Inside

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CEO
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EDITION
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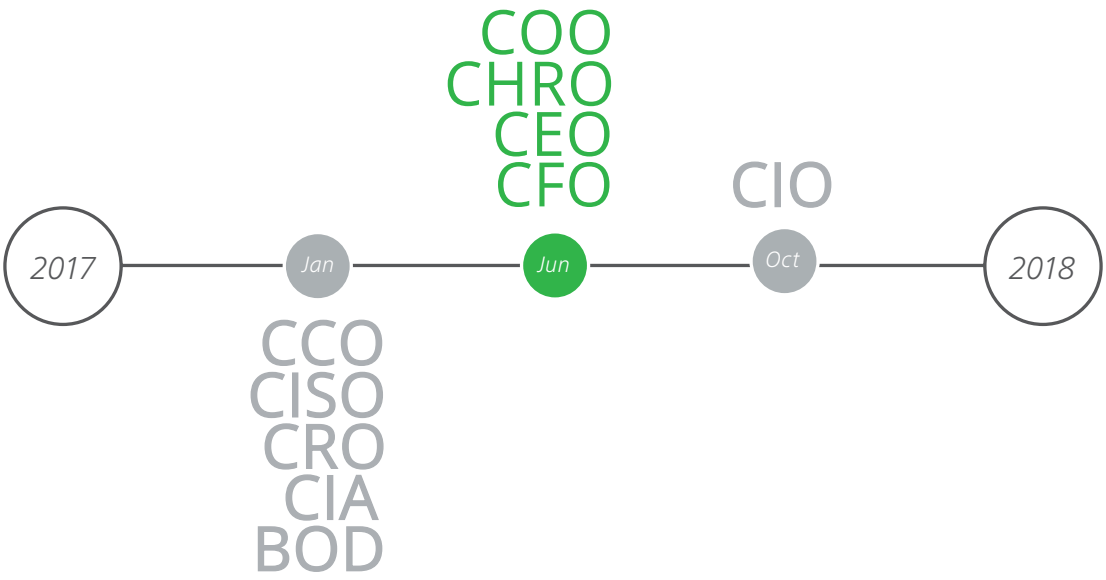
Each edition of the magazine will be addressing subjects related to a specific function. Please find below an overview of the spotlight for the upcoming editions of the magazine:



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Foreword

Dear readers,

Welcome to the fifteenth edition of Inside Magazine. It is with great pleasure that we introduce this new issue dedicated to the Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Operating Officer (COO), and Chief Human Resource Officer (CHRO). For the past four years, we have selected hot topics of the market to offer you a quarterly publication with an exclusive insight into current trends and opportunities ahead in the future.

We are now proud to provide you with this anniversary edition that combines articles on hot topics for leaders responsible for strategic, financial, operational, and human capital decisions. In this edition, we highlight essential current trends affecting leaders today. As customers move to a more central space in a digital era, the market is calling for new strategies. Our expert authors are excited to offer you their analysis of challenges and opportunities that this new age is bringing.

From banks to small and medium-sized enterprises (SMEs), leaders need to review and enhance their strategies and processes to fit the emerging trends and not be left behind. In order to support you to be ready for tomorrow, we look at key trends within the organization, such as customer experience, the transformation of branches, and efficiency growth, as well as external changes, such as Brexit. We also tackle new regulations such as GDPR and discuss technological disruptions, such as the Internet-of-Things and virtual reality.

We hope you will enjoy reading this new edition of Inside Magazine as much as we enjoyed preparing it. As always, we look forward to receiving your impressions and comments.
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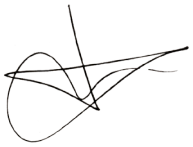

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Editorial

Dear readers,

In this issue, we aim to provide you with some perspectives by drawing your attention to hot trends, current challenges, and opportunities in the financial industry to support your decision-making process. We are definitely facing a fast-changing world in which adapting your strategy quickly is key, not only to maintain the profits and margins but also to survive and stay competitive. The challenges are multiple and varied such as the customers changing behavior, the high level of competition, employee satisfaction, the complex and challenging regulations, and even major geopolitical changes.

Therefore, for this edition we have selected articles that reflect wide range of points of view on strategies and challenges that might inspire you for your short- and long-term positioning.

With a tumultuous economic situation, banks are under pressure from a highly competitive market and evolving customer needs. They have to consider their strategy and consequently review their operating model to improve metrics such as the return on equity, cost income ratio, and net promoter score (NPS). Investing in this NPS indicator for customer experience and being able to measure the created value is crucial to earn market shares and build strong competitive advantages.
The financial sector is subject to impacts of major events, such as upcoming regulations, which lead to higher cost pressure. Nevertheless, the latter can also be turned to your advantage by leveraging regulatory implementation for innovation, as suggested for global data protection (GDPR). Similarly, other events like Brexit could, if anticipated, generate business growth.

As we also care about our people and our planet, we aim at giving insights on the use of digital in favor of social impact, well-being, and the health of employees.

We hope you will enjoy reading this issue.

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Part 01

In a changing world, new strategies are required...

The Future Models of Banking in Europe

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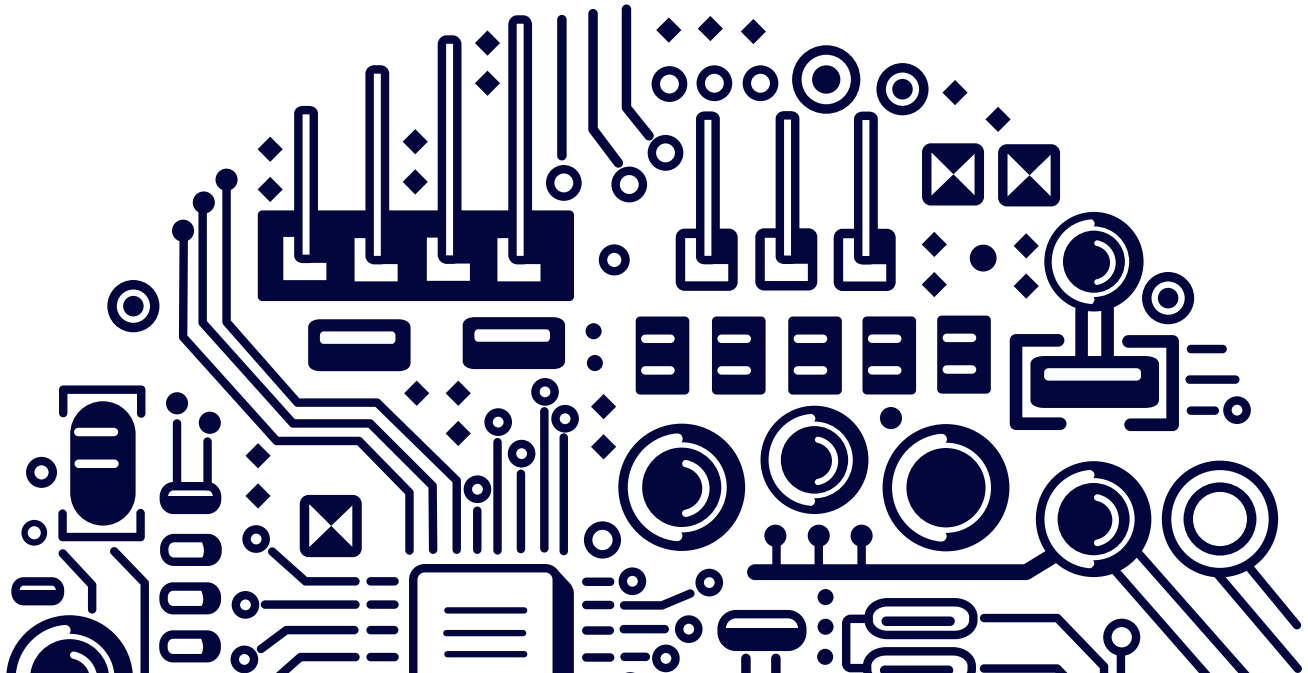
European banks continue to be subject to a wide range of pressures, from the persistent low interest environment to evolving customer preferences, from the development of entirely new types of competitors to regulatory concerns. How can they adapt to these pressures and take advantage of new opportunities in this environment?

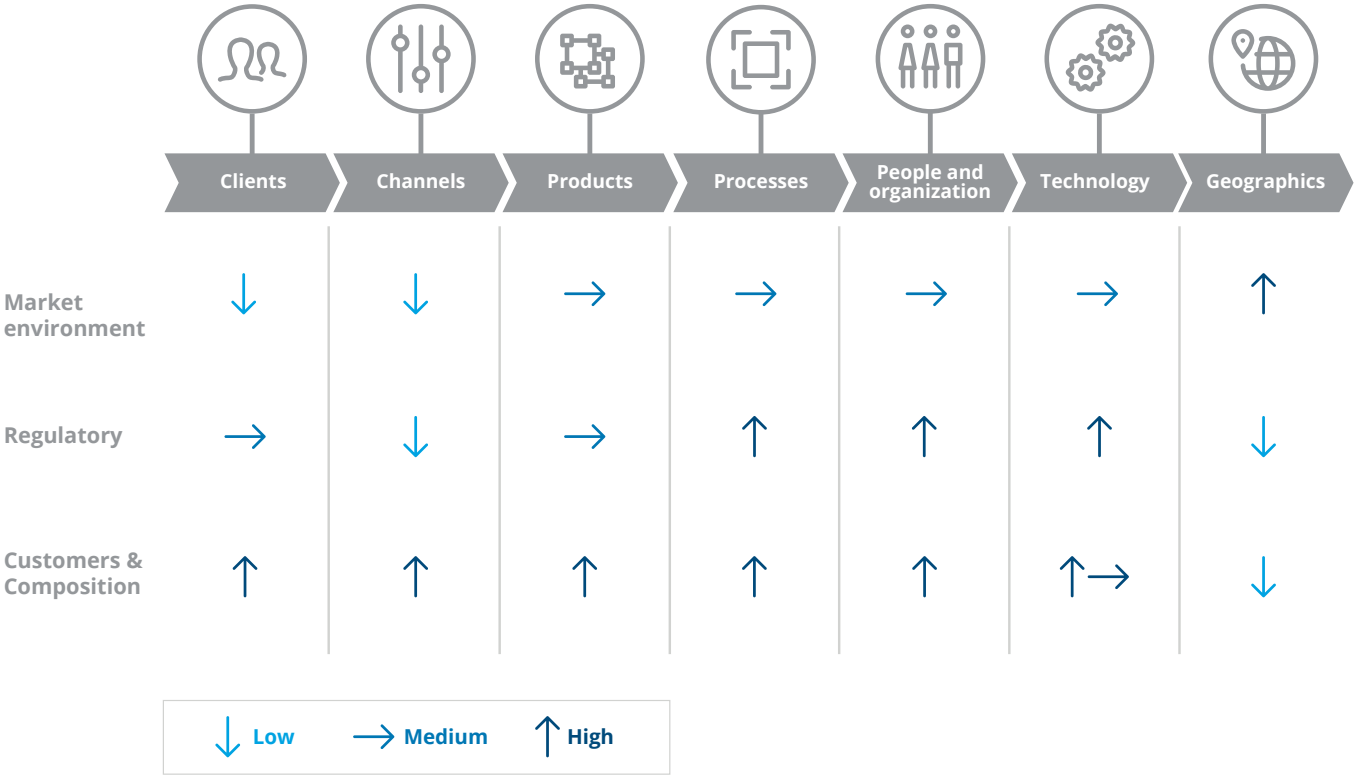
What are the key sources of pressure affecting the European banking sector today?

1	**Significant erosion of net interest margins as a result of the negative interest-rate environment**	Interest margins of European banks have been meaningfully compressed since 2008 as a result of the low interest-rate environment. They have not seen meaningful recovery thus far.
2	**Increasing costs due to a more complex regulatory environment**	Following the financial crisis of 2008, banks need to manage their balance sheets to fit a wider set of potentially conflicting regulatory ratios, pay closer attention to their risks, improve their governance structures, and comply with an increasingly vast body of consumer protection regulation. This has had a meaningful impact on all banks, but has particularly hit the smaller players that lack the economies of scale necessary to be able to absorb the impact of regulation.
3	**Evolving consumer preferences and the rise of competition**	Customers are becoming increasingly well-informed and therefore more demanding in terms of pricing, convenience, and quality of service. Some of the barriers to switching providers are also disappearing with the shift to online channels and the advent of new regulation such as the Revised Payment Services Directive (PSD2) opening up access to customer data. Hand-in-hand with this trend, companies outside the banking sector (including telecoms, technology firms, and retailers) as well as independent entrepreneurs have started to launch alternative services in order to compete with banking providers. Competition has been increasing across all sectors, including a disintermediation of traditional credit activities (such as through crowd funding), automated advisory services (like robo-advisers for asset management) and a disruption in traditional payment activities with the advent of new technologies such as blockchain and the application of PSD2 that will force banks to open their infrastructure to innovative and lightly-regulated actors.



What are some of the strategic choices that banks need to make to tackle these pressures?

In order to frame their thought process, banks could consider the impact of each source of pressure on the various aspects of their target operating model. The model provided below is a generic example and could change depending on the bank's core business.



In our view, some strategic choices that could be considered are the following:

Impact on clients

Banks will need to be increasingly focused on client service in order to catch up with the emerging competition and make up for prior underinvestment in customer experience. Nascent competitors are predominantly targeting very specific user groups to win market share away from banks. Banks will therefore also need to define whether they will:

- Focus their efforts on certain client groups
- Maintain a broad service offering and service multiple types of clients
- Partner with other players either to reach new client bases or to outsource their client management experience

Impact on channels

Competition is increasingly technology-driven and focused on mobile and online channels. However, new competitors are currently unlikely to have sufficient scale and financial resources to quickly roll out a meaningful physical presence through branches. Banks will need to decide whether they will:

- Refocus their business on a digital-based operating model to reduce their cost base
- Maintain the competitive advantages they may have today with their large branch presence
- Partner with other players to improve their channel mix or outsource their channels for the use by other players

Impact on products

Clients are becoming increasingly less interested in selecting from a large range of bank-created products, and would either prefer their choice to be limited to a few offerings tailored to them or to be able to customize the products to their taste. Banks will therefore need to decide whether they want to:

- Focus and streamline their product offering
- Provide a wide range of products that will support customers through the various stages of their life ("one-stop shop")
- Collaborate with other players, where the others could provide some products (where they have an advantage) on a "white label" basis or where the bank outsources some of its products

Impact on people, organization, processes, and technology:

Again, banks have several options here:

- **Standalone cost rationalization—** both traditional cost-cutting measures (e.g., rationalization of the branch network) and new non-traditional measures (e.g., investments in new technologies such as robotic process automation) can be foreseen
- **Alliances—**banks could consider merging some of their middle and back-office platforms in order to rationalize their cost base or consider expanding the reach of existing shared services entities to third parties as a commercial strategy
- **Increased outsourcing—**business process outsourcing companies could flourish in order to take advantage of the economies of scale in some of the middle and back-end processes and increase the variability of the cost base of certain banks

Impact on geographies

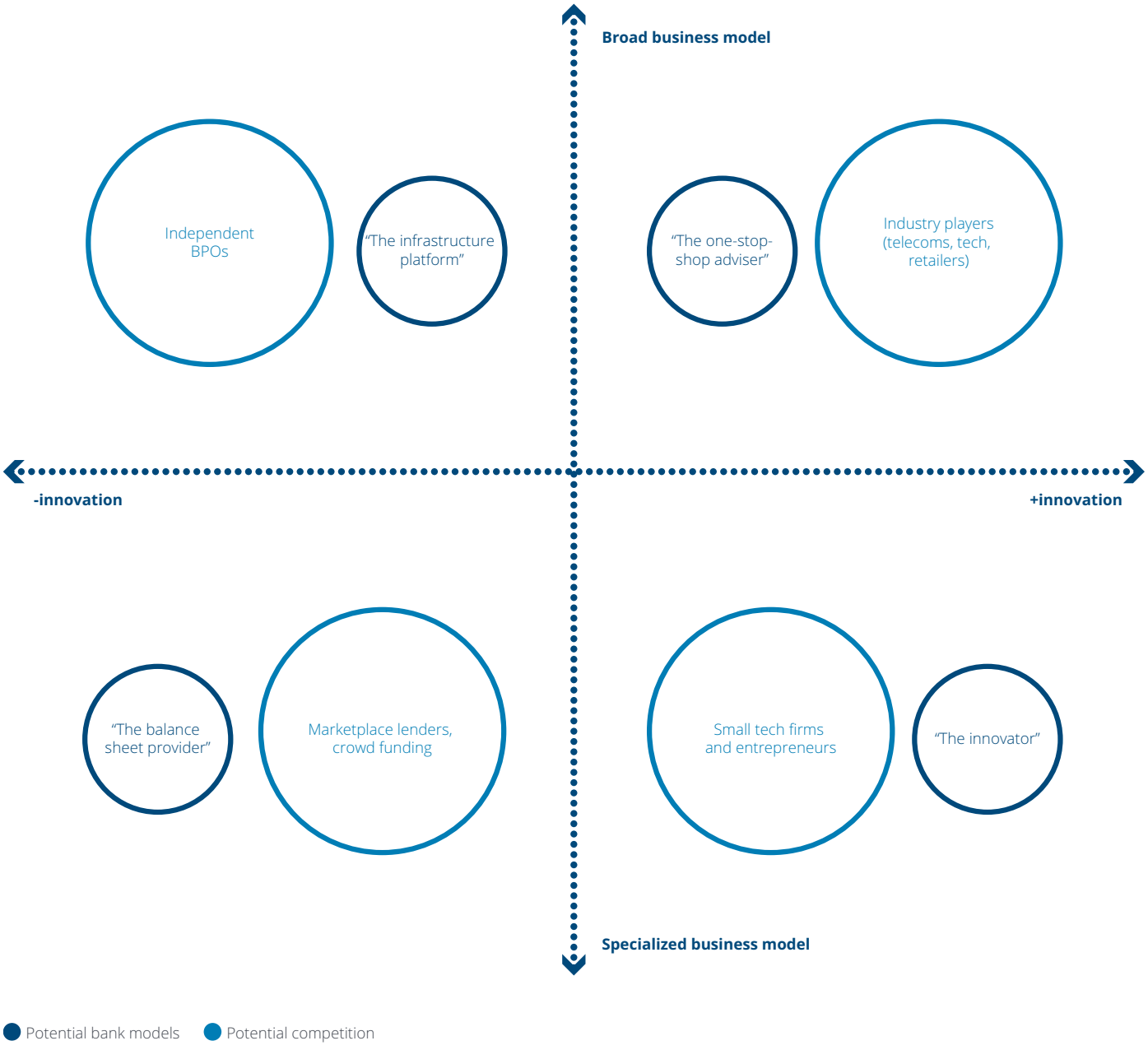
On the revenue side, banks could consider expanding their reach outside of Europe with its sluggish economy and move into other markets that are less affected by the current market environment. However, this needs to be balanced carefully with the need to adhere to a new set of regulatory and operating environments and the related risks.

On the cost side, moving some operations to lower cost locations remains an alternative.

What types of bank operating models could exist in the future?

Overall, some of the choices outlined above can be combined in several different operating models, joining the above elements. We discuss a few such models below:

- **"The one-stop-shop adviser"** model would target customers looking for convenience and a single provider that could service all of their needs
- **"The balance sheet provider"** model would target customers with large financing requirements
- **"The innovator"** model would target customers needing fresh, fast, and potentially lower-cost financial services
- **"The infrastructure platform"** model would act as a backbone service provider to other banks rather than serving the end client directly


Broad business model
Independent BPOs
"The infrastructure platform"
"The one-stop-shop adviser"
Industry players (telecoms, tech, retailers)
-innovation
+innovation
"The balance sheet provider"
Marketplace lenders, crowd funding
Small tech firms and entrepreneurs
"The innovator"
Specialized business model
Potential bank models
Potential competition

The one-stop-shop adviser

Certain players will aim to cover all of a client's core banking needs across their lifecycle to improve their share of wallet, as certain customers will seek convenience. This could be done either through an existing operating entity or potentially through the creation of a "challenger bank" that expands its service offering over time.

