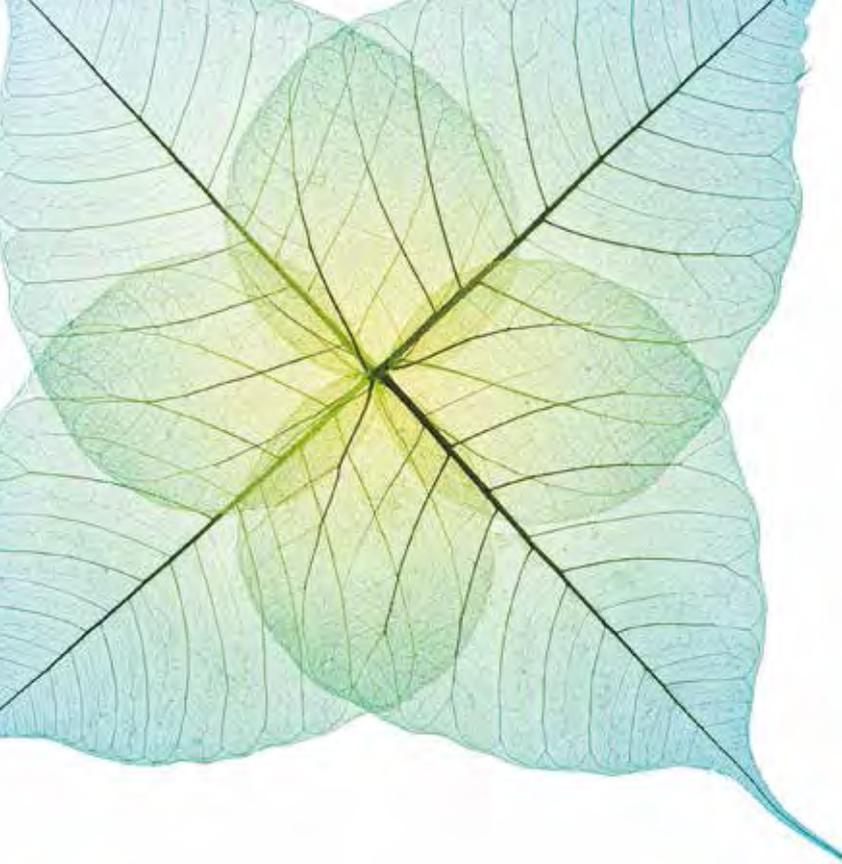
### Global context

Until a few years ago, the automatic exchange of information outlook was relatively poor:

- Exchange of information on demand (according to OECD principles, and generally laid down in double taxation treaties) was considered to be the standard system of exchange between tax authorities. Such exchange of information on demand requires a series of stringent conditions to be met before a treaty partner can be obliged to provide information on a taxpayer in their jurisdiction. Depending on local law, the holder of information and/or the taxpayer may also be able to initiate legal proceedings against such a request
- The automatic exchange of information was limited to the scope of the EU Savings Directive (in force since 2005), which requires the automatic exchange of information between EU tax authorities (with certain non-EU countries and Dependent and Associated Territories of EU member states applying

similar or equivalent rules). However, this directive has a very limited scope of application; only the cross-border payment of interest income (as well as distributions and redemptions in certain types of fund) is affected. Additionally, certain banking secrecy jurisdictions (such as Austria, Luxembourg and initially Belgium) were allowed to temporarily apply an anonymous savings withholding tax regime instead

In 2010, the OECD used the publication of grey lists to make a concerted push to convince banking secrecy jurisdictions (who until then made reservations under their double taxation treaties as to the application of this type of exchange) and other 'non-cooperative' jurisdictions to accept exchange of information on demand provisions and amend their double taxation treaties accordingly. As a result, a series of countries (including Switzerland, Luxembourg and Belgium) agreed additional protocols to their double taxation treaties to allow such exchanges and to be taken off the OECD's grey list (as being listed may trigger anti-abuse provisions and other measures leading to adverse tax consequences for businesses).