Customers and products	The customer will be served from their first student account to their retirement, with the products offered being constantly and proactively tailored to their stage in life (e.g., for retail customers, this would be credit cards upon first employment, mortgage upon marriage, and wealth management activities upon reaching a certain amount of accumulated net assets).		
Channels and geographies	The model to be followed will likely need to be omni-channel-based, with the customer being able to contact their adviser both remotely and physically, as specific life events (e.g., inheritance) have a particular emotional or confidentiality factor that requires face-to-face interaction. A physical presence will also improve the bond between the adviser and the customer. Several geographies can be targeted, but due to the need to expand the local advisory presence and parts of the physical network, the geographic expansion would tend to be more limited than in other models. In addition, a "travelling salesman" concept could be introduced instead of a traditional branch offering, with the branch staff being redeployed to other activities such as call centers and back office depending on the load distribution over the day.		
People, process, and technology	The bank will need to invest in data analytics in order to ensure that the customer's key life events can be predicted with a certain degree of accuracy. Staff will need to be trained to be able to serve a wide range of products and potentially be able to fulfill a wider role within the bank (especially in the branch networks).		
Who could this model be suitable for?	This model is suitable for large universal banks, given their large existing physical networks and capabilities in multi-product offerings. Smaller banks with a more limited product offering could consider collaborating with other players, i.e., a conglomerate of smaller banks working together in competition with the larger banks.		
What are the risks?	The model's success hinges on successful predictions relating to the customer life cycle. Additional regulation restricting product bundling and tying practices is another risk.		
Effectiveness of the model in addressing challenges	Market environment HIGH	Regulatory LOW-MEDIUM	Customers and Competition HIGH
	If executed well, the model should create additional value for customers and therefore improve volumes and margins	A multi-product offering is more challenging to manage from a regulatory perspective than a more streamlined business offering	Customer experience should improve, thus creating a competitive edge for the players that execute the model well

The balance sheet provider

Certain banks will try to leverage their deposit gathering abilities and the size of their balance sheet in order to focus on credit intermediation activities and growing net interest income.

Customers and products	The product set will be limited to loans and deposits and could be more tailored to institutional clients, such as corporates, that require larger absolute amounts of financing. Balance sheet providers could also service other financial industry players, such as FinTechs, by providing them with the necessary financing to operate, thus detaching themselves from the "end customer."		
Channels and geographies	The model will have a higher balance toward online activities, with only limited physical presence for customer management due to narrow margins. The model should be relatively easy to expand on a cross-border basis, and would be particularly successful in geographies with a greater need for credit financing.		
People, process, and technology	The bank will be narrowly specialized in a certain set of product types; therefore, the processes should be as lean and as simple as possible.		
Who could this model be suitable for?	This model is for large banks with firepower to lend who do not have the capacity or the interest to further invest in customer-facing activities, as well as existing lenders with sophisticated credit risk management tools. This model is less suitable for smaller banks given the lack of economies of scale and increasing competition in this space from non-traditional lenders.		
What are the risks?	The risks include the fluctuation of interest-rate levels (the model would be less profitable in the current environment) and margin squeeze by competitors such as asset management companies who may take customer liquidity away.		
Effectiveness of the model in addressing challenges	Market environment LOW-MEDIUM	Regulatory LOW-MEDIUM	Customers and Competition MEDIUM
	In the current interest-rate environment, the model would have relatively low profitability; however, there is a meaningful upside when higher interest-rate levels return	The model is relatively simple in terms of compliance; however regulatory capital developments will need to be monitored carefully	Having a large balance sheet for lending purposes is a competitive advantage; however, the model can nevertheless be easily replicated by competitors and therefore the model is likely to remain low margin/high volume

The innovator

Certain banking players will take the lead in new technologies.

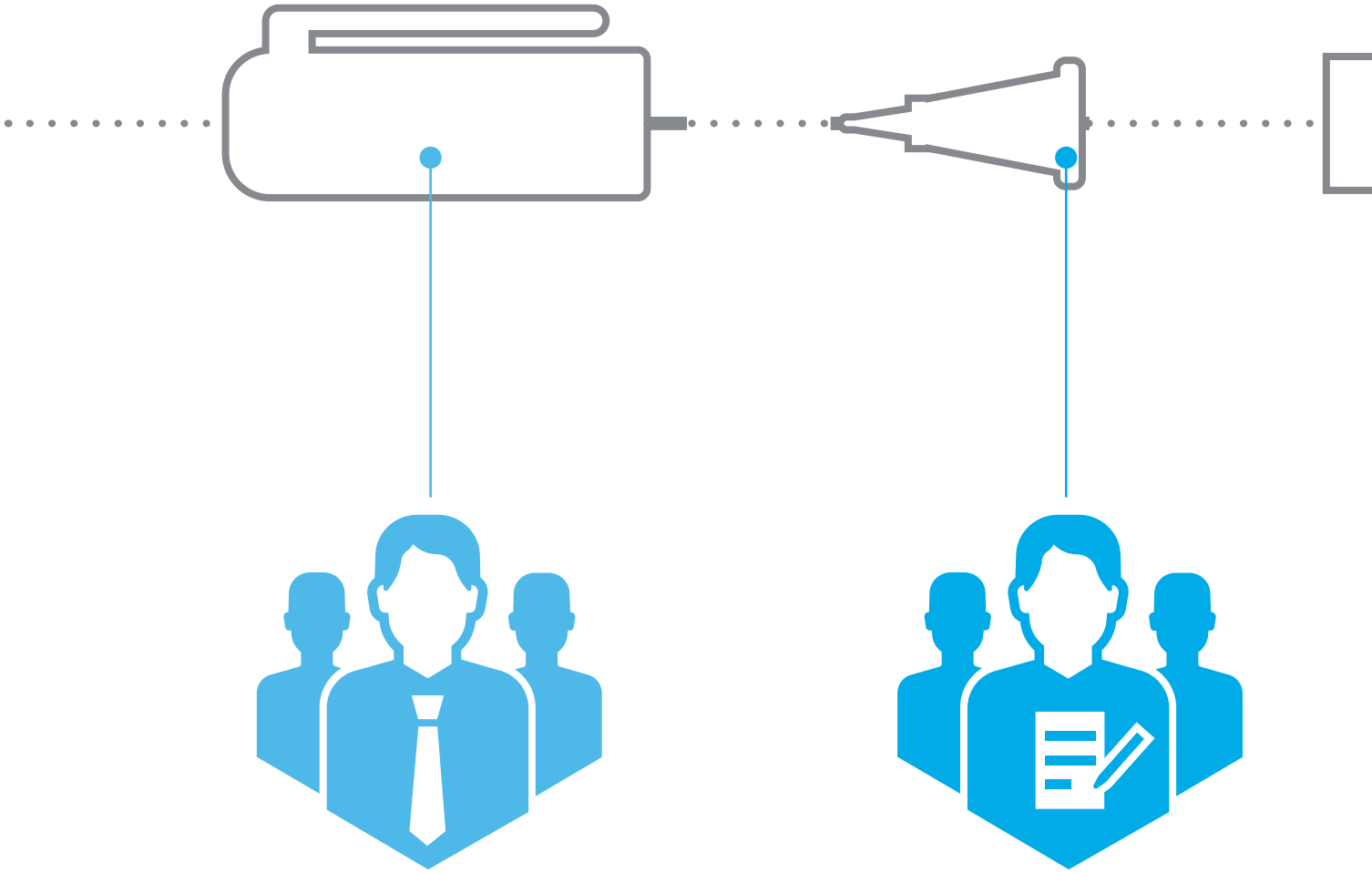
Customers and products	This model would focus on targeting customer niches that look for innovative services (such as the Millennials) and specific products, thus requiring a high degree of specialization. "Innovation across the board" is unlikely to be achieved for the moment given the regulatory cost overhang and the need to monitor costs and budgets carefully.		
Channels and geographies	The model will be predominantly digital in terms of channel offering, as customers will need to be able to switch into innovative services easily and at their convenience. The model is therefore likely to be easily extrapolated on a cross-border basis.		
People, process and technology	The model could be achieved either through banks' own investments (e.g., hiring of personnel for R&D purposes) or through partnering and incubating new innovative financial services players.		
Who could this model be suitable for?	The model could appeal to banks with a light existing physical infrastructure (no large legacy IT systems and no existing branch network), e.g., smaller entities such as challenger banks and asset management-focused banks. This is also more suitable for mass-market services.		
What are the risks?	The risks include not being able to find suitable personnel or partners for a successful innovative project and being subject to changing customer tastes. Lack of business diversification leads to a high risk/high potential return strategy. Technology failure is an additional consideration.		
Effectiveness of the model in addressing challenges	Market environment HIGH	Regulatory MEDIUM-HIGH	Customers and Competition MEDIUM-HIGH
	If executed well, the model would have great potential in overcoming the current market environment challenges	Regulators are increasingly looking into innovative services and the risks these bring; this creates the possibility that additional compliance measures will be imposed in the future	Assuming successful execution, the model can create a meaningful differentiating factor; however, the bank will need to stay on track with ongoing innovation

The infrastructure platform

In this model, banks with existing large investments in systems, IT platforms, physical branch networks, and back-office processes could consider becoming service providers to other banks in order to make additional returns on their fixed cost base.

Customers and products	The focus will be on servicing institutions rather than individuals, and breaking down various components of the bank's operations to be sold externally.		
Channels and geographies	As the offering is not a mass-market offering, selling channels will mostly be "travelling salesman" style. The geographies served will be highly dependent on where the bank is present today and if its systems are adapted to an international environment.		
People, process and technology	The operational processes will need to be carefully monitored and managed given the nature of the services to be provided.		
Who could this model be suitable for?	This model could work for large banks with existing infrastructure platforms that are readily adaptable to other business models, e.g., provision of support with back-office processes, sharing of branch networks, etc.		
What are the risks?	A large operational mishap or a reputational issue could create problems for the bank as a service provider and potentially even lead to its failure and exit from the market. There is a potential risk of margin squeeze by other banks or new entrants without legacy costs that are able to create a more flexible offering from scratch. New technologies could bring down the costs of setting up stand-alone platforms.		
Effectiveness of the model in addressing challenges	Market environment HIGH	Regulatory MEDIUM-HIGH	Customers and Competition MEDIUM-HIGH
	If executed well, the model would have great potential in overcoming the current market environment challenges	Being a service provider to institutional customers would involve a meaningful compliance effort; however, its effectiveness will also depend on the specific elements that are being outsourced	The institutional customer base could be more challenging to manage than individuals; the model can be relatively easily challenged by new entrants

A further important element to highlight is that the models are not necessarily self-contained. The bank can choose to combine several models as part of its operations, and either develop these by itself or by forming various collaborations or conglomerates as outlined below.

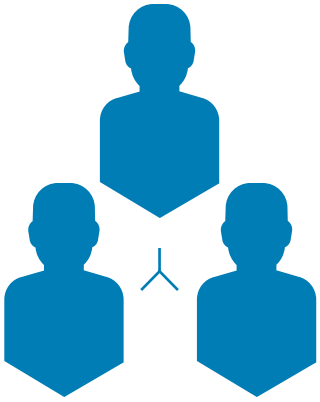


Specialists focus on end client

Specialist "innovators" creating new products and services for clients. They could be self-contained given the lean operating models or leverage "infrastructure platforms" if necessary Increasing needs for financing will encourage the spread of "balance sheet providers" in the banking sector, in particular in the small- and medium-sized corporate sector where the financing needs are the most meaningful

Specialists middle and back office

"Infrastructure platforms" acting as business process outsourcers to other entities and being enablers for startups



Conglomerates

"One-stop-shop advisers" working with other business models such as specialized "innovators" and "balance sheet providers" to take advantage of the products enabled by these groups
as well as "infrastructure platforms" to keep costs down

Conclusion

- The future will lead to a disaggregation of the banking value chain, with larger self-contained banks becoming less frequent, and a new range of leaner and more differentiated entities taking their place
- Customer experience will regain its importance, leading to different strategies to address client needs
- We expect a higher number of alliances forming between banks and other industry players in order to tackle common challenges
- Banks will need to consider their strategy and where they will fit within the banking chain of the future in order to be successful in the new operating environment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How to integrate Customer Experience into a real Business Case

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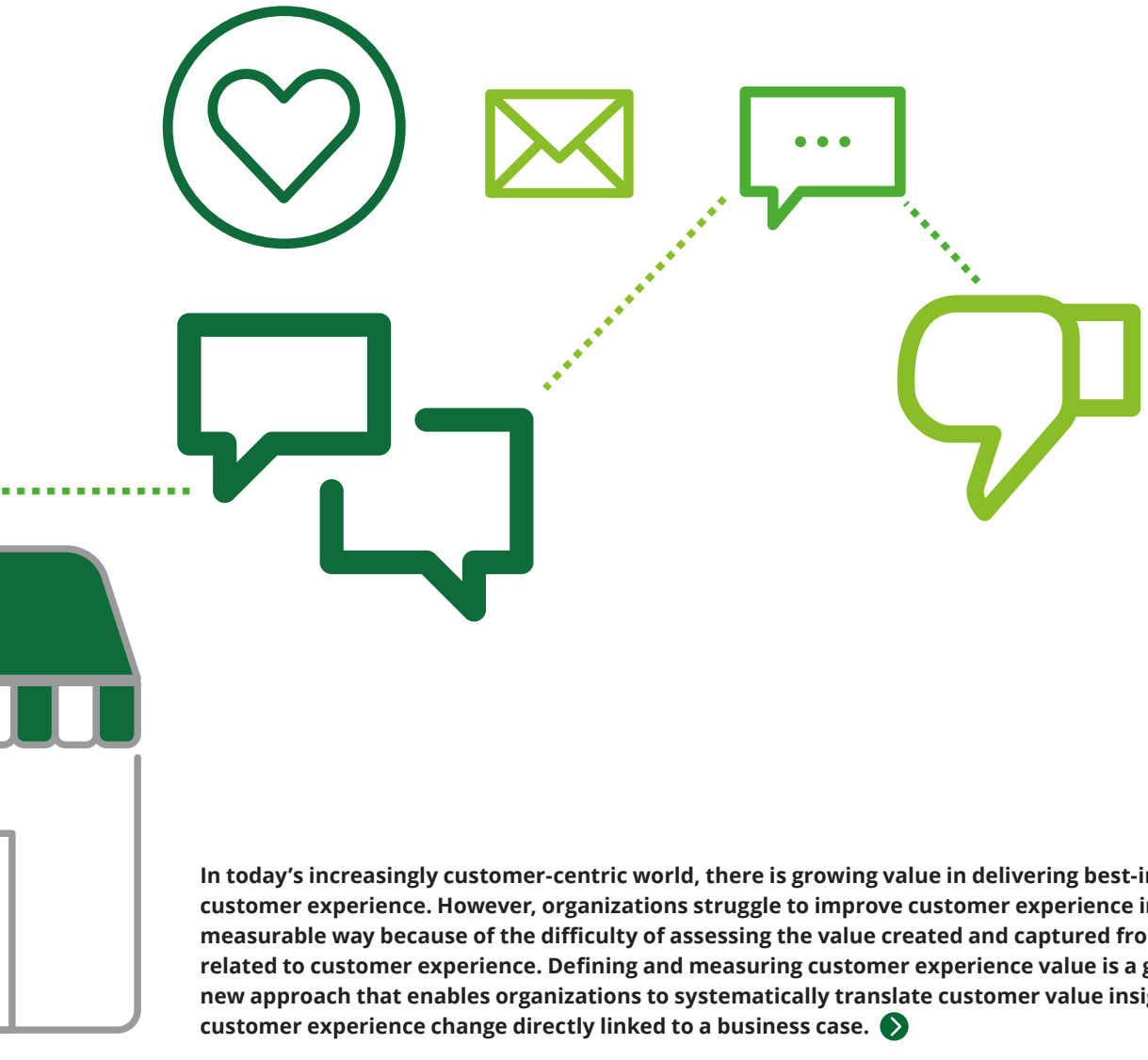


In today's increasingly customer-centric world, there is growing value in delivering best-in-class customer experience. However, organizations struggle to improve customer experience in a systematic, measurable way because of the difficulty of assessing the value created and captured from investments related to customer experience. Defining and measuring customer experience value is a game-changing new approach that enables organizations to systematically translate customer value insight into customer experience change directly linked to a business case.

Not long ago, if you had asked a group of executives what was their organizations' key differentiator, you would have received an array of responses: low prices, free returns, fast shipping, bundled services, ease of use...the list goes on. Today, if you ask that same question, you will likely receive a very different and nearly unanimous response: superior customer experience (CX). Gartner predicts that by 2018, more than 50 percent of organizations will have implemented significant business model changes in their efforts to improve customer experience. This is a significant shift in the market, where much of the power has changed hands from the organization to customers and their ever-increasing demands. Today's customers have come to expect a superior and holistic experience across all sectors, requiring organizations to continuously innovate, disrupt the market, and become more responsive. Executives are therefore challenging their organizations to transform customer interactions into dynamic, beautiful personalized experiences, but they are still struggling to improve CX in a systematic and measurable way that would compare investments and benefits.

New technologies deliver predictive insight to drive experience

Alongside the market shift in customer power and expectations, new technologies are rapidly emerging. Digital and analytical capabilities are disrupting how organizations interact with customers. As an example, analytical reporting tools are evolving from static, historical views of the customer to predictive decision engines. Still, organizations are struggling to integrate these huge data flows given the complexities of transforming people, processes, and technology. Organizations are left with a plethora of data and metrics, but with no way of making sense of it all to identify the impact of customer experience investments.

Making Sense of the Madness:
Measuring Both Value Created and Value Captured

Organizations have traditionally attempted to determine the impact of experiences by attaching a value to CX. They measure experience value—the value the organization creates for its customers—for instance by calculating Net Promoter Scores (NPS) and increased satisfaction scores, but they struggle to connect these metrics to bottom line impact.

Additionally, a myopic focus on experience value can lead an organization to invest in experiences that increase customer satisfaction, but not necessarily revenue. Separately, organizations focus on customer profitability as a proxy for business value—the value the customer creates for an organization. Most commonly, marketers still use Customer Lifetime Value (CLV), a concept dating from the late 1980s, to calculate this value. With the large amount of customer data available today, organizations using traditional CLV are missing opportunities to fully extract value from their customers (e.g., value linked to the promotion of their brand by customers, quality of interactions).

Along with CLV, organizations use return on investment (ROI) to assess the business value of CX activities. However, ROI is often used in an ad hoc manner, specifically measuring the lift in sales or reduction in costs from a recent initiative. ROI is rarely tracked for all CX initiatives across the customer journey, at the individual customer level, or iteratively over time. Many companies are now at a crossroads, facing two distinct options: remaining a follower by trying to stick to the most successful actions, or attempting to gain a critical competitive advantage by employing a CX strategy that connects their customer investments to bottom-line results. The time has come for organizations to build the next generation of customer experiences by connecting experience value and business value, and measuring both in a systematic, predictive, and continuous way.

Organizations are left with a plethora of data and metrics, but with no way of making sense of it all to identify the impact of customer experience investments.

Defining and measuring Customer Experience Value: a game changer

Going forward, organizations aiming to differentiate themselves through customer experience should employ a "customer value" lens. They need to know what value their customers generate at an individual level so as to invest in the most effective way and achieve optimal ROI.

Defining and measuring Customer Experience Value (CXV) is a game changer for organizations. It helps organizations to create highly-personalized "moments that matter" between an organization and its customers, to invest in proportion to customer value creation, and to continuously improve CX investments.

The key components of Customer Experience Value are "experience value" and "business value," each of which can be measured through certain "value measures".

Experience value is comprised of two value measures, each in the form of a question:

- "What is the quality and nature of their interactions?" which reflects their engagement and the effort they require to interact with your organization (one point worth noting is that not every interaction is a "good" interaction for your organization; for instance, repeated service calls increase the cost of serving your customers. We will be focusing on interactions that increase, rather than decrease, value)
- "How satisfied are they?" which reflects your customers' overall satisfaction and likelihood to remain loyal

Business value includes three value measures:

- Promotion (e.g., through social media)
- Spend
- Cost to serve

Organizations often focus on either experience value or business value, but CXV is unique in its ability to connect both, enabling them to create meaningful experiences that their customers are willing to pay for.

Customer Value

How can one define and measure customer experience value?

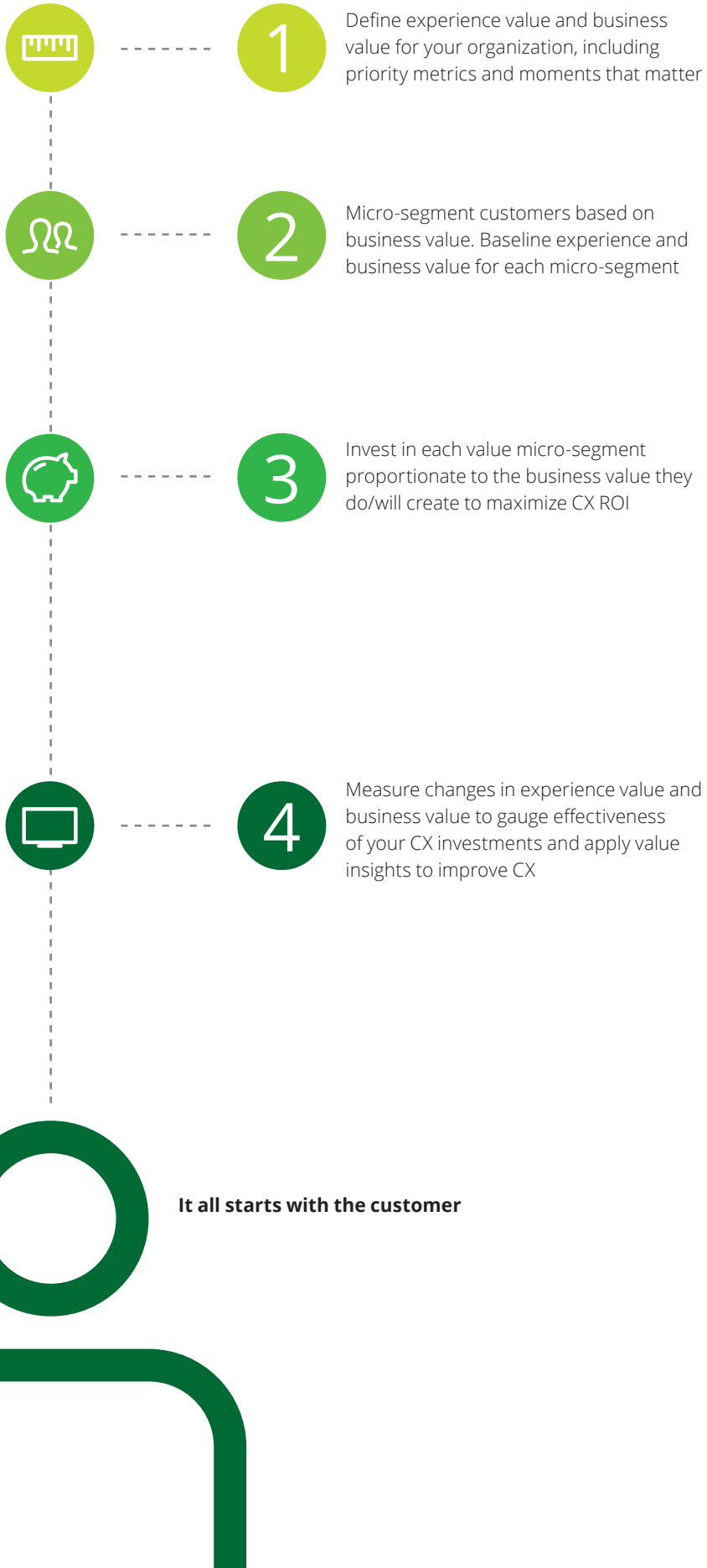
The approach is based on four steps:

01. Define value: Define experience value and business value for the organization, and identify the moments that matter most to the customer and the organization, and priority metrics for each.

02. Know who drives value: Micro-segment customers based on business value (e.g., spend, cost-to-serve, promotion) in addition to a traditional segmentation based on customer demographics and psychographics. Baseline the experience value (e.g., satisfaction, quality/nature of interactions) currently being created for each micro-segment.

03. Create value through experience: For each micro-segment, invest proportionately to customers' value creation, and only in experiences that customers will pay for, to improve the profitability of CX initiatives. Using a holistic view of customer value, create highly personalized, dynamic moments that matter to your customers and to you (e.g., dynamic content and treatment rules).

04. Track and enhance value creation: Leverage predictive customer value analytics linked to CX investments, measure changes in experience value and business value. Gauge effectiveness and continuously improve CX investments through real-time value insights drawn from an ecosystem of vendor partners.



Each organization needs to customize this approach based on its industry and business context. One example is provided in the case study below:

Case study: A Canadian bank wanted to improve its analytics capabilities to better understand and predict customer behavior across touchpoints. They built predictive models to identify potential first-time home buyers, the likelihood of choosing the bank, and risks of attrition. A network-based approach was used to identify customer lifestyles by analyzing the connections created by customers' day-to-day transactions.
Building these models resulted in:

- Driving greater speed and accuracy of attrition models to allow for earlier and more effective intervention
- Developing Big Data capability to enable rapid identification and analysis of customer behaviors and lifestyle attributes
- Two percent increase in annual economic profit on mortgages through an increase in product penetration and balances per customer

Transforming into a CXV-oriented organization

Keeping abreast of customer expectations and technological progress is not an easy task. An organization must embrace a digital culture and break down its organizational silos, which may include changing incentive structures. It must integrate data across its ecosystem, including front-office data (e.g., sales), back-office data (e.g., billing), and third party data (e.g., individual search). It must have the ability to not only segment its customers demographically or based on psychological profile, but also at a micro-segment level based on the value they provide. It must have the ability to determine the moments that matter for each unique customer. Data integration, in particular, is a complex challenge. In order to ensure a true 360-degree individual customer view, organizations need to capture and integrate cross-channel data such as customer profiles, social media interactions, sales interactions, service interactions, marketing interactions, and costs to acquire and serve. An organization must determine where technology gaps exist (e.g., a survey tool may be needed to capture and act on real-time customer feedback) and then strategically design its systems to provide a comprehensive customer-centric view.
Despite these challenges, transforming into a CXV-oriented organization presents a significant opportunity. Once an organization is able to develop the technical architecture and capabilities needed to capture, measure, and translate data into value insights at an individual level, it can make informed strategic decisions to offer a different customer experience and maximize ROI.

Case Study: A leading communications networking company in the United States was struggling to deliver cost-efficient, customized CX to its B2B customers, with manual touchpoints in 100 percent of their order processing instead of auto-processing. This resulted in order processing prices of more than three times the industry average. Applying the principles of CXV, the company developed an integrated solution aligning front-end and back-end systems. By capturing the right customer data, they were able to segment their customers based on value. The company then determined when, how, and to whom to offer high-touch, high-cost experiences versus streamlining experiences through automation. As a result, monthly orders increased by 50 percent and variance in order processing costs decreased by 40 percent over four years.

The Customer Experience bar has been raised for organizations. Customer expectations are constantly rising and digital capabilities are rapidly evolving. To win in the marketplace and gain a critical competitive advantage, organizations must apply a customer experience strategy that connects their customer investments to benefits within the scope of a concrete business case.

In order to ensure a true 360-degree individual customer view, organizations need to capture and integrate cross-channel data

Sources: Gartner

"The branch is dead"?[1] Where will customers bank tomorrow?

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1 The American Banker, July 2013

In a survey on consumer finance carried out by the Federal Reserve Bank in 1995, entitled “Who uses electronic banking?” the authors asked: “Will internet banking ‘commoditize’ financial services to the point that any existing locational rents are made irrelevant?”

This statement was made more than 20 years ago and still seems visionary today, as banks are still confronted with the question: Where will customers bank tomorrow and how can I use this to drive my profits?

The world and customers are changing—and so should banks

Transforming bank distribution will directly drive profits

The traditional bank model and its profits are under pressure in an environment where the bank is no longer the only actor providing banking services. Traditional banks are facing new, untraditional competitors who really know what they are doing. They are slowly stepping into the banks' territory and grabbing chunks of market share by capitalizing on their understanding of consumer expectations to respond quickly and accurately to customers' needs and banking behaviors. As commercial companies, such as telephone operators, internet giants such as the GAFA,[2] and lean new startups enter banking services, banks are confronted with a new type of competition and disappearing revenue streams. Just looking at some numbers, a survey by Fortune magazine shows roughly one in three banking and insurance customers globally would consider switching their accounts to Google, Amazon, or Facebook.

At the same time, banks need to confront a myriad of regulations that reinforce this trend. On one side, a number of regulations limit previous revenue streams, including MiFID II, which places a ban on inducements;[3] interchange fee regulations, that decrease revenues from card-based payment transactions; or the Revised Payments Services Directive (PSD2), which opens the market for non-banking actors and also increase costs for customers by generating significant efforts to ensure compliance.

In this difficult situation, it is necessary to bypass the barriers of existing mind frames and think about new possibilities to generate revenues and reduce costs. Taking an example from the new competitors that banks are facing, it is necessary to put customers and their behaviours at the heart of the strategy and take advantage of changing customer behaviors to generate new revenues and decrease the cost base. In 2015, Luxembourg's banks had more than 220 branches, resulting in annual costs of approximately €500 million a year for branches across the country. At the same time, research shows that these traditional bank branches may not be what the customer is actually looking for.[4] We believe that by looking forward and putting the customer at the center of their strategy, banks will have fewer but different bank branches, reducing costs as well as generating new revenues. So let's have a look at the key trends driving customer behavior.

Customers want to bank anywhere and anytime and they don't mind self-service (sometimes)

The rise of the web, smartphones, and connected devices is changing the way in which consumers interact with providers of all types of services, including financial services. Equipped with these devices, consumers no longer interact only at specific times or locations, but interact with companies seamlessly across an array of digital and internet-connected devices anywhere, anytime.

95 percent of people in Luxembourg have a mobile phone, and they use it all the time. In a survey carried out by Deloitte, a quarter of respondents said they check their smartphone within five minutes of waking up and three quarters use it while watching TV. Increasingly comfortable in these routines, customers want to be able to carry out their business, including banking, from their home, and they want direct and quick responses.

At the same time, customers are increasingly confronted with self-service in distribution and the new, rising generations of customers enjoy and adopt self-directed services. The Deloitte Global Mobile Consumer Survey shows that while only 13 percent of users over age 65 carry out their banking operations through the mobile channel, almost half of Luxembourg users aged 18 to 44 perform banking operations through the mobile channel rather than in branches, for example. Contrary to what one might think, self-directed channels such as mobile phones and ATMs are not merely limited to transactional activities.

In fact, studies show that self-directed channels may facilitate entry into relation and encourage cross- and upselling. If we look at another industry for example, McDonalds found that customers using self-directed channels such as kiosks had a check that was one dollar higher than those customers who ordered in person. Furthermore, they found that 20 percent of customers who initially did not order a drink decided to order one when they had it proactively proposed to them; something kiosks did more regularly than humans.[5]

This has major implications for the role of the branch. Today's branches are rigid teller-centric units, taking up large amounts of space and allowing only for assisted banking at restricted hours and at specific locations, forcing the customer to go against his desire for simple, quick banking, from anywhere at any time. The bank's aim, however, should be to encourage the use of lower-cost, automated, self-directed channels for those customers who want them, responding to a need for flexible banking services that are more engaging for the customer. Considering the advanced technologies that exist, for instance versatile ATMs[6] enabling users to purchase airline tickets or pay parking fines, automation can even drive real added value for the customer.

Equipped with mobile devices, consumers no longer interact only at specific times or locations, but interact with companies seamlessly across an array of digital and internet-connected devices anywhere, anytime.

2 Google, Apple, Facebook & Amazon
3 Under certain circumstances
4 Forbes magazine: Do Bank Branches Still Matter? Retail Banking and the Customer Experience
5 Harvard Business Review: How Self-Service Kiosks are changing customer behaviour
6 ATMs which provide extended services as banking deposits and transfers, recharge of pre-paid mobile phones, booking of train and airline tickets and payment of parking fines.

New formats and technologies provide customers with these opportunities. Emirates NBD, for example, has introduced a new design for its branches with three key zones that combine traditional human interaction with self-directed banking: the digital banking zone, the future banking zone, and the advisory and relationship zone. The digital banking zone provides customers with technologies such as interactive teller machines and video conferencing stations to carry out their banking operations. This frees up staff to carry out value-added activities in the advisory and relationship zone.[7] This shows how banks, by moving customers to self-directed channels and focusing human interaction on value-added services, may be able to significantly reduce staff costs in bank branches.

Physical branches remain relevant, but they need to change

Technological developments mean that customers are able to carry out a large amount of their operations without a branch and human interaction. The period between 2011 and 2015 saw the number of branches decrease by approximately 35,000 in Europe,[8] and this trend is set to continue. Nevertheless, the branch is not about to disappear. Nearly two-thirds of consumers still want human interaction in financial services, mainly when it comes to complex financial products like mortgages and investment, where human interaction plays an important advisory role. And while some challenger banks, such as N26 in Germany, might manage to move toward branchless banking, traditional banks are struggling to do this without facing the risk of customer attrition.

As the Harvard Business Review highlights, customers want "products and services that combine digital advances with the time-tested advantages of physical interaction." Banks must provide a fusion between digital and physical banking to make banking convenient for the customer and cost efficient for the bank. In this context, for traditional banks, which have accustomed their customers to a dense branch network, the path toward more efficient banking service distribution will consist rather in the creation of a meaningful, interwoven network that includes specific branches for specific needs.

Hub and spoke models, differentiating between different types of branch formats (e.g., a transactional branch and an advisory branch) enable banks to build this bridge. Internationally, large commercial banks such as Citigroup and Commerzbank have implemented this model, putting smaller transactional branches in place, which are automated to a large extent; small advisory centers, which may not be staffed full-time; and combining them with larger flagship branches that offer all services. As a result, branches are becoming less cost intensive.

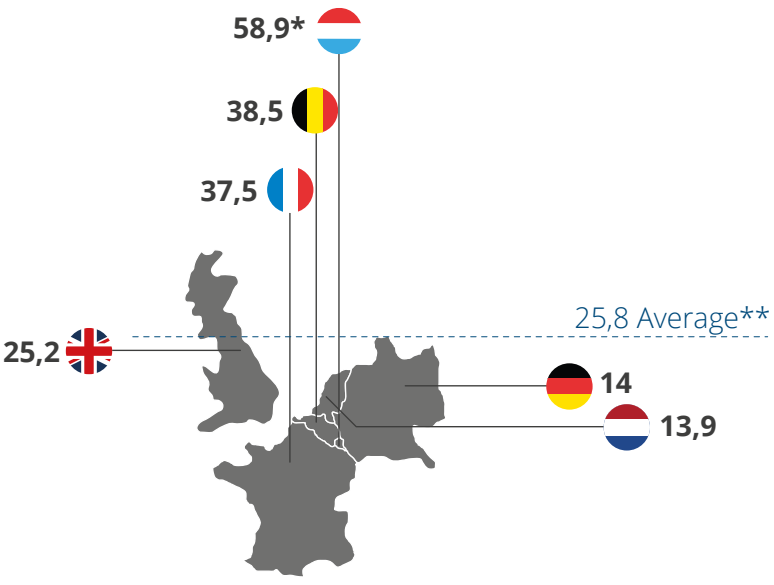
Both staff costs and real-estate costs can be reduced with this strategy, which reduces human involvement in transactional activities and reduces branch square meters. A recent study for example has shown that in the US, the average branch size has decreased from approximately 460 square meters to 130 square meters. As cash transactions are increasingly moved toward self-directed channels, requirements in terms of staff will also change in branches. To take the example of Commerzbank, through automating manual work processes and including lean "City-Filialen," Commerzbank has significantly cut its branch network. That will save almost €1.1 billion by 2020.

Banks in Luxembourg could improve their bottom line by up to €225 million by systematically reducing their branch network

Banks in Luxembourg can build on this example to improve results considering how large the local branch networks are in comparison to neighboring countries. Looking at data from the World Bank, Luxembourg has the highest number of banking branches per 100,000 adults compared with countries such as Belgium, France, UK, Germany, and the Netherlands. At the same time however, Luxembourg has high levels of web and mobile banking penetration in comparison with other European Union countries, which sets an interesting paradox and highlights the fact that Luxembourg banks may be missing significant opportunities.

If we take into account the 170,000 daily commuters, there are 58.9 branches per 100,000 adults in luxembourg. Excluding these commuters, the number is even more significant—100,000 inhabitants have 76.9 branches. By comparison, the second most densely branched country, Belgium, provided 38.5 branches per 100,000 adults to its customers in 2015. Let's imagine that Luxembourg banks take advantage of the high mobile and online penetration rate and adapt their number of branches, so that Luxembourg would be aligned with European standards—as a result, Luxembourg banks could significantly cut costs by reviewing their branch networks and save over €200 million annually.

Number of bank branches per 100,000 adults in Luxembourg compared to other comparable European countries in 2015



** Including commuting workers*
*** Average between Belgium, France, United Kingdom, Germany and Netherlands*

What is next?

Banks will need to engage in a thorough review of their individual branches, as well as their branch network as a whole to uncover the full potential of branch transformation. Data-driven analyses will provide the bricks of the foundations that will drive the transformation journey.

Banks will need to dig deep into existing data and develop further data capabilities to be able to clearly measure and analyze key indicators on individual branches and the aggregated network. The process should include an in-depth analysis of the current effectiveness of individual branches in terms of revenues and costs, and also an analysis of micro-markets surrounding individual branches, not only from a current perspective but also taking into account future evolutions. On this basis, network reconfiguration and restructuring opportunities can be identified and defined, allowing the inclusion of new, innovative, and customer-friendly formats.

It's a laborious process—but the early bird will catch the worm, and the worm is fat!

7 The Financial Brand: Spring 2017 Retail Banking Branch Design Showcase
8 The European Central Bank

Efficiency growth for SMEs

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SMEs are a key part of our economy. Facing the same efficiency requirements as larger structures, SMEs are increasingly obliged to put projects in place that are aimed at their improvement. Considering that they do not always have the same internal structure to carry out those projects, how can we best integrate their specific features into a suitable service offering?

Working to ensure operations run as efficiently as possible is a key issue that must be considered by every management committee. Indeed, company activities are in a constant state of flux: the needs of customers are evolving, products and services are being adapted, the competitive landscape is shifting, and internal teams are changing. These changes produce a great many challenges that must be overcome. One of the consequences of these changes is the need to very frequently rethink how a business, its processes, and activities should be conducted. For companies, this "never-ending story" contributes to keeping a firm grip on costs but also on the level of service offered to clients. The challenge is for companies to remain both competitive and attractive in markets where competition may be intense and where there are many complex factors for competitiveness.

All those mechanisms are well known within large companies that have been compelled by their own growth to quickly implement strategies and establish teams to work specifically on efficiency. As mentioned above, SMEs are often confronted by the same constraints in their environment, but they do not always have the right means to face them. This is true whether in terms of time, specific skills, or financial means. One of the solutions available to them is to join forces with external stakeholders who will be able to support them in this process of constant improvement. An approach must be offered that is suited to the specific nature of SMEs. Where larger companies will mostly seek structuring and highly specialized expertise in a particular field, SMEs will more often look for a broader and more general approach that will respond to its structural issues in a pragmatic and tailored way. In general, SME managers have a detailed view of everything taking place within the company, from the first meeting with the prospect to the payment of the last invoice. They are able to pinpoint the problematic part of the value chain where they feel things are not happening as they should. However, it is not always possible to make the right diagnosis, to identify the root cause of problems, and thus devise appropriate solutions. This is why they will be keen to work with allies who are able to quickly understand the multiple aspects and specific characteristics of their business and their own processes, and to make an accurate and relevant analysis of the whole value chain.

SME managers will therefore ask to meet with multidisciplinary consultants who are able to offer relevant expertise in all topics, while being pragmatic, simple, and direct in analyzing problem causes and in proposing improvements.

A first phase of preliminary analysis will enable an inventory of the company's existing operations to be established. This step is essential. It will not involve general observations, standard processes, or unrealistic action plans, but rather a diagnosis of the value chain in order to understand the operations and areas for improvement. Once again, the company will expect concrete proposals, with direct gains and some certainty of success in the implementation of the actions proposed. Given the structure involved, the effort and means that can be devoted to these projects are limited, so there is no room for error. SME executives seek collaborators who will not just give advice on what should be done. Rather, they prefer to work with someone who will have conviction in their recommendations, who will work with them in implementing those recommendations, and who will share the risk associated with the decision to begin implementation. In fact, SME executives look for collaborators who share the same entrepreneurial spirit as their own.

One of the simplest ways to ensure a partner's commitment is to share the financial risk associated with the project. It is therefore logical for SME managers to request that the fees they are required to pay are contingent on the attainment of the results with which the consultant is involved.

It also makes sense to wait until the project's return on investment has been clearly identified. Although the return on investment is calculated systematically for a machine purchase, it is rare for the same calculation to be performed in the case of investment in a "human" project to improve operational efficiency.

Both cases generally have the same objective, but this approach is clearly more fitting for material investment than for human investment. However, it is very common to have returns on investment for machines that span over many years and are never verified in practice after performing the initial calculation to release the financing. Indeed, the expected yields are not always achieved, the machines' capacities are not as expected, or they are not sufficiently reliable. In this case, often nobody has shared the risk and there is an inclination toward forgetting the real cost of the investment and its low return.
On the other hand, in the case of efficiency improvement projects, it is common to achieve a return on investment after much less than one year, which makes the net costs of supporting these projects equal to or less than zero.

SME executives seek collaborators who will not just give advice on what should be done. Rather, they prefer to work with someone who will have conviction in their recommendations, who will work with them in implementing those recommendations.

It is also possible to mitigate the risk to the return on investment; by simply requesting that the partner make their fees contingent on achieving the common objectives, the company can be assured of the consultant's commitment.

Once collaborations have been secured and projects launched, the challenge for SME managers is to create an environment that enables success. This requires a climate of close sponsorship, transparent communication with teams, clear objectives, a participatory approach, fast and fact-based decision-making by strong leadership, and appreciation of teams' work.