More recently there has been a shift towards tax transparency, with the automatic exchange of information chosen as the standard. This shift was accelerated significantly by the financial crisis and by the U.S. Foreign Account Tax Compliance Act (FATCA):

- In its standard version, FATCA is a regime allowing the IRS to obtain information from financial intermediaries (not just banks but also funds, certain insurance companies and certain non-supervised investment structures) on the identity of U.S. Persons, the financial assets they hold and their investment income. Financial intermediaries that fail to comply with these reporting obligations (or clients of those financial intermediaries who fail to provide sufficient information to the intermediary to be classified correctly for FATCA purposes) may be subject to a punitive 30% FATCA withholding tax on their direct (and at a later stage, indirect) sources of U.S. income
- In view of pre-existing political pressure within the EU (and among the G20 countries) to move to the automatic exchange of information, five EU member states negotiated a framework agreement with the U.S. in order to impose FATCA obligations based on the automatic exchange of information via local tax authorities (known as the Intergovernmental

Agreements or IGAs) Meanwhile, a second model of IGA is available whereby automatically exchanged information is still sent directly via the IRS

- The IGA concept has proven to be a success as a large number of countries worldwide have signed (or are in the process of negotiating) an IGA with the U.S.
- In addition, the amended EU Savings Directive was adopted this year by the European Council following a long negotiation process that began in 2008. With a view to closing loopholes in the current EU Savings Directive, the new version will have a significantly expanded scope of application and will be applicable as from 1 January 2017
- Elsewhere, and as a result of, among other things, an initiative led by the 'Big 5' EU member states (Germany, France, the UK, Italy and Spain), the OECD has released a global standard for the exchange of information. Dubbed the Common Reporting Standard or CRS, it was endorsed by the G20 in February 2014, an event followed by a statement issued by 44 jurisdictions wishing to be 'early adopters' (aiming for its application as from 2016). The 'Big 5' EU member states wish to formally sign the CRS at the Global Forum meeting in October 2014 in Berlin, together with all early adopters wishing to do so. As it stands, the OECD Convention on Mutual Administrative Assistance in Tax Matters has been signed by more than 60 jurisdictions, including Luxembourg and Switzerland
- Finally, the EU Administrative Cooperation Directive will (in various phases) enter into force as from 2015, imposing requirements including the automatic exchange of information between tax authorities within the EU on salaries, pensions, director's fees, insurance and real estate. It is the European Commission's intention to extend the scope of application of this directive to all types of financial income

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**Financial intermediaries in general need to do more than simply implement (or continue implementing) the Luxembourg FATCA IGA, leading to important changes to procedures and IT systems**

The automatic exchange of information is consequently heading towards:

- A virtually global automatic exchange of information system
- A wide range of data exchanged on all types of financial income
- Different, yet partly overlapping frameworks that at some point will need to be integrated into a single standard. It may well be that the CRS developed by the OECD will at some point 'absorb' the EU Savings Directive

### Focus on Luxembourg

Luxembourg also recently made a shift towards full participation in the automatic exchange of information. The government's decision to negotiate an IGA with the US triggered a kind of domino effect:

- Luxembourg decided to conclude an IGA Model I with the U.S., which basically establishes an automatic exchange of information regime between Luxembourg financial institutions (banks, funds, certain insurance companies and certain non-supervised investment structures) and the Luxembourg tax authorities on U.S. Persons. The Luxembourg tax authorities will forward this information to the IRS
- Having accepted the automatic exchange of information with the U.S., Luxembourg also took (or in practice, had to take) steps to discontinue the 35% savings withholding tax under the EU Savings Directive. Luxembourg will apply the automatic exchange of information under the EU Savings Directive as from 1 January 2015 (provided draft law no. 6668 in this respect is adopted)
- Although Luxembourg is currently not one of the 44 early adopters of the Common Reporting Standard, it is a signatory to the (protocol of the) OECD Convention on Mutual Administrative Assistance in Tax Matters, and will consequently also participate in the automatic exchange of information based on the CRS at some point
- As Luxembourg and Austria abandoned their opposition to the amended EU Savings Directive and it was then adopted by the EU Council this year, its broadened scope of application will apply as from 1 January 2017 (including through the automatic exchange of information, since—as mentioned above—Luxembourg will discontinue the savings withholding tax as from 2015)

### Industry impact in Luxembourg

It is clear that the banking, fund and insurance industry, as well as certain non-supervised investment structures need to follow these developments closely to ensure timely implementation of the automatic exchange of information obligations.