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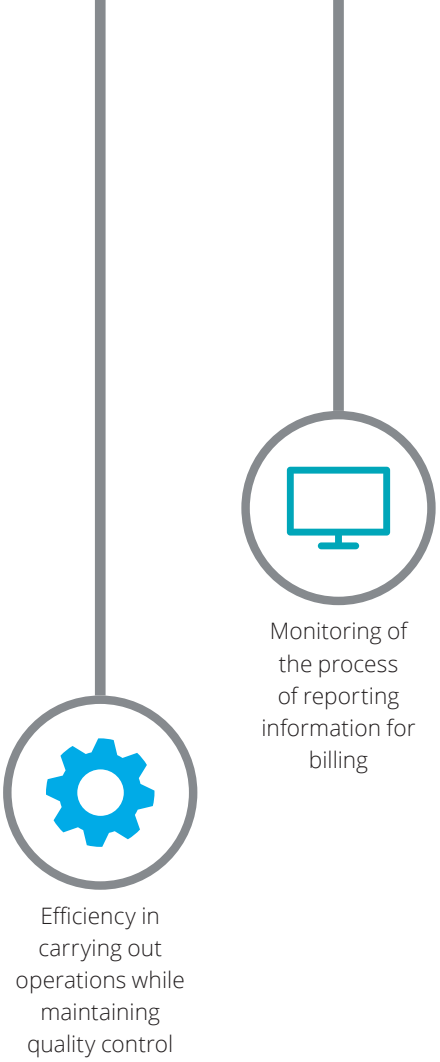
When a fertile breeding ground is in place, it is then a question of pushing for results. The vast array and specific nature of the jobs found in SMEs mean that each project must be tailored to perfectly fit the individual demands of each situation.
In general, the projects launched will revolve around:

Facilitation of the sales force

Cost control

Anticipation of team workload and availability

Business planning



The better the project is understood and integrated, the more chance it will have for success.

An additional area for reflection is increasingly being added to all of these elements: that of digitizing processes. Nowadays, it is unthinkable to consider reviewing activities and processes without considering their dematerialization and automation using tools that are increasingly efficient, flexible, and financially accessible. This specialized digital competence is also an essential part of a dedicated SME toolbox.

The objectives pursued around these areas of work often seek to improve pure productivity, as well as the level of customer service, the quality of the production process, or margin control. Any other operational objective can of course be included in this type of approach as long as it is in line with the company's strategy. It is essential to give meaning to this type of project, for all levels of the company's hierarchy. The better the project is understood and integrated, the more chance it will have for success.

Despite the diversity of the projects and themes addressed, some fundamental common points must be present in the adopted methodology.

First of all, the methodology must provide evidence of the elements considered, through indicators and adapted reporting. This approach relies on facts and can be summed up by the maxim "there is no progress without measure." This helps to avoid disagreement and to move away from an approach based on feelings toward an objective approach. Appropriate indicators are used to monitor activity, measure improvements, and take corrective action as the project progresses.

It is not uncommon for a plan to be understood and well documented in procedures and notes, but still to not actually be put in place.

A second requirement for achieving concrete results is the need to drive both of these indicators and the adoption of new working habits. It is not simply a case of defining an ideal target situation, a new process, or a desired goal in order for this to take place in practice. It is not uncommon for a plan to be understood and well documented in procedures and notes, but still to not actually be put in place. In order to take the leap from intentions to action and then ultimately to results, consultants must devote much of their effort to supporting teams on the ground through facilitation. Project facilitation has many objectives, which include:

- Gaining team membership and collaboration
- Progressively applying the new modus operandi
- Introducing and efficiently using KPIs to steer the activity
- Constantly responding problems encountered and questions raised through the change process
- Training and supporting teams in this change over a long enough period to ensure new working habits are firmly anchored
- Ensuring regular monitoring until the new system is stabilized and fully autonomous

Projects of this type extend over a long period of time, ranging from six to eighteen months as a result of the abovementioned factors and in order to guarantee the sustainability of the actions implemented. This timeframe will obviously depend on the organization's capacity to integrate the changes and manage the transition smoothly. Finally, in order to ensure this sustainability and the anchoring of new habits, consultants will adopt a "coach and learn" approach during the facilitation phase. In the first phase, they will take the lead on actions, and in particular hold daily/weekly operational meetings during which indicators are analyzed and frequent corrective action is taken. After time, they will gradually transfer the responsibility for this new system to internal teams, having taken care to make them autonomous and comfortable with working on these new tasks.

In order to ensure this sustainability and the anchoring of new habits, consultants will adopt a "coach and learn" approach during the facilitation phase.

While it is clear that the needs of SMEs for operational excellence are specific to their size and markets, it now seems unthinkable to avoid regularly reviewing performance, as we can see that there are significant areas for improvement. In this approach, companies will have to find true collaborators who are able to deliver tailored solutions, adapted and proven methodologies, and a gamut of specific and specialized skills, while fully committing themselves to the project and sharing the inherent risks and difficulties with the companies.

How will Brexit affect financial centers of excellence?

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On 29 March 2017, UK Prime Minister Theresa May officially triggered the process that will lead to the United Kingdom's exit from the European Union. This marks the beginning of what is likely to be an in-depth two-year negotiation period that will re-draw the relationship between the UK and the EU. These negotiations will be complex and touch many areas.

Speculations over the last nine months have led to talks of a hard Brexit. It has now become clear that the EU and the UK have converging interests in reaching an agreement that would minimize disruption to businesses, investors, and citizens; in May's own words, in her letter triggering Article 50 of the EU's Lisbon Treaty, ".... as the UK is an existing EU Member State, both sides have regulatory frameworks and standards that already match," and this should greatly facilitate the process.

Given the number of technical aspects that need to be covered, however, the criticality of certain topics and the necessary links to be drawn between them for the sake of fruitful negotiations, it may well take more than two years for the players to be able to draw comfort from a clear, stabilized situation and make definitive plans for the future. Since very few players can afford uncertainty, many have already initiated steps to plan remediation actions in order to secure business continuity in a worst case scenario until they eventually discover how much relief they can draw from successful negotiations. Since Thursday 23 June 2016, there is still a great deal of uncertainty as to the terms and conditions of the negotiations, with a marked contrast between the views of the UK and the EU. In response to Theresa May's urging to "build an ambitious free trade agreement" between the UK and the EU, saying it is "necessary to agree on the terms of our future partnership alongside those of our withdrawal from the EU," Angela Merkel countered that "the negotiations must first clarify how we will disentangle our interlinked relationships."

Yet now is the time to realize that there is much more at stake than just trying to mitigate the impacts of the UK and the EU no longer having free access to each other's markets. Brexit also creates opportunities for accelerating the creation of pan-EU product and service distribution centers of excellence. This article analyzes the impact and options at stake for UK players, and how this will drive new development opportunities for traditional cross-border centers in the EU.

After the referendum, UK fund firms had to face redemptions resulting from retail investors' uncertainty, although this situation appears to have stabilized for the time being.

UK firms with EU-centered interests can no longer afford to live with this constant uncertainty, and have already initiated remediation plans to ensure continuity of their pan-EU distribution models.

From the moment the referendum result became clear, UK fund firms with strong interests in continental Europe had to contend with redemptions, driven by retail investors' irrational fears, although this situation appears to have stabilized for the time being. Alternative fund managers also encountered certain challenges in raising cross-border capital for their new projects in the UK; the prospect of potentially being locked into an investment vehicle for several years, with no certainty on the ultimate tax treatment applicable upon exiting, appeared to become a challenge for qualified investors. This scenario pushed various UK-based fund initiators to start replicating their existing UK-based products in the EU. Similarly, third country managers, who traditionally used the UK as their entry point into the EU, have been considering alternatives for their new projects.

For fund managers and MiFID firms with generally strong local anchors and interests in the UK, the key challenge is trying to sustain the balance of securing both continuity and future business development on both sides of the Atlantic. Typical future target operating models for UK management companies and MiFID entities will be to establish themselves in another EU jurisdiction of choice and to delegate portfolio management and other value-added functions back to the UK, to the largest extent possible. This setup is based on the strong assumption that the UK will benefit from minimal recognition of equivalence. This being said, it is worth noting that only AIFMD and MiFID mention the possibility of third country regimes, so businesses should not solely rely on equivalence as a strong future business model.

Many actors can already rely on the footprints they have established on the continent to support other businesses; others see benefits, at least in the short

term, in partnering with a local player or even "renting" a third party management company to help cement their EU link and access to a single direct market. While proximity to star investor pools or to real assets might be considered as key criteria in relation to the choice of the target location, all players will need to consider multiple dimensions including taxation, infrastructure, and costs when conducting their detailed comparison exercise between possible candidate host jurisdictions.

Arbitrage between jurisdictions—an opportunity to redistribute cards inside the EU?

The perspective of drawing some benefits from the UK's exit has stimulated certain EU country challengers and led other, mainly cross-border, jurisdictions to intensify their campaigns on their undisputed merits. While Ireland and Luxembourg, having both built their growth on catering to non-local actors and cross-border distribution, are taking a more subtle approach to future opportunities, France is active in promoting ad-hoc toolboxes designed to incentivize relocation to its territory. Although EU regulatory environments are generally harmonized, there are still rather unequal practices between member states. Ease of doing business, excellence in supporting cross-border dimensions, and linguistic compatibilities will undoubtedly be one of the critical differentiators between best candidates in this race.

Beyond the free competition element, however, the EU should not forget looming threats of growing fragmentation. The EU's ability to grasp this opportunity to accelerate the series of reforms initiated through the Capital Markets Union Action Plan might well be critical for its potential to capitalize on its strengths in the future. Actors seeking to relocate pan-EU distribution activities to a single EU member state still seem to face inconsistent approaches from one member state to another. Asset management firms performing both fund and MiFID activities often operate client-facing activities through branches established in the EU and are contemplating transferring their branches to other EU- or EEA-based entities. Large asset management firms may seek to benefit by grouping these activities under the umbrella of their management companies. Yet at this point in time, it still seems difficult to streamline this type of setup across member states.

UK center of excellence as the new gateway to Eastern Europe and the rest of the world?

Over the last nine months, it has become clear that Brexit will also provide the UK with an opportunity to position itself as a center of excellence to support development in other world regions. If the UK is successful in negotiating balanced agreements with the EU, this venture may well turn into a win-win situation for Britain as a leading financial center.

A recent idea consists in implementing a dual fund regime, with standard EU products on one hand and lighter regimes for products aimed at clients outside the EU on the other. According to Jamie Carter, deputy chairman of the New City Initiative, "A dual fund regime would allow UK managers with EU interests to continue complying with EU laws and directives and retain favorable access to their EU investors, while simultaneously letting others market 'ex-EU' to the rest of the world and avoid the worst excesses of EU regulation. This type of regime could also enable fund managers to avoid relocating their businesses to onshore EU locations such as Ireland and Luxembourg, provided equivalence for the UK is granted."
It will take months before the consequences of Brexit for the financial industry are fully realized, and to what extent this event will trigger a restructuring, or even creation, of financial centers of excellence on a global level. If a member state no longer wishes to recognize the jurisdiction of the European Court of Justice, how can it expect to still have access to the single market? Considering President Trump's stated intention to deregulate, the EU will need to quickly figure out how much longer it can afford to continue leveraging its label of excellence when external competition on the cost of compliance is becoming a general threat.

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Part 02

… and different issues related to challenges and opportunities of an internet age remain relevant

The General Data Protection Regulation
Cross-industry innovation

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The European Commission has launched an ambitious program to establish a genuine European Digital Single Market (DSM) and to revitalize innovation. One of the key steps toward the creation of an effective DSM was the Commission's consideration to review the existing legislation on data protection. The new General Data Protection Regulation (GDPR) aims not only to modernize the current data protection directive, but also to facilitate business development by simplifying and unifying the rules and thus preparing the groundwork for innovation, while strengthening the fundamental rights of citizens in the digital age. Recent studies show that over 90 percent of all companies are starting to prepare for the upcoming regulation.

The adoption of the GDPR has received mixed reactions. The fear of additional expenses associated with data protection and the perceived costs for compliance already experienced in most industries are the main concerns. Critics also denounce an obsession of the European Union with the protection of privacy and data protection, which could drive the digital economy "two giant steps backward," as claimed by the Information Technology and Innovation Foundation (ITIF). However, the Commission's goal is not only to protect the right to data protection, which is one of the fundamental rights, but also to promote innovation.

At first sight, the GDPR could be seen as detrimental to innovation, as it appears to expand the regulatory burden on businesses and industries that were perceived not to be previously covered by the rules on data protection. The definition of personal data now clearly contains features such as online identifiers, location data, and genetic data. In addition, the GDPR states that compliance not only applies to data controllers and processors in the EU, but also to all those who offer goods or services to EU citizens. However, in practice, these new definitions have little direct influence on the scope of the data protection regime. Although online identifiers and location data are now explicitly mentioned in the law, they only reflect the evolving jurisprudence. For example, even though IP addresses were largely believed not to be part of personal data, the European Court of Justice has now ruled twice on the subject and considers them to be personal data on the grounds that they allow an indirect identification of users. While article 4 on the territorial scope of Directive 95/46/EC on data protection was formulated in a much more lenient way than that of the GDPR, it already had an extra-territorial scope. In short, this means that any fear regarding a potential negative impact on businesses and innovation caused by the wider scope of the GDPR is without basis and mainly due to unfamiliarity with the present legal obligations. The increase in awareness that will be produced by the adoption of the GDPR could result in a wider range of actors recognizing the need to comply with data protection requirements and thus generate a need for innovative cross-industry approaches.

The increase in penalties for infringements of the GDPR could appear to have a similar negative psychological impact on business and innovation. Article 83 of the GDPR states that the national supervisory authorities may now impose fines of up to four percent of the annual turnover of an undertaking or up to €20 million (whichever is higher). On one hand, high fines are problematic because of the new, strict regulatory requirements and a high degree of legal uncertainty, but on the other hand they allow for interesting business cases and provide opportunities to create competitive advantages. It forces companies to actively seek solutions to problems that were potentially ignored in the past by applying principles like "data protection by design" and "by default" and by conducting "data protection impact assessments." Privacy enhancing technologies (PET) and other new and innovative solutions are starting to emerge and to gather momentum. Collecting valid consent under the GDPR can also become more complicated. The GDPR states that the person in question must have greater choice to decide to which parts of an agreement he or she consents and the data controller is required to demonstrate that the appropriate consent has been given freely. For medical researchers, this requirement might make it more difficult to gain access to valuable information and thus be innovative. This provision could also very well have an impact on existing business models, such as gaming companies providing free access to games in exchange for personal data likely not to be directly related to the gaming services.

However, dismissing the GDPR as an obstacle to innovation would be a mistake. The GDPR has great potential to meet the Commission's objectives of protecting the rights and freedoms of individuals and simplifying administrative burdens for businesses as well as the promotion of innovation in the DSM.

Contrary to what one might think at first glance, many of the potential setbacks concerning innovation that could possibly occur are much less or not at all problematic.

Contrary to what one might think at first glance, many of the potential setbacks concerning innovation that could possibly occur are much less or not at all problematic. It would be wrong to assume that the supervisory authorities are waiting for the right time to be able to issue fines. In fact, they have the duty to help, guide, and inform about the upcoming changes and fines will only be a last resort and proportionate. In addition, companies will not simply stop innovating because their activities might be considered non-compliant by the supervisory authorities; instead, they will continue innovating in new business areas, while keeping the new rules in mind.

Following the same logic, obstacles to research are readily mitigated in the GDPR: article 9 allows for the processing of data under certain circumstances without the explicit consent of the data subjects if the data and the processing are considered necessary for "the purposes of preventive or occupational medicine," "medical diagnosis," protecting against "serious cross-border threats to health," or if only used for "archiving in the public interest, scientific, or historical research." If one is able to demonstrate that research, such as a medical research project, meets one of the above criteria, the GDPR will not present a regulatory obstacle.

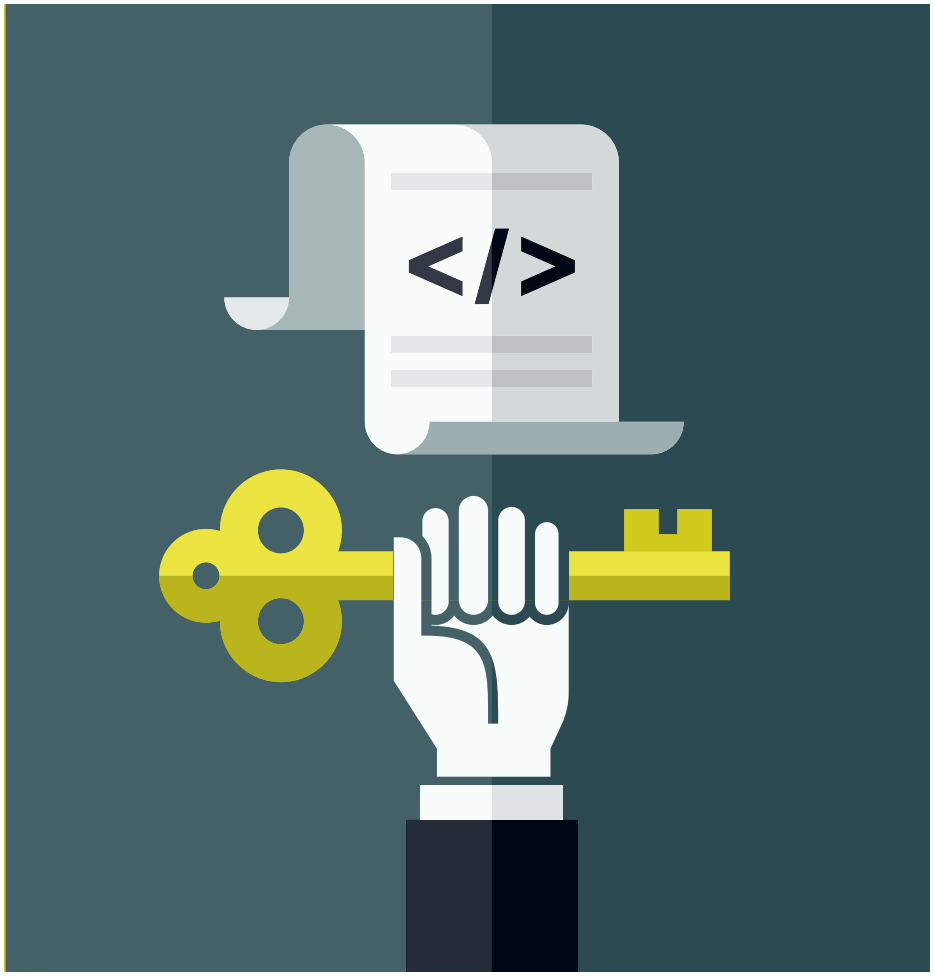
However, it will also depend on the extent to which member states create appropriate exceptions for research purposes, as provided for in article 89. In any case, the GDPR is unlikely to be interpreted narrowly, especially since intensive lobbying focuses the attention of policymakers on the matter. In addition, the objectives of EU politicians would be violated by a restrictive interpretation of these clauses, mainly because recital 159 of the GDPR emphasizes the objective of creating a European research area and points out that "the processing of personal data for scientific research purposes should be interpreted in a broad manner."

Companies will not simply stop innovating because their activities might be considered non-compliant by the supervisory authorities.

The restrictive rules of data protection can encourage innovation because they force companies to work with these limitations.

The improvement of data protection, by placing more emphasis on the protection of personal data, actually has a positive impact on competition and innovation. Data protection and data security have been and still are of interest to an increasing number of consumers and businesses. Effective data protection offers companies a real opportunity to restore and keep consumer confidence. Weak consumer confidence can be as much a source of costs as the attempt to reach a high level of compliance. While many studies show the keen willingness of consumers to share personal data in exchange for free services (like the 2015 Intercede consumer research), this is only part of the story. Multiple reports (like the 2015 Aimia Global Loyalty Lens report) show that consumers are starting to display growing concern and that the existence of a trusted relationship with an organization is valued by customers.

The enormous social and commercial potential of Big Data is dependent on the size and quality of the record.
By providing consumers with proof that their right to data protection is taken seriously, companies can also increase the willingness of consumers to share data or to use the services offered. Free and specific consent as required by the GDPR will not be problematic if companies properly communicate the purpose and benefit of sharing data with the person concerned. In a world where people are increasingly aware of the intrusive data collection practices undertaken by social media platforms, these companies could gain a competitive advantage by focusing on new and innovative means to enhance data protection. This development has already begun to materialize as a growing number of customer messaging applications are turning to encryption to secure the privacy of conversations.



In addition, the GDPR is pursuing the harmonization of data protection rules in the EU and although a certain degree of discretion is left to the member states, the GDPR will considerably increase harmonization and facilitate and ensure the compliance of pan-European companies. This is particularly true because, unlike its predecessor, the GDPR is directly applicable to all member states. Contrary to the positive effect of harmonization, the success of the one-stop-shop mechanism is less certain however. While it should facilitate compliance for businesses by allowing firms to have a single contact with a regulator, the mechanism might miss the desired effect by causing conflicts between authorities and thus lead to significant delays when dealing with European businesses active in multiple member states. Despite the uncertainty of the one-stop-shop, greater harmonization should have a positive impact on innovation by reducing compliance costs, as data flows more easily across the European Union and industries can spend resources on innovation instead of devoting attention to complying with different laws in 28 member states.

The restrictive rules of data protection can encourage innovation because they force companies to work with these limitations. This is particularly true where the GDPR promotes the principle of privacy by design and by default; that is, the integration of data protection measures from the very outset. In contrast to the largely inadequate level of data protection under the current scheme, the high fines that will soon be applied for non-compliance will encourage the widespread adoption of the principle of data protection by design. This means that innovation will be needed to offer compliant products and services.

As it becomes more expensive to collect personal data, algorithms are starting to emerge based on machine learning, which will produce data that resembles personal data but which is not linked or linkable to a real physical person. In addition, the newly introduced data portability right, in conjunction with similar regulations like PSD2, will lead to innovations that will facilitate data transfer.

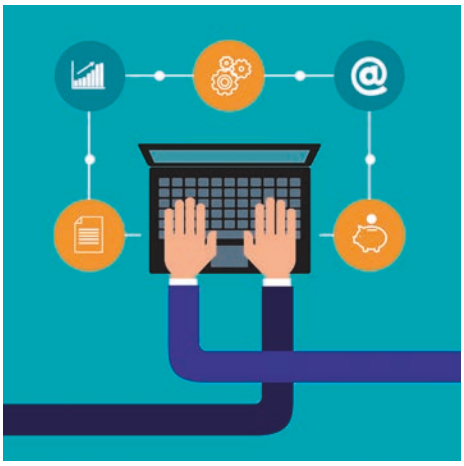
As companies will have to export personal data in a "structured and machine-readable format" and transfer the data to another provider at the request of the subject, they feel the need to introduce harmonized formats enabling them not only to export, but also to import such data.

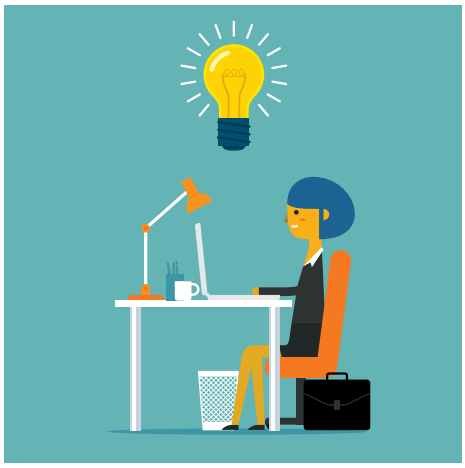
Likewise, the European Parliament noted the higher cost of compliance for data controllers and processors to store and process data securely, which should prompt innovation to find cost-effective security solutions. The example of the automotive industry has shown that the increasing regulation of vehicle safety does not stifle innovation. Instead, the mandatory use of airbags has not only allowed the development of many patented airbags, but it has also created a new type of competition and innovation in the area of car safety. History will only have to repeat itself for innovation to change the way we look at the use of Big Data.

Conclusion

- In this context, the aim of the European Commission is to revitalize the "digital single market" by creating a unified playing field to enable competition
- The GDPR has great potential to promote innovation overall and across all industries
- Harmonization will free resources that can be applied to innovation
- New constraints will create the need for innovative approaches
- The GDPR, combined with other regulations like PSD2, will definitively create the need for enhanced data transfer mechanisms

By providing consumers with proof that their right to data protection is taken seriously, companies can also increase the willingness of consumers to share data or to use the services offered.



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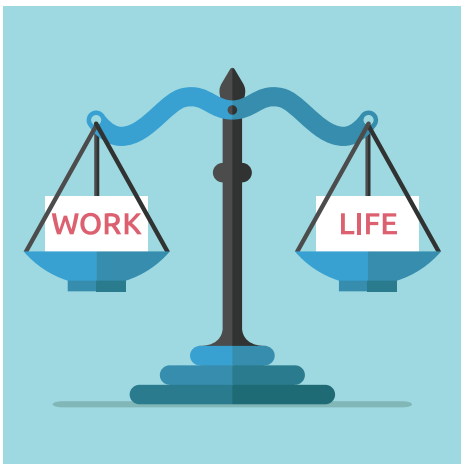
WORK
LIFE

A new generation of employees and technology

How leadership needs to evolve to handle tomorrow's challenges

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The workplace is by nature ever-evolving. Not long ago, computers were still a novelty and handing out loyalty gifts to employees with 30, or even 40 years' service was nothing out of the ordinary. But this era is slowly coming to a close; in a few of years from now, the last of the baby boomers will retire, Generation Z will enter the workforce, and robots will play an increasingly important role in corporations. These major disruptions are already showing their first symptoms: employee turnover is increasing, digitalization of every aspect of work is progressing, employer excellence awards are becoming more important, and employees worry about losing their jobs to robots.

A new generation of employees with a modern upbringing is arriving on the scene with challenging expectations toward their employers—and a new generation of technology is making automation a reality. Among other trends, these are likely to be the two key drivers of future change and it is time for leadership to prepare for the resulting challenges.

The two disruptors of our time are closely linked and should be analyzed in conjunction to allow the holistic understanding necessary for developing the most appropriate response.

What defines the new generation of employees?

While Generation X is moving up the managerial ladder in organizations, Generation Y is at the source of several new movements in the employer-employee relationship. One of today's key challenges is employee loyalty toward organizations, which makes talent retention one of the key corporate challenges of our time.

First of all, low retention rates challenge **knowledge management** within any firm, and increase the need for a good sharing culture. With young employees moving in and out of corporations, management needs to ensure that knowledge is retained in the company. Hence, the need to find appropriate ways to secure its employees' expertise on paper, or nowadays more often on hard drives, in order to minimize the loss of knowledge after the departure of a staff member. Similarly, this high turnover also means a high number of new recruits, and it is essential to get them up to speed and fully functioning as quickly as possible. Hence, the process of onboarding, which for many companies still remains a formality, becomes increasingly important in order to transfer firm knowledge. Qualitative knowledge transfers become irreplaceable and state-of-the-art tools such as knowledge sharing platforms prove to be of great value.

Another consequence of a high turnover rate is the constantly **increasing hiring activity** to secure the supply of talent. Due to increased volatility in the job market, companies need to work relentlessly on attracting the best available human capital. In order to be successful in attracting the best people, companies need to address and respond to jobseekers' expectations. Where companies were fine to publish a job ad a decade ago and have dozens of candidates lining up in front of their offices, creativity in approaching their target group and using the right channels and technology has now become indispensable. And that is not all: some startups are putting corporations in a display window, providing transparent information about salaries, fringe benefits—and much more alarmingly—proxies for employee satisfaction. Companies have become transparent for candidates, and designing and implementing an employer-of-choice strategy has become necessary if a firm would like to maintain its access to the most talented employees.

Looking into the future, what else does leadership need to prepare for?

While leadership currently adapts the corporate talent strategy to respond to the current generational challenges, it is highly advisable to anticipate the arrival of Digital Natives. Exposed to touchscreens and mobile data since their childhood, they are stereotypically more comfortable communicating through multiple social media apps on their smartphones than having a face-to-face conversation. Whereas the Millennials are often considered to have great confidence about the future, seeking independence and entrepreneurial opportunities, the Post-Millennials are, in contrast, in search of stability. The New York World Trade Center attacks are some of their earliest memories, and they were in their teen years—a period considered to have a substantial impact on a person's character traits—at the time of the Great Recession. They are inspired by youngsters from their own generation like Malala Yousafzai, the youngest ever Nobel Peace Prize laureate, as a sense of unsettlement and insecurity has accompanied their childhood. Generation Z is a true product of a globalized world, always connected through the constantly available internet, at ease with ever-evolving technologies, but equally aware of global issues such as inequality, climate change, and terrorism.

This particular DNA explains their challenging expectations toward employment. Having experienced their parents being under pressure during the recession or mentally exhausted due to excessive stress, burnouts are a serious concern that this generation will more actively try to prevent than any other generation before. Increased demand for a **healthy balance between their personal and professional life** and flexibility is the product of this fear. The typical responses from management provide a good basis, but will have to be reinforced going forward: home-office, flexible working hours, internal mobility, and secondment schemes are just a few options that will be required in the future, rather than just being "nice to have." And for as much investment that offerings like gyms, sophrology, or yoga courses will require, they are not the medicine that will prevent burnouts, stress-related frustration, and the resulting employee turnover. Although these elements are pieces in the puzzle of employee well-being, they are not the solution. The only sustainable remedy against employee exhaustion is helping them to create awareness about their physical and psychological state and helping them to develop the courage to take corrective action when they sense they are getting off balance.

Additionally, the feeling of doing **meaningful work** is becoming a critical source of motivation. Working for a company whose values they share or for something they believe in not only has a positive influence on employee well-being,

but also has a significant impact on their intention to stay with an organization.[1] Believing in the mission of their work and working autonomously toward an ideal is increasingly important for Generation Z. This might explain why 37 percent aspire to lead a company they founded or own,[2] inspired by role models such as Elon Musk, serial entrepreneur and founder of Tesla and SpaceX and champion of disruptions.

Reflecting on the different characteristics of the new workforce, one apparent conclusion is the need to connect employees emotionally to their jobs and companies. For Generation Z, this translates into the feeling of doing something meaningful and impactful. Even though how to create this connection remains the million dollar question, more deeply engaging with young employees and having regular discussions about their passions and drivers is likely to be a good start.

Thinking for a living and how time is actually spent

While the above observations apply to Generation Z as a whole, they apply in particular to knowledge workers—people who think for a living. Benefitting from the highest level of education, young university and business school graduates do not expect to perform tedious chores, such as scheduling meetings and filing expenses, when they enter the workforce. However, with the rise of computer tools and internet services, many tasks previously performed by secretaries are now landing in the laps of employees. This allows for greater autonomy, and yet consumes a lot of time that could be spent on the core of one's job description.

Moreover, office technologies that supposedly automate operations, such as Enterprise Resourcing Planning (ERP) or Customer Relationship Management (CRM), often remain disconnected from each other and unable to complete an entire process end-to-end. As a result, employees have to perform tasks such as extracting and moving data from one system to another. The technology cannot deliver value by itself and therefore needs a knowledge worker to perform routine and mostly monotonous tasks, which, as you might rightly guess, fall far short of the expectations of the recent generation.

How can automation change this?

Certainly, hopes are high that this is an aspect where the new generation of technology can bring substantial change. Robotic Process Automation (RPA) is software with artificial intelligence able to learn structured administrative processes that until today required human involvement, such as feeding ERP and CRM systems from multiple sources like emails and spreadsheets. After very limited training, business operations people with the relevant process and subject matter expertise can start automating processes with RPA tools, even without any programming experience. The user links, drags, and drops icons representing process steps in a very similar way to Microsoft Visio. Afterward, the robot acts through the same user interface as a human, not interfering with underlying computer systems. The implementation threshold is comparatively low and will lead to an increase in automated processes in the near future.[3]

Generation Z is a true product of a globalized world, always connected through the constantly available internet, at ease with ever-evolving technologies, but equally aware of global issues such as inequality, climate change, and terrorism.

1 Deloitte Millennial Survey 2016
2 Randstad Gen Z & Millennials Collide @ Work report
3 Harvard Business Review (2015) What knowledge workers stand to gain from automation https://hbr.org/2015/06/what-knowledge-workers-stand-to-gain-from-automation

In this way, operations can be radically transformed, improving service quality and increasing compliance, while at the same time cutting delivery times and costs—and this is clearly no science fiction anymore. As an example, UK mobile communications provider Telefonica O2 already uses 160 robots to process 400,000–500,000 transactions per month, not to mention the projected three-year return on investment of over 650 percent.[4]

While this sounds like a recipe for headcount reduction, this is not necessarily the case. For example, at Xchanging, an IT, business and procurement services provider, workers embraced the opportunity to include robots in their teams, allowing them to do intellectually more interesting work while the robots process the structured information into standardized templates, perform checks, and only escalate exceptions to the employees. Thanks to artificial intelligence, the robots learn over time and decrease their margin of error. From a capacity management point of view, the ability to easily scale up and down according to workload reduced challenges such as staffing, overtime, and training.

Co-working teams of humans and robots, with each assigned their specific tasks, will be the future of operations. Knowledge workers will be able to concentrate on tasks that require creative and intellectual problem solving, with robots performing the supporting work as needed. This collaboration could free employees from tedious and mundane tasks, which responds to one of the major concerns of the incoming generation. In jobs where repetitive and high-volume tasks can be automated, employees can add value at a higher level: interpreting the data processed by the robots. By this, entry-level jobs are especially becoming more satisfying. This is an attractive improvement for young generations expecting to make a difference and find meaning early in their careers. Rather than being afraid of RPA, the right cooperation between man and machine can lead to increased output and employee satisfaction levels, and potentially even improve retention rates.

What does this mean?

Accepting automation as a part of our everyday lives will not be an easy change. Companies adapting robotic technology will be challenged by managing the people side of change. Retention will once again become a key aspect of this process. As processes are being automated, workers will have to learn new skills and companies should facilitate a reorientation of their workforce to ensure minimal layoffs. Learning opportunities have to be offered alongside the introduction of automation; firms will quickly realize the skill gaps

4 Leslie Willcocks, Mary Lacity and Andrew Craig (2015) Paper 15/03: Robotic Process Automation at XChanging http://www.xchanging.com/system/files/dedicated-downloads/robotic-process-automation.pdf

between their existing workforce and the new generation of technology. This is an opportunity for employees and employers alike and should be approached as such. Leadership needs to offer the necessary training and development to ensure the smooth adoption of RPA. Change management should focus on how technology can benefit employees in releasing them from unproductive work and increasing the quality of work produced.

At the same time, it becomes apparent that the arriving generation of employees will more easily embrace these new technologies. Further, automation will enable employers to offer the activities Generation Z is looking for: creativity, innovative thinking, and the ability to understand and process information—the same skills that new technologies will require from employees. It seems that the new generation of employees and technology will work well together.[5]

And what about the existing workforce?

Assuming that the new generation of employees and technologies will meld well together, the real challenge for leadership will be to create and foster an environment in which this modern collaboration can take place. Given that it is Generation X that has to construct this accommodating work environment, the real challenge is their own understanding of a world that is much different from the one in which they have grown up, and their change readiness. In many corporations, management is not at ease with modern technologies and also struggles to understand the expectations of newer generations of employees. As a first step, leadership needs to fully recognize the factors that motivate Generation Z and then match these with their business needs. Becoming more responsive is the first condition for creating an attractive workplace, and introducing RPA can be one of many tools for accomplishing it afterward. Therefore, the human factor will play a substantial role in guaranteeing smooth cooperation between employees and robots.

It is becoming clear that the bigger challenge is to onboard the existing workforce on this journey. Firstly, it is essential to ensure that as many people as possible develop a working knowledge of incoming technologies. Secondly, more senior employees will have to work toward accommodating the different approach and understanding the changing expectations that younger employees bring to the workplace. As a result, the successful inclusion of Generation Z and the adoption of automation depend on the flexibility of managers as well as their ability to guide employees through a period of fear and motivate them to overcome initial gaps.

Getting ahead of the disruption should become the motivation for management to start preparing themselves and their current workforce for the arrival of both a new generation of employees and technology.

Glossary

Classifying people into different generations is of course a theoretical attempt at categorizing key behavioral differences and similarities over time. Hence, the borders of each generation are fluid and might overlap.

As a guide, we can define the last generations by the following birth years:

- Baby Boomer Generation: mid '40s–mid '60s
- Generation X: late 60s – late '70s–early '80s
- Generation Y (Millennials): early '80s–mid '90s, also considered as children of the Baby Boomers
- Generation Z (Digital Natives or Post-Millennials): mid '90s+

Given that it is Generation X that has to construct this accommodating work environment, the real challenge is their own understanding of a world that is much different from the one in which they have grown up, and their change readiness.

5 Charlotte Jee on Techworld (2016) Technology is not about to steal your job - here's why www.techworld.com/careers/technology-is-not-about-steal-your-job-3634370/

Seven hidden costs of a cyberattack

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There are many ways a cyberattack can affect—and cost—an organization, and the impacts will vary depending on the nature and severity of the event.

Common perceptions, however, are mostly shaped by what companies are required to report publicly—primarily theft of personally identifiable information, payment data, and personal health information. Discussions tend to focus on costs related to customer notification, credit monitoring, and the possibility of legal judgments or regulatory penalties. And thanks to important work done in this area, the industry is generally converging on the calculation of a "cost per record" for consumer data breaches.[1]

Rarely brought into full view, however, are cases of Intellectual Property (IP) theft, espionage, data destruction, attacks on core operations, or attempts to disable critical infrastructure. Beneath the surface, these attacks can have a much more significant impact on organizations and lead to additional costs that are both more difficult to quantify and often hidden from public view. A new Deloitte study, "Beneath the surface of a cyberattack: A deeper look at business impacts," recently outlined the depth and duration of cyber incidents in financial terms.[2] In this issue of CFO Insights, we'll focus on seven costs that are not typically apparent and why it is important to include them in calculating the total cost of a cyberattack.

Below the surface costs

Overall, the cyber report identified 14 business impacts of a cyber incident as they play out over a five-year incident response process—seven "above the surface" and seven "hidden" costs. For the identified intangible costs, various financial modeling techniques were used to estimate the damage (see sidebar, "Assigning value to intangible losses"). And in the scenarios presented, the direct costs commonly associated with data breaches were far less signficant than the hidden costs. In fact, in Deloitte's scenarios, they accounted for less than 5% of the total business impact.

1 Ponemon Institute is recognized as a leader in this area for its widely referenced annual Cost of a Data Breach studies, available at www.ponemon.org
2 "Beneath the surface of a cyberattack: A deeper look at business impacts," Deloitte Advisory, June 2016

Discussions tend to focus on costs related to customer notification, credit monitoring, and the possibility of legal judgments or regulatory penalties.

Given that impact, CFOs should be aware of the following seven hidden costs:

01. Insurance premium increases

Insurance premium increases are the additional costs an insured entity might incur to purchase or renew cyber risk insurance policies following a cyber incident. There is little public data available on actual premium increases following cyberattacks. Deloitte conducted informal research among leading providers of cyber insurance and found that it is not uncommon for a policyholder to face a 200% increase in premiums for the same coverage, or possibly even be denied coverage until stringent conditions are met following a cyber incident. According to Deloitte's sources, factors that influence future costs may include: a willingness and depth of information provided by the policyholder upon review of the incident; the policyholder's plans to improve incident handling or other aspects of its security program; anticipated litigation; and assumptions concerning the company's level of cybersecurity "maturity."

02. Increased cost to raise debt

Increased cost to raise debt occurs when, as a result of a drop in credit rating, the victim organization faces higher interest rates for borrowed capital, either when raising debt or when renegotiating existing debt. Organizations appear to be perceived as higher-risk borrowers during the months following a cyber incident. Deloitte analyzed the credit rating of nine public companies (from the same industry and comparable in size) and observed an average Standard & Poor's credit rating of A, and assessed these companies against companies that had recently suffered a cyber incident. It was observed that, in the short term, the credit-rating agencies typically downgrade by one level companies that have experienced a cyber incident.

03. Operational disruption or destruction

Impact of operational disruption or destruction is a highly variable cost category that includes losses tied to manipulation or alteration of normal business operations and costs associated with rebuilding operational capabilities. This could include the need to repair equipment and facilities, build temporary infrastructure, divert resources from one part of the business to another, or increase current resources to support alternative business operations to replace the function of systems that have been temporarily shut down. It could also include losses associated with the inability to deliver goods or services. The nature of operational disruption—and therefore the appropriate method of calculating its impact—is very specific to each situation and requires direct knowledge of distinct information components.

04. Lost value of customer relationships

During an initial period immediately following a breach, it can be hard to track and quantify how many customers are lost. Economists and marketing teams approach this challenge by attaching a "value" to each customer or member to quantify how much the business must invest to acquire that customer or member. They then look at the likely revenue that this one customer or member will generate for the business over time. These numbers can then be evaluated per industry and particular organization to estimate how much investment is needed to attract and acquire new customers.

05. Value of lost contract revenue

Value of lost contract revenue includes revenue and ultimate income loss, as well as lost future opportunity associated with contracts that are terminated as a result of a cyber incident. To determine the financial impact of the lost contracts or premiums, Deloitte estimated the value of the contracts in test cases both before and after the cyberattack. Following a cyberattack, if the subject company were to lose contracts, it was assumed there would be a decrease in revenues. Then the present value (meaning an estimate of the value of a future income stream depicted in present dollar terms; receiving a dollar today is worth more than receiving a dollar in the future, since one could earn interest on that dollar) of cash flows that the company would earn over the term of the contracts was determined.

06. Devaluation of trade name

Devaluation of trade name is an intangible cost category referring to the loss in value of the names, marks, or symbols an organization uses to distinguish its products and services. A brand name is associated with the name of a specific company or a specific product, whereas a trade name relates to an organization as a whole. To determine the financial impact of a cyber incident on the value of a company's trade name, the likely value of the trade name both before and after the cyber incident has to be assessed. To value the trade name itself, Deloitte employed the relief-from-royalty method. The relief-from-royalty method, commonly used to value IP assets such as trade names, estimates the value by analyzing what another entity would have to pay to license the company's trade name.Deloitte's analysis involved establishing a reasonable "royalty fee" by looking at royalty fees or rates paid in actual royalty transactions for similar types of IP, and the analysis of profit margins across the industries to which the test cases belonged, to determine what a typical company in the industry would have the capacity to pay.

07. Loss of intellectual property

Loss of IP is an intangible cost associated with loss of exclusive control over trade secrets, copyrights, investment plans, and other proprietary and confidential information that can lead to loss of competitive advantage, loss of revenue, and lasting and potentially irreparable economic damage to the company. Types of IP include, but are not limited to, patents, designs, copyrights, trademarks, and trade secrets. Unlike other types of IP, trade secrets are protected indefinitely until publicly disclosed. Similar to the value of a trade name, the value of IP is estimated by approximating how much another party would pay to license that IP.