Indeed, financial intermediaries in general need to do more than simply implement (or continue implementing) the Luxembourg FATCA IGA, leading to important changes to procedures and IT systems. Those intermediaries are also likely to be impacted by related developments, triggering procedural and IT system changes as well. These include:

- The switch to be made under the current EU Savings Directive from a savings withholding system to the automatic exchange of information on 1 January 2015
- More significant changes to be made as to the substantially broadened scope of application of the amended EU Savings Directive, applicable as from 1 January 2017
- The Common Reporting Standard, which may significantly extend automatic exchange of information obligations to a much larger number of countries, based on similar (yet not identical) mechanics as those applicable under the FATCA IGA. An additional complication is that the exact implementation date is not yet known, and a harmonisation move may lead to the absorption of the (amended) EU Savings Directive by the CRS at some point in the future (before or after the implementation date of the amended EU Savings Directive)

Apart from the above-mentioned financial intermediaries, service providers need to adapt their service offerings to be able to deal with an increased specialised demand for assistance in this area.

It is clear that these developments need to be monitored closely in order to limit implementation costs, and to allow synergies between these related developments to be exploited where possible.



# A leadership model and role description for the CIO 2.0

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The main development in the role of the new CIO is the shift from a technology-centric role to a business-centric and innovation role. The skills and technical competencies that characterised the CIO of the past are still essential, but are no longer sufficient to fulfil all expectations of this function moving forward.

The CIO 2.0 requires additional leadership skills which will define his/her success in running a department that is moving from an infrastructure and technology focus to an organisation that uses a process approach to create agility and respond rapidly to an increasingly fast-changing business environment.

Whereas the original CIO role focused on managing a smooth IT operation and department, today he or she needs to find a balance between these management skills and the innovation and coaching skills required in the new leadership role. It is important to note that it is not a choice between these three leadership styles but a balanced combination of the three that will enable an effective chief information officer.

**The innovation component** of the role allows the CIO to define an effective strategy that is aligned with business expectations. Now that all parts of an organisation are affected by technology innovation, this is a very challenging part of the role that is continuously

gaining in importance. Studies have shown that the innovative, entrepreneurial part of the role has become more important than the CIO's purely technical IT skills.

**The coaching component** of the role centres on listening, motivating and developing a high-impact IT organisation that radiates the business focus and agility required today. The transition from an IT product-centric approach towards a business solution approach is certainly not limited to the CIO function itself, but is a shift that affects the entire information department. New roles are emerging, with IT business partners deeply embedded in the internal or external customer organisation so as to understand the business challenges and come up with appropriate solutions. It is obvious that managing these new roles in the IT department requires enhanced leadership and people management skills. As these new roles do not even always report into the IT function itself, the coaching and influencing skills of the CIO 2.0 are even more important.

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## We have looked at the CIO role from a leadership model perspective whereby we consider it important that the individual has all three leadership styles

**The third component**, which is the management part of the role, is the aspect that is normally best understood—but unfortunately, it often has a too dominant a presence in the CIO function. Having a vision without the structure, organisation and governance to execute that vision effectively will evidently not help the organisation either.

However, too many IT departments are run on a purely reactive basis these days, whereby priorities are driven by external IT product evolutions and internal IT issues—the term ‘firefighters’ comes to mind—rather than being guided by execution of a strategy for the short, medium and longer term.

The three leadership behaviours described above can clearly be translated into more tangible leadership competencies that can be assessed, measured and developed to increase the success of the CIO. Ensuring that translation from the leadership behaviours and defining a specific development path for each of the critical leadership skills will help the whole of the IT organisation to acquire these skills and not just the CIO 2.0 role. To implement the model introduced above, individual development, coaching and change management are critical factors for success. Using a leadership competencies-driven approach in the assessment of candidates, development planning, succession planning and evaluation of staff will help to create a team of people that not only have the required technical competencies but also the right behaviours to support an ever more demanding customer.