Organizations appear to be perceived as higher-risk borrowers during the months following a cyber incident.

To determine the financial impact of a cyber incident on the value of a company's trade name, the likely value of the trade name both before and after the cyber incident has to be assessed.

A fuller cost picture

For all the attention major breaches receive, business leaders, including CFOs, rarely see what occurs behind the walls of an organization struggling to recover from an attack—until it happens to them. Moreover, while cyber incidents may begin as a technology issue, they typically extend well beyond the technology domain and hit at the very heart of business value and performance.

To understand the less obvious impacts of a cyberattack requires a multidisciplinary approach that integrates deep knowledge of cyber incidents with business context, valuation techniques, and financial quantification. But with better visibility into a broader range of the potential business impacts—including the seven outlined here—leaders can transform the way they manage cyber risk and improve their ability to recover when a cyberattack occurs.

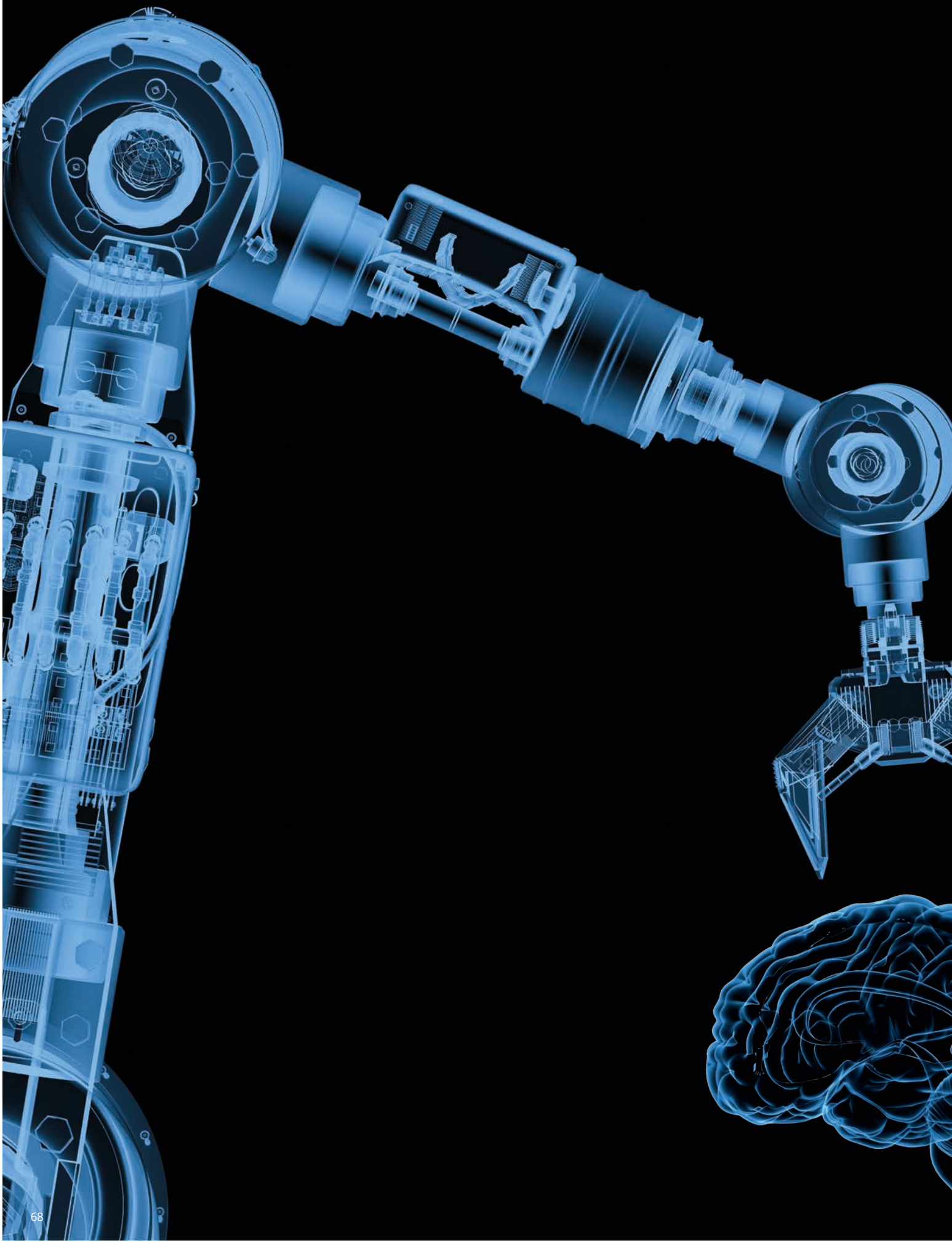
Assigning value to intangible losses

In the "Beneath the surface of a cyberattack" report, various financial modeling techniques were used to estimate the value of lost IP, damage to trade name, and impact of lost customer relationships and contracts. The following concepts are useful in understanding these methods.

Valuation and financial quantification are associated with a specific point in time. Given the time value of money and a wide range of unforeseen internal and external factors that may also impact the future value of an asset, the aim of the valuation process is to assign an estimated value or financial benefit to an asset at a specific point in time—in this case, the time the cyberattack was discovered. The study applied the widely accepted Discounted Cash Flow Method under the Income Approach, which broadly entails estimating the present value of the projected economic benefits to be derived from the use of the asset.

With-and-without method. The "with-and-without" method is a comparative business valuation technique that involves estimating the value of an asset under two scenarios: one, with a certain asset or situation in place (the "situation," in this context, being the occurrence of a cyberattack); and the other without the asset or situation in place (in this case, the absence of a cyberattack). The difference in these value estimates yields the isolated value impact that can be attributed to the situation.

Reliance on assumptions. Performing a valuation or damages/loss exercise often requires the use of professional judgment and reasonable assumptions in the absence of detailed, actual data. In the study's analysis of the impact of a cyber incident on particular assets in the hypothetical scenarios, typical industry benchmarks were used (or research conducted to identify benchmarks) to arrive at assumptions for a financial impact analysis. Some of these assumptions leveraged Deloitte's experience performing valuations and damages analyses in similar contexts.



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Robo-advisers continue to be ahead of the game compared to traditional wealth managers. More companies keep evolving, offering digital and automated investment advice, bringing ever more variations of sophisticated wealth and asset management methodology and technology to the masses. The race is on and the relatively low Assets under Management (AuM) gained so far by existing robo-advice startups show that there is significant market share up for grabs.

B2C Ranking across Europe (non-exhaustive)

Name/ Category	Robo-Level	Degree of Portfolio-Individualization	UI/UX Online Visualization	Transparency & Ease of Use	Costs
AnlageFinder/ MaxBlue	1.0				€
Diversifikator	1.0				€€
Easyfolio	3.0				€€€
Easyvest	3.0				€€
Fintego	3.0				€€
Ginmon	3.0				€
Growney	3.0				€€€
Liqid	3.0				€
Marie Qantier	3.0				€
Meetinvest	3.0				€€
Novofina	3.0				€€€
Nutmeg	3.0				€€€
Quirion	3.0				€
Scalable Capital	3.0				€€
Swanest	3.0				€€
TrueWealth	3.0				€
United Signals	3.0				€€
Vaamo	3.0				€€
VisualVest	3.0				€€
Wealthify	3.0				€
Whitebox	3.0				€€
Yomoni	3.0				€€
					€€€

Best in Class | Low level of maturity | Medium level of maturity | High level of maturity

Source: Deloitte Consulting GmbH

If you have been following Deloitte's series on robo-advice, you will know that this technology democratizes previously exclusive investment management solutions and significantly reduces costs for consumers. This topic was explored in the paper "The expansion of robo-advisory in Wealth Management,"[1] and we could even say that the situation is in many ways the banking equivalent of prototype racing, much like in Formula 1. Cutting-edge technology is crafted behind closed doors, then prototyped and launched in a highly competitive yet small environment. It takes years until the insights gained here enter mass production and become available to the public.

But once they do, you don't want to miss these things. We can all agree on the bene-fits, so now imagine life without them-the pre-improvement era. That's where your money is right now.

But robo-advice has nearly completed its transition from prototype tech to mass market solution. We have arrived at the point where success has been proven and adoption by the public is picking up. Pioneers in the United States have gained significant size since inception and shown that they can sustain over time.

Europe is currently considered to be a nascent market, but with the insights from overseas, risks for market entrants are significantly reduced. That's probably one reason why there are so many companies offering some sort of robo-advice. People can see the potential, know which solution works, which features are in demand, and which ones aren't. Under these conditions, potentially strong competitors of traditional and incumbent wealth managers rise quickly.

Today Deloitte Germany tracks well over 250 robo-advisers across the globe, and 40 of those originating in Europe have a foothold here. Sounds like a lot? Well, it is. And more keep popping up. Sure enough, not all will reach the threshold required to offer robo-advice services to customers in the long-run. But more importantly for wealth managers is the question who will emerge as a true competitor and change investment advice as we know it today.

To answer this question, we bring you the results from our deep-dive into the rising European robo-advice market as a competitor matrix, ranking relevant features across pure B2C players (those with end consumer offerings) available as of November 2016. The ranking identifies "best-in-class" robo-advisers for each section.

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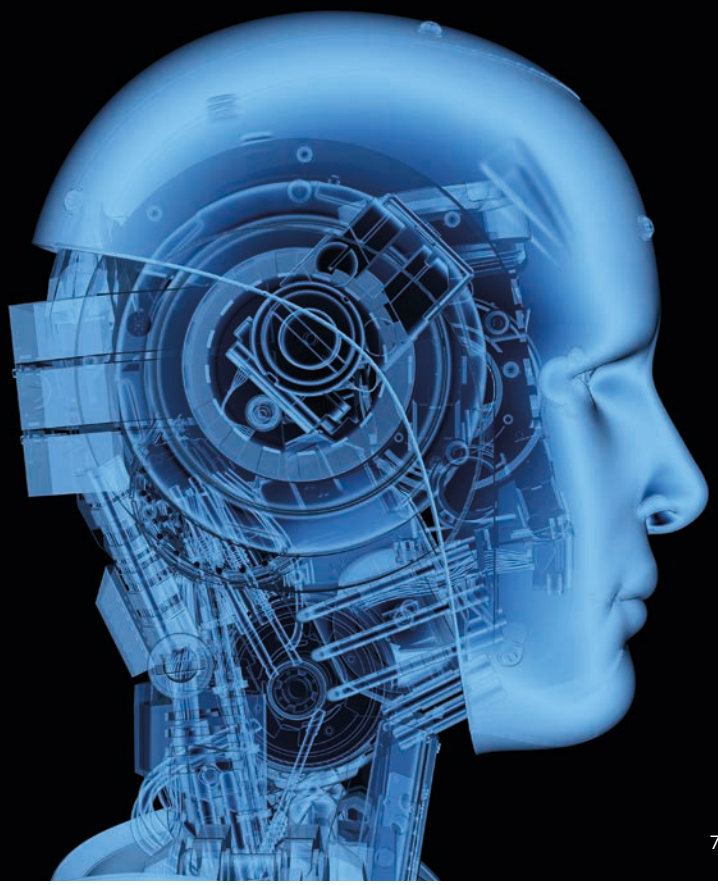


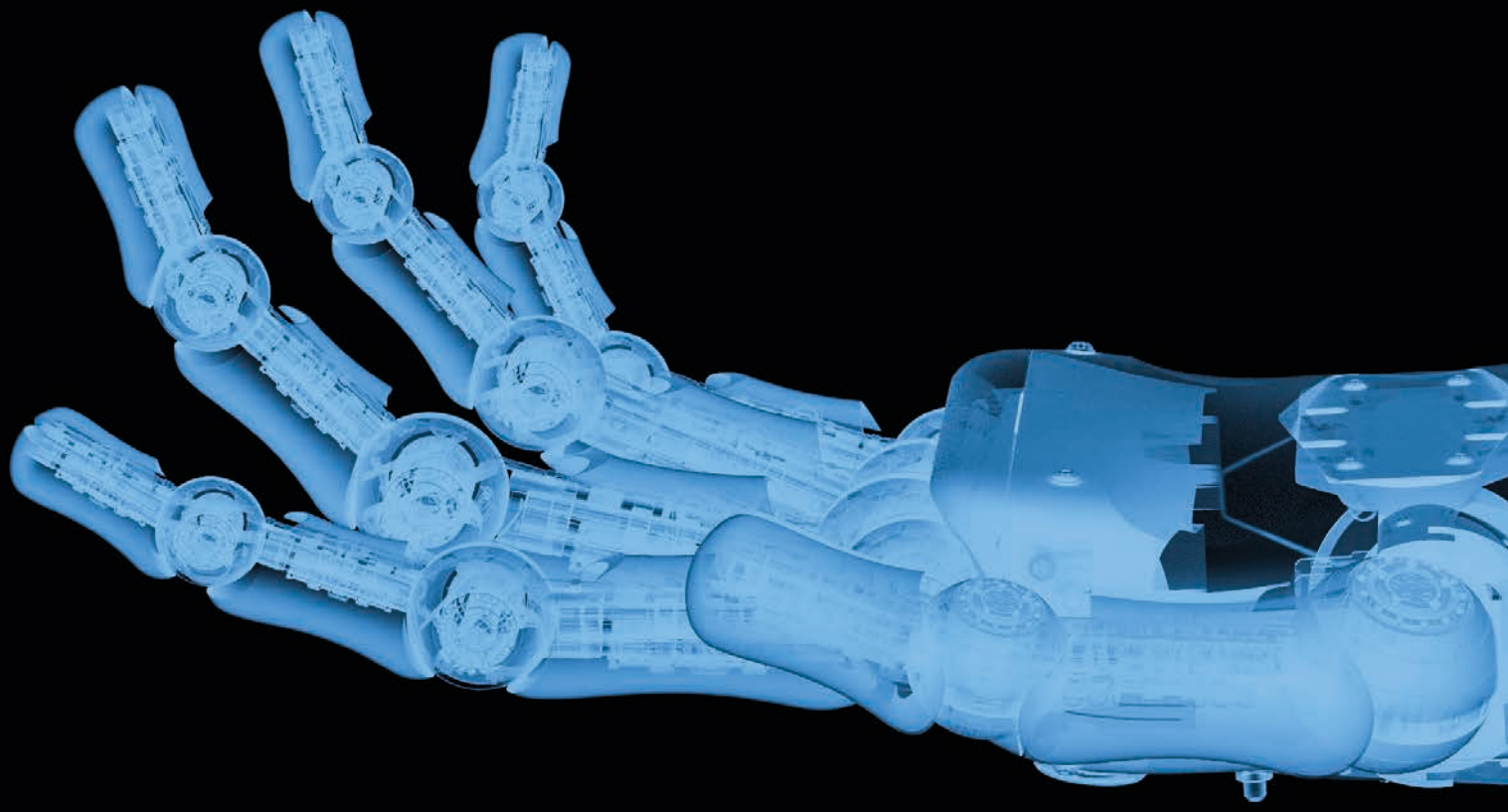
1 https://www2.deloitte.com/content/dam/Deloitte/de/Documents/financial-services/Deloitte-Robo-safe.pdf

To create the robo-advisory ranking, we chose five distinct criteria to evaluate the players currently in the market. To start with, we elaborated on four robo-advisory levels of evolution that have a range of service and capabilities.

Findings show that robo-advisers 1.0 only offer basic functionalities, such as an online questionnaire that identifies which products among the listed ETFs, bonds, and shares suit the client's interests best. Robo-advisers 2.0 expand on this function with risk-based allocation and managed portfolio adjustments. However, the majority of robo-advisers currently operating in the market, a full 80 percent, can be classified as robo-advisers 3.0. They have developed proprietary algorithms to manage portfolios in accordance with pre-defined investment rule sets and make rebalancing proposals for the client. Robo-advisers 4.0 are the next step of the evolution and offer fully-automated portfolio management based on self-learning algorithms that automatically perform asset shifts as required with regard to the current market cycle.

The next category, the degree of portfolio individualization, assesses the diversity of portfolios offered by robo-advisers. Robo-advisory offerings vary between three standard portfolio allocations and highly customizable and individualized portfolios. We have also analyzed the asset mix and diversification in terms of asset classes.

Robo-advisers are renowned for attractive user front-ends that change roles and allow clients to sit in the driving seat when it comes to portfolio reallocation or simple money matters like setting up savings plans. Front-ends are intuitive and user-friendly, and provide additional customer support benefits in the form of live chats, chat bots, and direct messaging options; however, most robo-advisers have advanced user experience facilities when compared against each other. Particularly user-friendly websites and apps offer explanatory visualizations, videos, chat clients, or bots for instant customer support. Some set themselves apart from the crowd with very intuitive dashboards, analysis tools with comprehensive visualizations, and many options for customer support, for example hotlines and FAQ sections. In addition, transparency with regard to their respective services offered and pricing structures is a distinguishing factor. Therefore, the UX/UI, with particular attention to online visualizations, as well as ease of use with regard to transparency, navigation, and search factors, have been assessed.



Another criterion is what fees robo-advisory firms charge for their service offering. Especially among B2C providers, low fee structures are a strong selling argument. To make fees comparable across different fee structures, which can comprise management fees on AuM, performance fees, or fixed fees, we calculated average fees on €50,000 invested with the robo-adviser.[2] Thus, robo-advisers with the lowest fees on this investment size have an advantage over comparable offerings with higher fees.

The factors described above were evaluated by Deloitte with a pre-defined rating system, and a "best-in-class" robo-advisor selected for each category. As service offerings are evolving and robo-advisers are continuing to develop their business models, this ranking is a snapshot of the current landscape in late 2016.

While it looks exhaustive, the print version only shows a small fraction of the research and deliberately neglects offerings that are purely offered as B2B solutions, which are white-labeled and offered only through partners such as private banks or wealth management firms.

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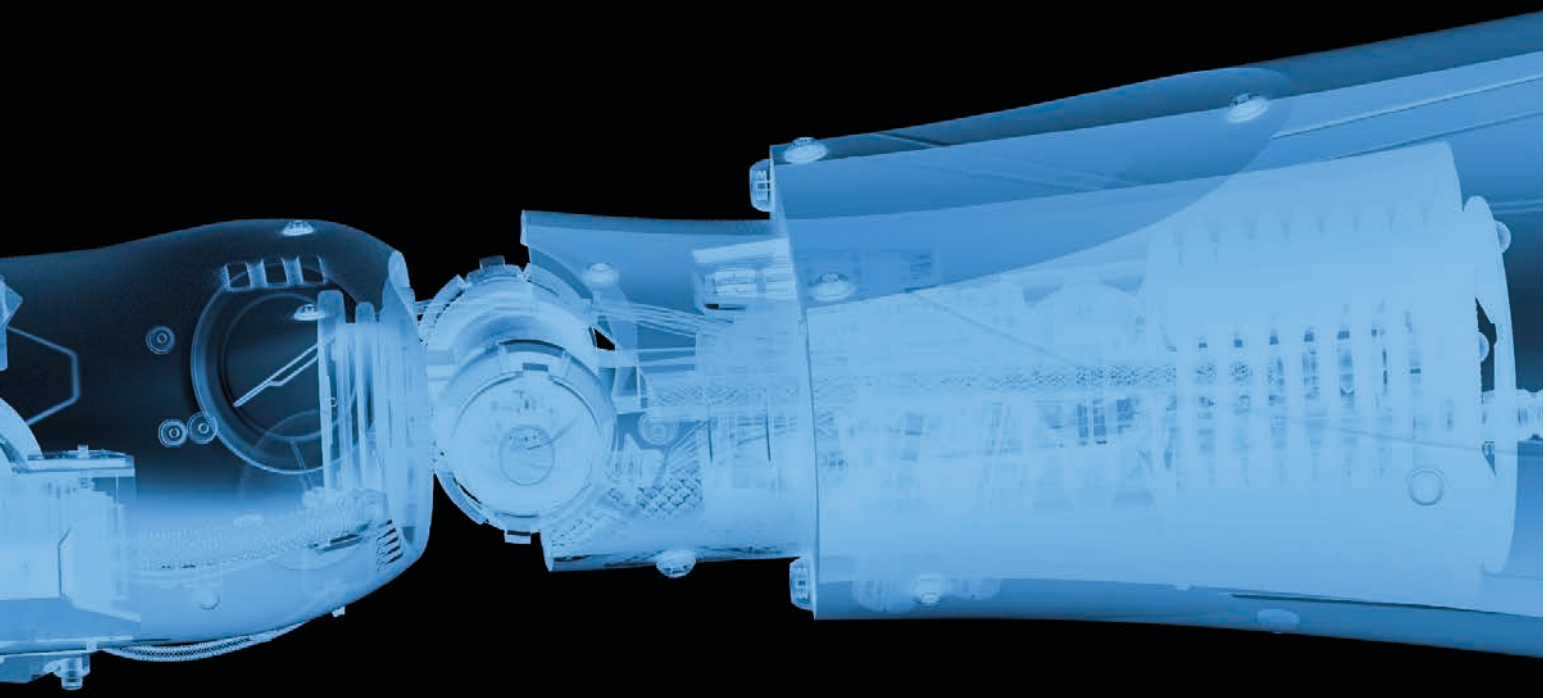

2 The evaluation of fee structures may vary for less or more assets invested as many robo-advisers differentiate their pricing in a price scale depending on the investment size.

Digital government and the citizen journey

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A smart nation requires a digital government

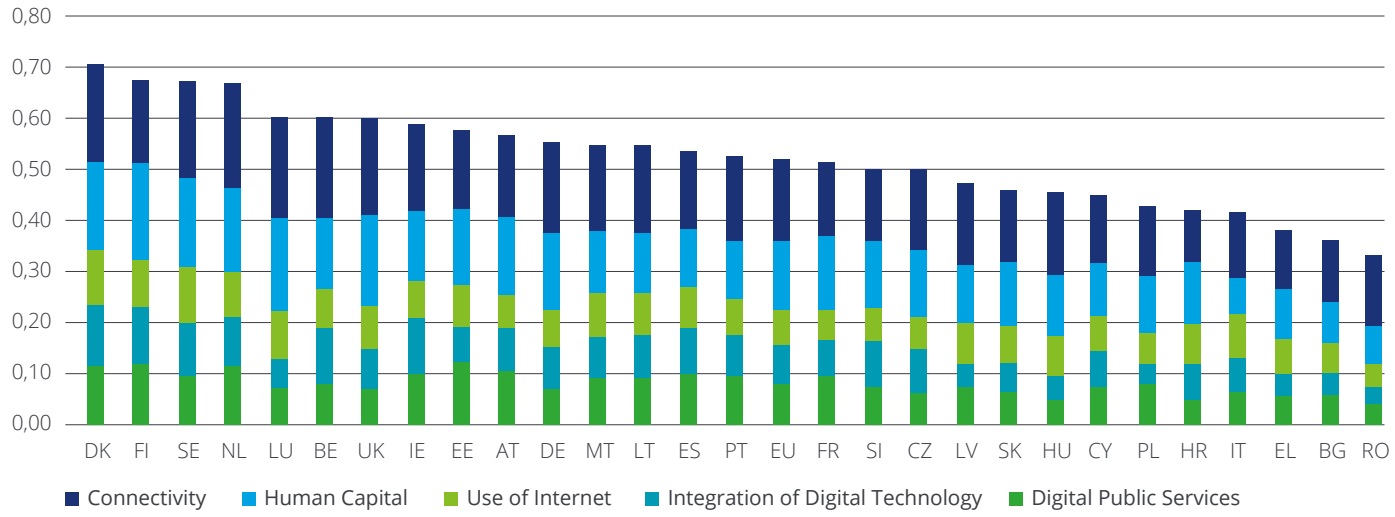
A recent survey conducted by Deloitte on digital transformation in the public sector, which gathered information from more than 1,200 government officials in over 70 countries including Luxembourg, found that digital technologies are having a major impact on government. Nearly all the respondents (96 percent) claimed that the disruption brought about by digital technologies is having a significant impact on their domain.[1]

One of the key drivers identified by Deloitte in its GOV2020 vision, and which is a factor that is changing the context in which government operates, is "empowered citizen-consumers." This new kind of citizen, brought about by the internet, is proactive, connected, collaborative, and aspires to contribute to a better society.[2]

The rise of this new type of digitally-driven citizen and the growing impact of digital technologies on governments require a change in the approach government organizations use to deliver their services to society. This change needs to take on the form of a shift within government organizations from a more inward focus (on processes, efficiency, cost-saving, etc.) to one that is more outward-focused on citizens and their experience while interacting with specific services. Already in 2014, the Luxembourg government presented its "Digital Lëtzebuerg" initiative with the aim to strengthen and consolidate the country's position in the ICT field in the long term. The guiding principle behind the initiative is to diversify the economy for the benefit of citizens and all socio-economic sectors. Digital Lëtzebuerg is therefore intended to be the assertion of a new image of the Grand Duchy as a "smart nation"—a modern, open, highly connected nation ready to cope with a digital society. In 2017, the first results of this initiative could be seen, as Luxembourg holds a strong fifth position in the European Commission's Digital Economy and Society Index (DESI), a composite index summarizing relevant indicators on Europe's digital performance and tracking EU member states' progress in digital competitiveness.

The rise of a new type of digitally-driven citizen and the growing impact of digital technologies on governments require a change in the approach government organizations use to deliver their services to society.

Figure 1: Digital Economy and Society Index (DESI) 2017 ranking[3]



1 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html
2 http://government-2020.dupress.com/driver/empowered-citizen-consumers/
3 https://ec.europa.eu/digital-single-market/desi?utm_source=twitter&utm_campaign=DESIeu&utm_medium=social

The journey toward digital begins with the citizen

The impact made by the new type of digitally-empowered citizen-consumer, whose preferences change constantly, is not limited to government organizations. Private organizations around the globe have already come face-to-face with these "enhanced" consumers and understand the importance they should place on customer experience. This is evidenced by the dedicated roles such as Chief Marketing Officer (CMO) and, in some cases, Chief Experience Officer (CXO), which are uncommon, if not unheard of in the public sector. The stats suggest that the effect on private organizations will only increase:

- By 2020, customer experience will overtake price and products as the key brand differentiator[4]
- 89 percent of marketing leaders expect to compete primarily on the basis of customer experience as compared with 36 percent four years ago[5]

It is clear that understanding and managing the customer experience is becoming vital and it should be a top priority for government organizations as well, since citizens used to digitally-enabled, customer-centric experiences provided by private organizations are sure to experience a disconnect if the same approach to service delivery is not present when they interact with government organizations.

It would be a smart move by government organizations to start thinking about and defining what they want citizens to experience while interacting with their services. To do this requires an organization's digital strategy—the objectives and strategic direction of the entire organization—to be in place, or at the very least in the process of being developed. A bold, clear vision of the organization's digital journey is required to guide it toward implementing and delivering digitally-enabled services to citizens.

Key principles to consider when defining the vision and developing the organization's digital strategy include the following:

Digital by default – create straightforward and convenient services that will be used by those who have the ability to do so, but won't exclude those who don't[6]

Once only – ensure that citizens do not have to supply the same information more than once, e.g., information provided in an online form or questionnaire is saved and can be revisited and updated later[7]

Transparency – share information in a format that is useable, i.e., open and analyzable, enabling people to look up, work with, and manipulate data. This is more than just paperless, it also precludes simply uploading and sharing PDF or Word files, since these are not machine-readable[8]

Single point of contact (SPOC) – provide one online portal, e.g. Guichet.lu in Luxembourg, which citizens can use to access government services or to pull relevant information[9]. The SPOC should interlink complimentary services and guide users to the most appropriate services based on their needs.[10]

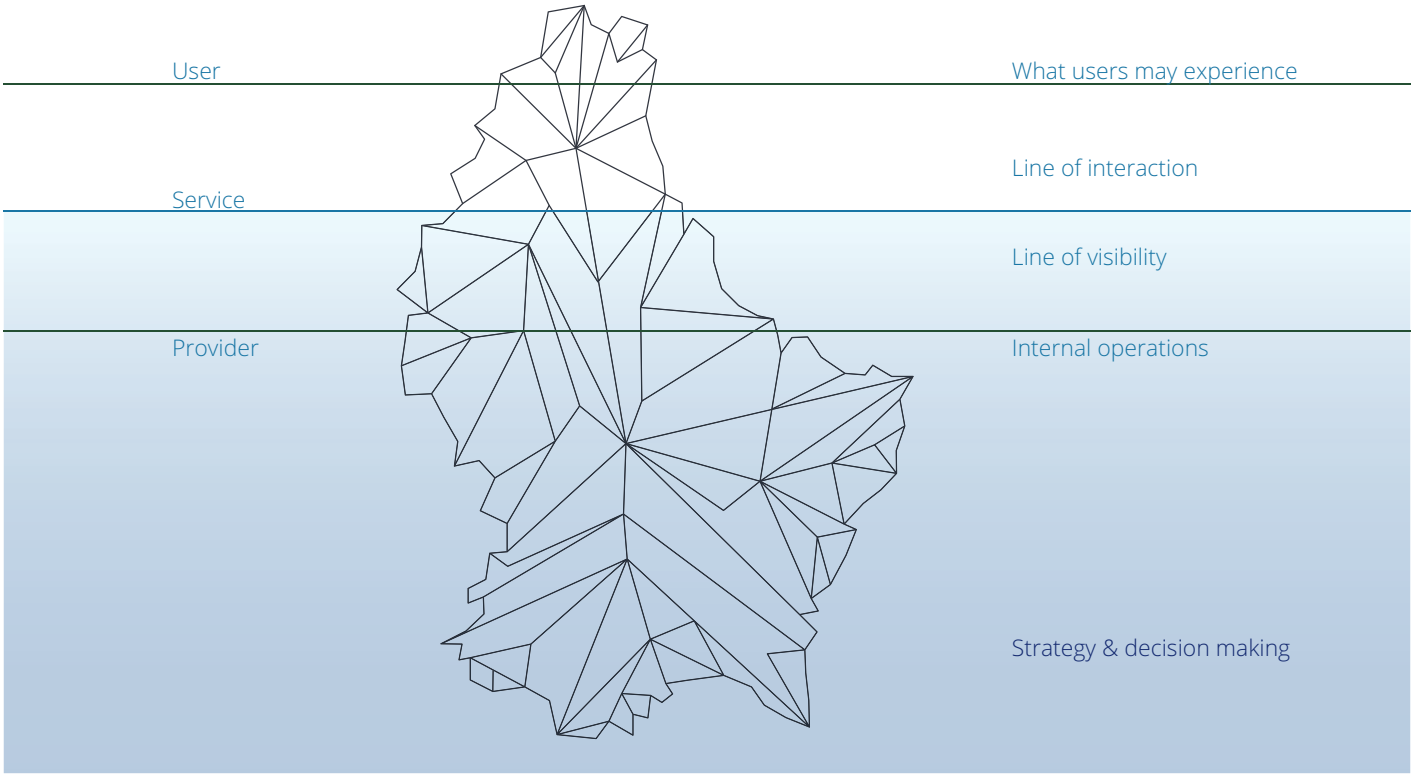
Once the strategic foundation for a citizen-centric approach to service delivery has been laid, the focus should shift to service design. Service design is an activity that is gaining traction in the move toward creating digitally-driven citizen experiences. It encapsulates the planning and organizing of the people, infrastructure, communication, and material components of a service in order to improve its quality and the interaction between the service provider and its customers, in our case citizens.

Service design embodies the idea that in order to successfully deliver the outward activities that make up a great user experience, what we call the Front Stage, a whole host of internal aspects and activities need to align internally, or Back Stage. A lot happens "below the surface," that citizens are unaware of, but which can, within a single moment, significantly affect their experience.

It would be a smart move by government organizations to start thinking about and defining what they want citizens to experience while interacting with their services.

4 Walker Info Differentiator
5 Gartner Customer Experience
6 https://gds.blog.gov.uk/2012/11/06/assisted-digital/
7 https://ec.europa.eu/digital-single-market/en/news/eu-wide-digital-once-only-principle-citizens-and-businesses-policy-options-and-their-impacts

Figure 2: Design for front stage and back stage



The primary way of gaining a better understanding of the citizen experience and designing a service accordingly is through a citizen journey map. Mapping a citizen (or user) journey depicts the citizen's end-to-end experience while interacting with a product, service, or system. This provides a unified picture of a citizen's engagement from beginning to end,[11] illustrating, in visual form, the interactions between the citizen and the organization from a citizen perspective.[12]

Creating a citizen journey map starts by identifying the service that needs to be digitally (re)designed and the definition of citizen personas. Citizen personas, as with customer personas in the private sector, are fictitious characters created to represent the major citizen types within a targeted demographic that might use a product or service. They describe real people (their backgrounds, goals, frustrations, motivations, and preferences), outline their major needs and expectations and provide a clear picture of how they would like to interact with the organization. Citizen personas help facilitate better strategic decision-making and reinforce citizen centricity.

With the citizen personas created, the current citizen journey(s) should be evaluated and the target citizen journey(s) should be defined. When mapping out a user's journey, a solid foundation on how the insights related to user behavior are articulated. Once the research has been done, the next step is to categorize events chronologically and group insights into three basic buckets: activity, emotion, and touchpoints, which help to identify the moments of truth that can make or break a citizen's experience.

8 http://www.gothamgazette.com/government/5339-evolving-definition-transparency-data-online

9 http://dupress.deloitte.com/content/dam/dup-us-en/articles/platform-strategy-new-level-business-trends/DUP_1048-Business-ecosystems-come-of-age_MASTER_FINAL.pdf

10 http://londoneconomics.co.uk/wp-content/uploads/2013/10/Single-point-of-contact.pdf

11 https://dupress.deloitte.com/dup-us-en/industry/public-sector/improving-customer-experience-government-performance.html

12 https://dupress.deloitte.com/dup-us-en/industry/public-sector/improving-customer-experience-government-performance.html

Figure 3: Key aspects that provide insight into the citizen experience

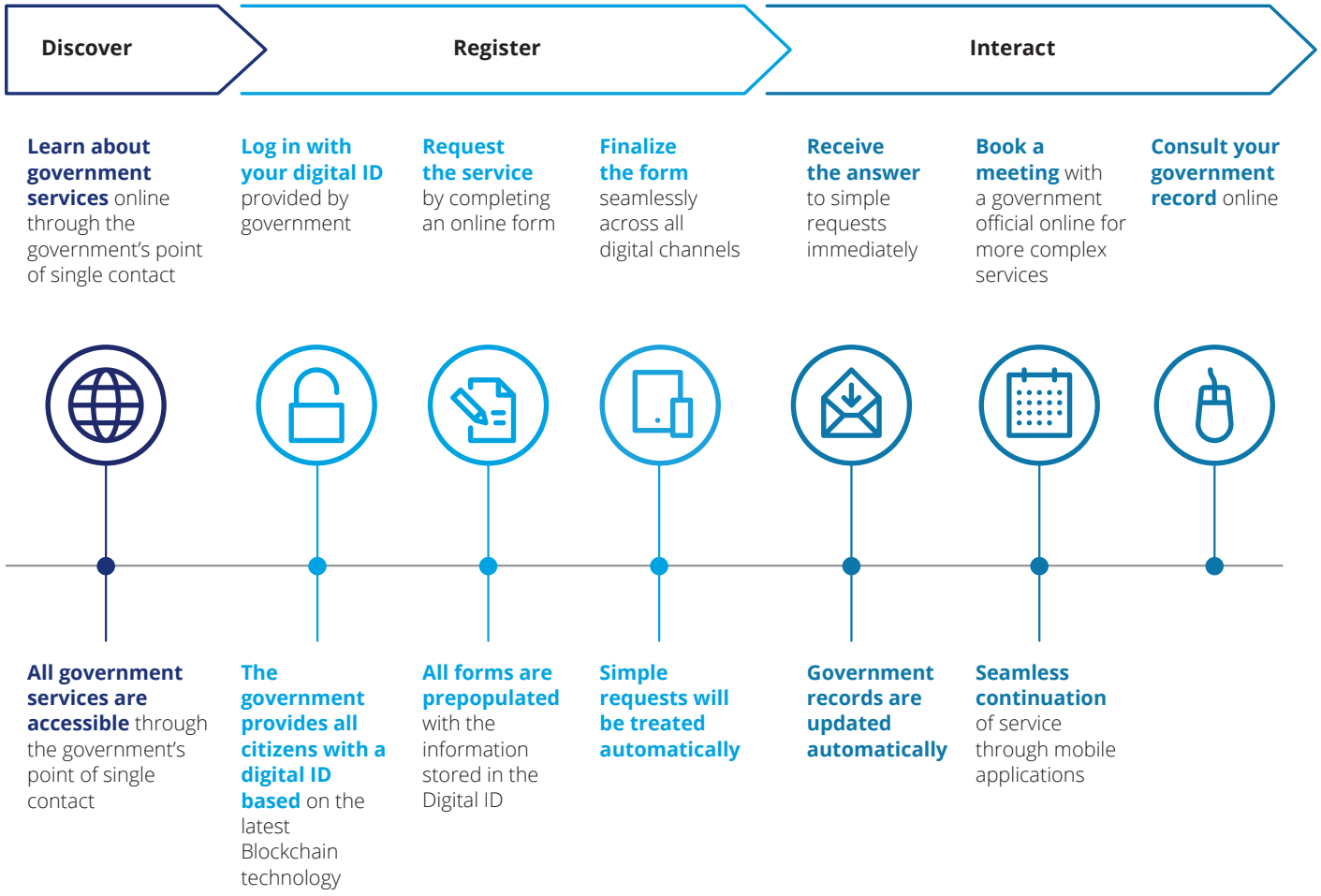
Activity
What your customers are doing, regardless of whether they are interacting directly with your brand or not. Activity forms the skeleton that understanding can be grafted onto. Activity also defines the start and end point for the narrative being crafted.

Emotion
As humans, our behavior is often driven by an emotional state, which can have a direct impact on brand perception. Understanding how customers are feeling and what they are thinking while engaged in an activity is the only way we can truly understand their motivation.

Touch Points
A touch point is a moment of interaction between customers and your brand. They serve as the connective tissue that ties one activity to another. Touch points can cross multiple channels, from website to app to in-person dialogue between customer and employee.

Moments of Truth
These are the interactions to which customers have a higher than normal emotional attachment. A moment of truth can significantly differentiate the experience in either a positive or negative manner.

Figure 4: Key elements that make up a citizen journey map can be seen in the illustration of a citizen journey

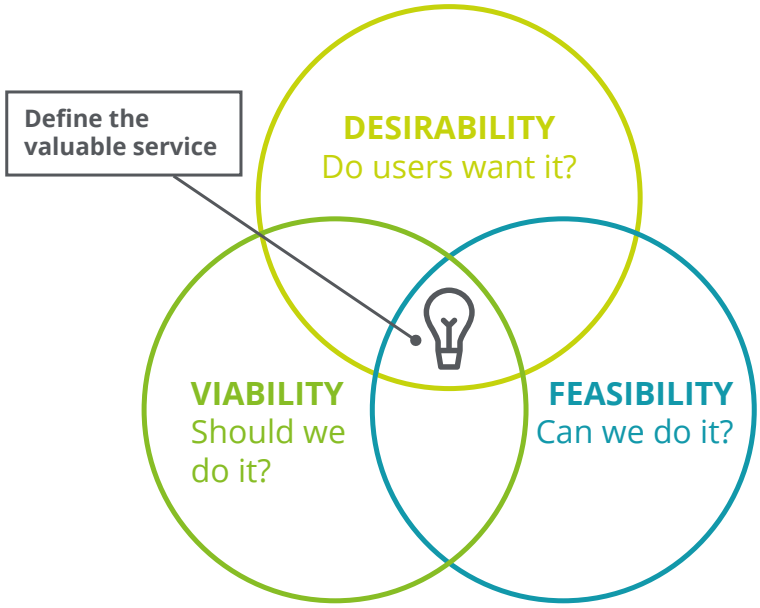


Two main benefits are derived from citizen journey maps. They ensure effective decision-making by focusing efforts on the most important interactions, and they communicate citizen strategy by visualizing the target end-to-end citizen experience. The process of mapping out a user's experience (journey) helps key stakeholders and production teams align their goals in an effort to better support positive citizen experiences.

In the end, successful service delivery comes from the ability to find the "sweet spot"—the area of common overlap between an offering's desirability, its feasibility, and its commercial viability (Figure 5).[13] To achieve this balance between the essentials of service delivery, an approach that is user-centric, multi-disciplinary, iterative, and agile is required.

13 Commercial viability can refer to a number of things: it could mean a service is profitable, if linked to revenue-generating activities, e.g., enabling citizens to apply for and renew licenses, permits, and registrations, or it could mean a service is cost beneficial from the point of view that by digitalizing the service, the costs of running it are reduced compared to before its digitalization. It could also refer to benefits that may be more difficult to quantify financially, e.g., the amount of time saved by citizens using the digital service as opposed to before, or the increased reach of a service as a result of its digitalization.

Figure 5: Finding the "sweet spot" of service delivery



Overcoming challenges along the digital journey

Approaching service design and delivery from a digital perspective and with a citizen focus is not something that happens overnight, and some significant challenges exist for government organizations that want to provide digitally-driven service offerings.