### Some concrete leadership skills that we consider critical for a CIO are:

- **Customer focus.** It is obvious that the CIO should meet customer needs. The CIO can achieve this through a relationship that is based on trust, listening to the requirements of the client and understanding what is needed
- **Total quality and performance management.** The CIO should use the methodologies, tools and technologies that are available today to optimise the operational processes of both the IT department and the wider organisation. Multiple models and approaches such as Lean Six Sigma are now available to help ensure that the objectives of the role are achieved. In addition, the CIO should be able to define clear objectives and the related performance measures and KPIs to measure the achievement of these objectives
- **Organisation and priority management.** The CIO should be able to mobilise the required resources to implement the defined strategy. This applies to both ongoing operations and specific projects
- **Motivating others.** The CIO should be able to delegate effectively by giving challenging and motivating objectives to his/her team
- **Interpersonal communication.** The CIO should be able to adapt his or her communication style based on the individual or group that he or she is talking to. The CIO should be able to create a constructive relationship with all types of people both inside and outside the organisation

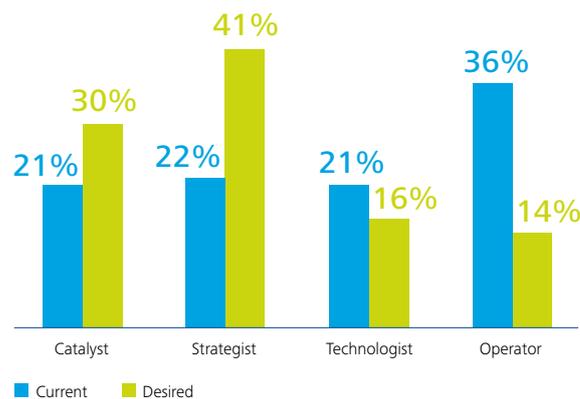
An interesting observation is that more than 30 years of research have shown that the development effort required for each of the skills listed above is not equal. The graph included shows the relative development complexity for each of the competencies listed. Whereas a skill like customer focus is something that can be acquired fairly quickly, learning effective interpersonal communication is something that will take a lot more time before a person becomes fully skilled in that area. It may even be argued that both 'motivating others' and 'interpersonal skills' are so critical to the role of the CIO 2.0 and take such an effort to develop that they should be prerequisites. This would mean that these skills are integrated into the pre-screening of internal and external candidates and are tested during the assessment centres for future CIOs in the organisation.

Development complexity of leadership skills



So far, we have looked at the CIO role from a leadership model perspective whereby we consider it important that the individual has all three leadership styles. Next, we look at the typical role description of the CIO. While there are a number of different models that can be used to describe this, we normally identify three key areas: responsibilities, experience and technical skills, and behavioural skills. As we covered the behavioural skills at length in the first part of the article, we will explore the responsibilities of the CIO in more detail below.

Average time in role (in %)



In a recent study carried out by Deloitte, we looked at the four main responsibilities or the 'four faces' of the CIO:

- 1. Catalyst**, investigates innovation through transformational change to business architecture, strategy, operations and technology
- 2. Technologist**, assesses technologies and designs technical architectures to increase business agility and manage complexity
- 3. Strategist**, partners with the business to align business and IT strategies and maximise the value of technology investments
- 4. Operator**, operates and delivers efficient IT services and solutions to support the business while managing risks and protecting core assets

going forward (see graph). Unsurprisingly, the findings fully concur with the key message in this article, as the typical CIO spends too much time on 'operator' responsibilities—essentially, twice as long as they would like—and are left with only half of the time they would like to spend in the 'strategist' role.

A recent Deloitte survey looked at each of these aspects and measured both where CIOs see themselves today and where they would like to put their focus

It is true that the complexity of the CIO 2.0 role and the attendant expectations can appear overwhelming, and it is—quite understandably—difficult to balance the operational, daily activities and the strategic component of the role. Depending on the size and complexity of the organisation, it may be necessary to appoint a Chief Technology Officer (CTO) to take care of the more operational aspects of the IT department. This can give the CIO time to work on the strategic and coaching part of the role and add value by managing the key business stakeholders.

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