Culture

Existing cultural norms within any organization can challenge the effort to instill the values and characteristics of digital technology. This resistance to change is perhaps stronger within government organizations compared to their private counterparts, since more than 85 percent of government organizations surveyed point to culture as a significant challenge faced in their transition to digital.[14]

A culture founded on innovation and collaboration is required for an organization to become digitally mature. A digitally-oriented mindset, characterized by open functionality, co-creation, a user focus, and an agile way of working is required. The ideal is for these characteristics to become deeply rooted within government organizations' respective work cultures. Steps can be taken to encourage this, such as changing the work environment to stimulate innovation and collaboration and by appointing people with the right mindset to key positions within the organization.[15]

Leadership

Having the right people in key positions of influence, who are able to provide a digital vision and possess a strong awareness and appetite for digital, can make a big difference. This is an area where there is still much room for improvement, since according to our survey only about 46 percent of government organizations have a clear and coherent digital strategy—an important starting point for any digital transformation. This can severely limit an organization's effectiveness, because a properly defined and executable digital strategy equips organizations to better respond to opportunities and threats. Additionally, evidence suggests that the presence or absence of a digitally-savvy leadership plays a big role in whether the organization upskills its workforce.[16]

Talent (workforce skills)

One of the main obstacles to transformation is a lack of digital workforce skills. According to respondents in our public sector survey, only 34 percent of them said their organization had sufficient skills to execute its digital strategy.
An integral part of any organization's digital transformation is a "tech-savvy" workforce, with tech-savvy meaning more than just possessing the technical skills. Skills required include business acumen, willingness to work collaboratively, and an entrepreneurial streak (Figure 2). Based on our survey results, the skills relating to digital transformation that seem to be the most lacking are agility, entrepreneurial spirit, and technology.[17]

Procurement

Effective digital transformation requires access to a robust and innovative technology marketplace; however, it would seem that most government organizations' capabilities are too limited to facilitate this. More than three-quarters of the public sector leaders surveyed believe that in order to facilitate digital transformation, fundamental changes to their procurement and commercial strategies are required.

By nature, digital technology requires organizations to be user-focused and agile, but the prevailing approaches to procurement, focusing on the effective spending of public money, mean that long-term supplier contracts are favored and cost-saving processes are established, which could lead to entrenching static business models. In order to be more digitally-oriented, organizations should simplify their procurement processes, reduce the size of contracts, or break large contracts into smaller parts and maintain a flexible and agile approach.[18]

14 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html
15 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html
16 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html
17 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html

The journey's end – mission accomplished!

Government services are the links between the government and its citizens, and their proper functioning supports the proper functioning of society as a whole. The digitalization of government organizations and the focus on citizen experience when delivering services should not become ends in themselves. Citizen experience is more than just making sure the citizen has a great experience; by improving the experience, government organizations are better able to execute their missions.[19] Focusing on citizens and their experience does not diminish or detract from the organization's mandate; it rather fulfils it.

Those rare organizations that truly "get" digital and have an ingrained digital mindset operate with a different approach to thinking about stakeholders and launching products and services.[20] Those who understand and embrace digital realize that it is more than just implementing technology—it is about seeing old problems and old processes with new eyes. It starts by looking at citizens, and their journeys with governments, with new eyes.

Figure 6: Skills necessary for digital transformation

Effective digital transformation requires access to a robust and innovative technology marketplace; however, it would seem that most government organizations' capabilities are too limited to facilitate this.

18 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html
19 https://dupress.deloitte.com/dup-us-en/industry/public-sector/improving-customer-experience-government-performance.html
20 https://www2.deloitte.com/uk/en/pages/public-sector/articles/the-journey-to-governments-digital-transformation.html

The Internet-of-Things
A revolutionary digital tool for the healthcare industry

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The global healthcare industry is starting its transformation due to the demand for high-quality care, the pressure of healthcare costs, and the patient profile shift toward patients who are more informed, empowered, and who ultimately turn out to be partners of healthcare providers rather than being passive observers of their own health journey.

The global population is growing while healthcare budgets are dwindling and the burden of chronic diseases is rapidly increasing worldwide. All these challenges are putting pressure on doctors, healthcare providers, and governments to look for new technologies so that they can continue providing high-quality healthcare while reducing costs.

Like the banking and retail sectors, healthcare has made its first steps into the digital era, thereby changing the way medicine is practiced. This industry, where mindsets and regulations are slow to change, has been overhauled by the digitalization of data and the incredible development of new technologies and apps to enable access to data anywhere and at anytime.

How can the Internet-of-Things (IoT) be defined for the healthcare sector?
The Internet-of-Things (IoT) is understood to be "a global network infrastructure, linking physical and virtual objects through the exploitation of data capture and communication capabilities. This infrastructure includes existing and involving internet and network developments. It will offer specific object-identification, sensor, and connection capability as the basis for the development of independent cooperative services and applications. These will be characterized by a high degree of autonomous data capture, event transfer, network connectivity, and interoperability."[1]

Applied to healthcare systems, the IoT—also called the Internet-of-Medical-Things (IoMT)—is defined as a network of medical devices that connect directly with each other to capture, share, and monitor vital data automatically through a secure service layer (SSL) that connects to a central command and control server in the cloud.

1 ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=1753

In recent decades, the wider availability of broadband internet, the decreasing cost of connecting, the integration "by design" of Wi-Fi capabilities and sensors into devices, and the strong penetration of smartphones have created the perfect basis for the development of the IoT to skyrocket.

The IoT is not new, but has been gaining more attention and traction lately in some industries, such as energy, mobility, and healthcare. The development of the IoT in the healthcare market has had a significant impact on the healthcare sector as a whole and has been particularly valuable in remote clinical monitoring, chronic disease management, preventive care, assisted living for elderly people, and personal fitness monitoring. The IoT has changed the game within the healthcare industry by lowering costs, improving efficiency, and bringing the focus back to quality patient care.

Internet-connected devices have been introduced to patients in various forms. The diversity of the sensors can be related to the nature of stimuli to which they respond (e.g., physiological vital signs such as heart beat or blood pressure and body movements), and to their location on the body (clothing, subcutaneous implant, wearable devices such as smart watch and glasses, etc.). These devices have the ability to meet patients' needs by transferring information in real-time to the patients' smartphones, computers, or other wireless devices and have the potential to influence their behaviors. Sensors allow patients to self-monitor, track, and assess physiological parameters, while also providing interfaces and a dashboard for caregivers[2] (Figure 1). Many of these measures, whose monitoring can be vital for some patients, usually require follow-up interaction with a healthcare professional. This opens a window of opportunity for smarter devices to deliver more valuable data and reduces the need for direct patient-physician interaction. For instance, some hospitals have begun implementing "smart beds"

2 http://archpublichealth.biomedcentral.com/articles/10.1186/2049-3258-72-28

Figure 1: Diversity of healthcare IoT devices[3]

that can capture vital sign information for better health management, detect when a bed is occupied, and detect when a patient is attempting to get up in order to prevent falls. It can also adjust itself to ensure appropriate pressure and support is provided to the patient without the manual interaction of nurses.[4]

IoT healthcare market

The global IoT healthcare market is expected to record considerable growth. It was valued at US$60.4 billion in 2014, and is estimated to reach US$136.8 billion by 2021, registering a CAGR of 12.5 percent over the forecast period.[5] In particular, the wearable tech market is expected to be worth US$34 billion in 2020, representing 411 million smart wearables sold. Wrist-based devices, such as smartwatches and fitness trackers, represent 50 percent of the estimated sales.[6]

The IoT healthcare market can be viewed from two different angles: the connected component itself or the application of the IoT in the healthcare sector.[7]

Successful implementation of the IoT in remote monitoring of diabetes and asthma patients, coupled with high penetration of fitness and wellness devices, has created strong demand for the Internet-of-Things in the healthcare industry. The remote patient monitoring market saw a big jump last year, with 7.1 million patients in 2016 enrolled in some form of digital health program featuring connected medical devices, and using patients' own mobile devices as a core part of their care plan.[8]

The IoT is not new, but has been gaining more attention and traction lately in some industries, such as energy, mobility, and healthcare.

3 http://electronicdesign.com/iot/future-digital-health
4 http://bamlabs.com/downloads/01_theSmartbed.pdf
5 www.todaysmedicaldevelopments.com/article/iot-internet-of-things-healthcare-medical-111716/
6 www.forbes.com/sites/paullamkin/2016/02/17/wearable-tech-market-to-be-worth-34-billion-by-2020/#26201e2d3cb5
7 www.slideshare.net/alliedmarketresearch/internet-of-things-healthcare-market-the-industry-set-to-grow-positively
8 www.berginsight.com/ReportPDF/ProductSheet/bi-mhealth8-ps.pdf

By components

System & Software

Network Layer

Database Layer

Analytics Layer

Devices

Implantable Sensor Devices

Wearable Devices

By applications

Patient Monitoring

Clinical Operations & Workflow optimization

Clinical Imaging

Fitness and Wellness Measurement

Drug Development

The IoT opens up opportunities for the healthcare industry

The IoT has the potential to reinvent the healthcare industry. It has the potential to transform traditional paper-based healthcare treatment through access to real-time patient data and remote patient monitoring. The emergence of this digital healthcare technology has delivered solutions to tackle the increasing need for better diagnostics and more personalized therapeutic tools. The IoT plays a significant role in a broad range of healthcare applications, from managing chronic diseases to preventing disease, but it also works as a fitness and wellness tracker for athletes.

The IoT is changing the business model in the healthcare industry; patients and providers both stand to benefit from the IoT for multiple reasons[9]:

Decreased Costs

Taking advantage of development in the connectivity of healthcare solutions allows healthcare providers to monitor patients in real time based on the collection, recording, and analysis of comprehensive information using sensors. In particular, hospitalized patients whose physiological status requires close attention can be constantly monitored using IoT-driven, non-invasive monitoring. In this way, the IoT simultaneously improves the quality of care through constant attention and cuts down the cost of care by eliminating the need for a caregiver to actively engage in data collection by checking the patient's vital signs at regular intervals.

Improved Outcomes of Treatment

The IoT provides healthcare professionals with access to real-time information that enables them to make informed decisions and provide treatment that is efficient and evidence-based.

Improved Disease Management

When patients are continuously monitored and caregivers are able to access real-time data, diseases can be treated before serious complications occur. It enables preventive care, allows early diagnosis, and gives insight into the efficiency of the prescribed therapy for the patient's health.

Remote monitoring of chronic diseases

Access to healthcare infrastructure and effective treatments can be complicated for populations living in remote regions. Small and powerful wireless solutions connected through the IoT now make it possible for these patients to have access to health monitoring. These solutions can be used to securely capture patient health data using a variety of sensors, analyze it, and then share it through wireless connectivity with medical professionals who can make appropriate health recommendations.

Enhanced Patient Experience

The connectivity of the healthcare system through the IoT places emphasis on the patients and on their needs. Patients are now able to take control of their own health, to self-monitor, and to communicate whenever necessary with the healthcare providers. This is leading to a new type of physician-patient relationship in which the patient becomes a partner to set up appropriate (or even proactive) treatments, improve the accuracy of the diagnosis, and facilitate a timely intervention by physicians.

Improved Drug Management

The creation and management of drugs is a major expense in the healthcare industry. Forbes reported the average cost to develop an approved drug at US$4 billion.[10] IoT devices and processes may prove helpful in better managing these costs-especially those related to drug supply chain management. RFID tags are already being added to medication containers to ensure producers, consumers, and regulators have greater confidence in the drug supply chain. The next step is to implant the RFID technology into the medication itself to be able to confirm its authenticity and reveal provenance information such as manufacturing location, dosage, packaging images, expiration date, supply chain data, and lot or batch number.[11]

The IoT certainly opens the door to many opportunities but also gives way to many challenges that must be tackled in order to allow the entire community to take advantage of the services offered by the IoT in the healthcare sector.

9 https://www.ibm.com/blogs/internet-of-things/6-benefits-of-iot-for-healthcare/

10 https://www.forbes.com/sites/matthewherper/2012/02/10/the-truly-staggering-cost-of-inventing-new-drugs/#18f8a99a4a94

11 http://www.cio.com/article/2981481/healthcare/how-the-internet-of-things-is-changing-healthcare-and-transportation.html

The IoT is transforming how healthcare providers deliver treatment to their patients and how patients are taking control of their own health and their data.

The expansion and adoption of the IoT may be limited by some challenges

The IoT is growing rapidly; in the coming years, the medical sector is expected to witness the widespread adoption of the IoT and the sky-rocketing development of new eHealth IoT devices and applications. The number of connected devices expected to be in use by the year 2020 has been estimated at 30.7 billion.[12] With so many devices collecting vast amounts of data in new ways, it is nearly impossible to fully prepare for every possible threat or fault.[13] Healthcare providers, manufacturers, governments, and users must identify the areas of potential failure to apply fixes in order to fully and securely explore the opportunities offered by the IoT.

The major healthcare IoT-related challenges are described in different areas:

Data privacy and security issues

The driver behind all the development of devices and sensors is the data that is generated. Healthcare devices and applications are expected to deal with vital private information such as personal healthcare data, including genetics. The area of IoT healthcare, which is connected to global information networks that are accessible anytime, anywhere, may be targeted by hacking in a world where data is the new gold. Protecting captured health data from illicit access is crucial. Information security, privacy, and data protection should systematically be addressed at the design stage when creating sensors and devices. Also, IoT devices do not always have enough computing power to implement all the relevant security layers.[14] The adoption of the IoT in the healthcare industry requires stringent policies, and technical security measures should be introduced to share health data with authorized users, organizations, and applications.

Unadapted reimbursement model

Healthcare reimbursement systems are still in a "fee-for-service" configuration, meaning that the only way that physicians get paid is to have face-to-face medical visits with patients. This creates a paradox: technologies are promoted to reduce face-to-face interactions when the reimbursement system calls for the opposite. However, a slight shift is observed toward a value-based care model, which ties payments for care delivery to the quality of care provided, and rewards providers for both efficiency and effectiveness. Value-based care aims to advance the triple aim of providing better care for individuals, improving population health management strategies and reducing healthcare costs. Then, there is more incentive to use new technologies that reduce unnecessary face-to-face physician-patient interactions, which are seen as a cost center. The regulatory and reimbursement environment for connected health programs must improve for adoption rates to accelerate.[15]

Patient safety issues

IoT technology can create new safety risks if it is not designed appropriately, implemented carefully, and used thoughtfully. Data integrity errors as a result of incorrect or missing data in electronic health records (EHRs) and other health IT systems are a crucial issue in the healthcare sector that can dramatically affect patient health. Data integrity issues occurred with the use of paper medical records as well, but now, as EHRs become more interoperable and hackable, incorrect information is more readily available, more easily shared, and harder to eliminate. One patient's data appearing in another patient's record, missing data or delayed data delivery, and clock synchronization errors between medical devices and systems are examples of data integrity failures, as listed in the Top 10 Health Technology Hazards for 2015 report.[16]

12 https://www.forbes.com/sites/louiscolumbus/2016/11/27/roundup-of-internet-of-things-forecasts-and-market-estimates-2016/#7e3e3ed6292d

13 https://www.isaca.org/SiteCollectionDocuments/2015-risk-reward-survey/2015-it-risk-reward-barometer-report.pdf

14 ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=1753

15 http://revcycleintelligence.com/features/what-is-value-based-care-what-it-means-for-providers

16 https://www.ecri.org/EmailResources/PSRQ/Top10/2015_Patient_Safety_Top10.pdf

Unclear IoT-related regulation

Health-related apps and devices generate huge amounts of data that can be used to monitor people's health. However, the line between medical devices and health gadgets is becoming blurred. The reliability and validity of wearable devices is not always proven, especially in the case of the fitness and lifestyle markets. Devices are marketed under the promise that they will help improve general health and fitness, but the majority of manufacturers provide no empirical evidence to support the effectiveness of their products, which most of the time are not cleared by the FDA or EMA. Also, it is unclear where the regulatory cut-off point lies for deciding which health apps and devices have to go through the regulatory process.

The IoT is transforming how healthcare providers deliver treatment to their patients and how patients are taking control of their own health and their data. Indeed, the IoT has made it possible for patients to work alongside professionals to customize their own health journey. Patients can track and automate various aspects of health, which in turn provides more comprehensive data for healthcare professionals to prevent, treat, and diagnose medical conditions for a lower cost.

No one knows what the IoT may bring in the coming years, but one thing's for sure; more connected devices means more data. Each click and command will be an engagement that is logged. And each engagement reveals something valuable about an individual's health. Healthcare professionals will have to learn how to collect, organize, and analyze this fragmented data to provide more personalized individual care and identify trends and symptoms that can lead to some cutting-edge treatments. The biggest challenge is not going to be in using IoT devices. Rather, it will be for healthcare practitioners to make sure that these devices are secure and not misused, that data is protected, and that errors and exceptions are properly handled to guarantee patient safety.

Fostering social impact through virtual reality

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Virtual reality is one of many examples that prove that Corporate Social Responsibility (CSR) goes beyond social impact and can act as a business booster. After having identified virtual reality and 360° videos as a relevant and innovative tool to help NGOs find regular sponsors, it became apparent that this concept can be taken to the next level in business services. The innovative and creative CSR approach can be leveraged to help client-facing services develop new high value-added services for their clients. The investment sector has been chosen as a focus for this article to illustrate this fact.

Corporate Social Responsibility (CSR) is all about making an impact that matters at company level and even beyond, to the best of our ability. Deloitte Luxembourg's CSR approach is innovative, creative, and eager to use new technologies. Therefore, we are convinced that CSR can act as a business booster and bring added value to organizations. We show this in a case study of our latest virtual reality project, which was initially designed for CSR but whose concept will be transferred to Investment Fund services.

Combining CSR and virtual reality to foster social impact

Virtual Reality (VR) is an innovative technology that can take people away from their daily lives and let them experience another situation in just a few minutes. This technology is appealing to all generations since it is relatively new and still not frequently used in either profit or non-profit sectors. VR has been identified as a great tool for fostering social impact and can be utilized to support the purposes of NGOs.

One of the main challenges for NGOs is to find donors who will help them finance their activities on a regular basis. A steady flow of donations is crucial for NGOs, since their projects directly depend on this money to ensure they can be properly implemented. Reluctance to support a charity can be mainly attributed to a lack of connection and information sharing between donors and NGOs. When making a donation, people may wonder how the money will be used by the NGO and what social impact will be generated.

Virtual reality can answer these questions. The creation of 360° interactive videos enables NGOs to display the work they do and the impact they have in the communities where the projects are implemented. With 360° videos, it takes no more than a few minutes to make a deep connection with viewers by going beyond what they would usually see in charity videos, thereby convincing them to support a good cause financially. Combining CSR and virtual reality is a great way to create an incentive to support a charity.

By ensuring continuous donations for NGOs, 360° videos prove to be a great tool in ensuring stability and sustainability.

The virtual reality experience instantly immerses viewers in the social impact that the NGOs generate. It also provides sponsors with proof of the impact that their donations have. Moreover, the video is designed as an environmentally friendly trip, letting donors experience a visit on the field without travel expenses or CO_2 emissions.

Virtual Reality (VR) is an innovative technology that can take people away from their daily lives and let them experience another situation in just a few minutes.

First steps

For our first 360° video, we had decided to support a Luxembourg-based NGO that is well known by our CSR team thanks to previous cooperation on other charity projects. This NGO is active in several Asian countries and is fully dedicated to the integration of young victims of extreme poverty experiencing social exclusion. They strongly believe that young people suffering from poverty and exclusion can develop professional skills and change their lives if they are welcomed in an environment where they feel confident and receive proper training. Their methodology is based on respect and support, as well as entrepreneurial workshops that will help these people become independent.

The video was shot in the Philippines in March 2017 and shows the NGO's work through footage of the training center and testimonials from program beneficiaries and NGO staff. Virtual reality enables viewers to visit the NGO's center and to feel and experience its impact in this specific community. In just a few minutes, viewers can follow a teenager's path toward social integration by seeing where he comes from and how the NGO's training changed his life.

The virtual reality project matches the NGO's strategic priorities as they are constantly looking for innovative ways to increase their visibility and promote their work. This NGO is also convinced of the relevance of developing strong links between civil society and the private sector.

We expect this project to be a starting point in using VR tools to show a social impact that people would not otherwise be able to see and experience. We intend to share our expertise with other NGOs in the future to help them address their own challenges in attracting donations and promoting their work.

From the social to the business impact

Although the virtual reality concept started in CSR, this concept is applicable in other areas, such as business services. The 360° videos for NGOs are a first step that can be used to develop new opportunities for organizations.

Let's take the example of the Responsible Investment Sector. The VR concept could be of interest to the investment fund industry for client impact-reporting purposes in order to attract new investors. An investment report made in 360° could indeed become a new kind of informing. Impactful images combined with relevant figures and graphs embedded in the video can actually illustrate the investment and replace old-fashioned reports. This tool can be used by the industry to make investment reports more appealing thanks to interactivity and the impression made by the virtual trip.

360° videos can be used for reporting purposes, as supporting evidence in impact measurement services and in project monitoring and evaluation.

Moreover, VR is a relevant tool that can be used in negotiations, as it can demonstrate a project in a way that will give investors incentives to support projects. Thanks to visual impact, messages will be more easily conveyed through the use of impactful pictures and key statements. Virtual reality can bring investment portfolios and data to life, thereby making them more accessible and tangible for asset managers. Although this technology is not yet widely found in the investment sector, we are convinced that there is great potential for this industry in the use of virtual reality.

Conclusion

- Virtual reality is a tool that offers great potential and can be used for both non-profit and profit purposes
- Projects initially created as part of a CSR approach can be turned into high value-added services for organizations

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Our expert authors, who are brimming with excitement about these disruptive topics, have written articles to help decision-makers to apprehend the new paradigms—if not to understand them all

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