



The future of asset servicing
Shaped by three disruptive technologies

Contents

Asset servicing today	05
Disruption uncovered	06
Robotic process automation (RPA)	07
Blockchain	11
Cognitive technology	15
Preparing for the wave of disruption	17
Possible outcomes	19
End notes	20
Global Investment Management contacts	21

Introduction

A huge wave of technology disruption is heading toward the asset servicing industry. Within a five-year timeframe, robotic process automation (RPA), blockchain and cognitive systems will drive dramatic change and have a profound, lasting impact on service providers' operations. According to a survey by CFA Institute, 54 percent of respondents viewed asset management as the industry most at risk from disruptive technologies.¹

We believe that these disruptive technologies offer enormous potential for asset servicers in creating efficiency, reducing risk and improving quality of service to clients. It has been suggested that automation alone could reduce headcount in the asset servicing industry by 60–70 percent while also achieving a cost savings of approximately 30–40 percent.

This paper from Deloitte Global describes where we believe these impacts will be felt most, and outline actions that asset servicers can take to ensure they can ride the wave of technology disruption without being consumed by it.

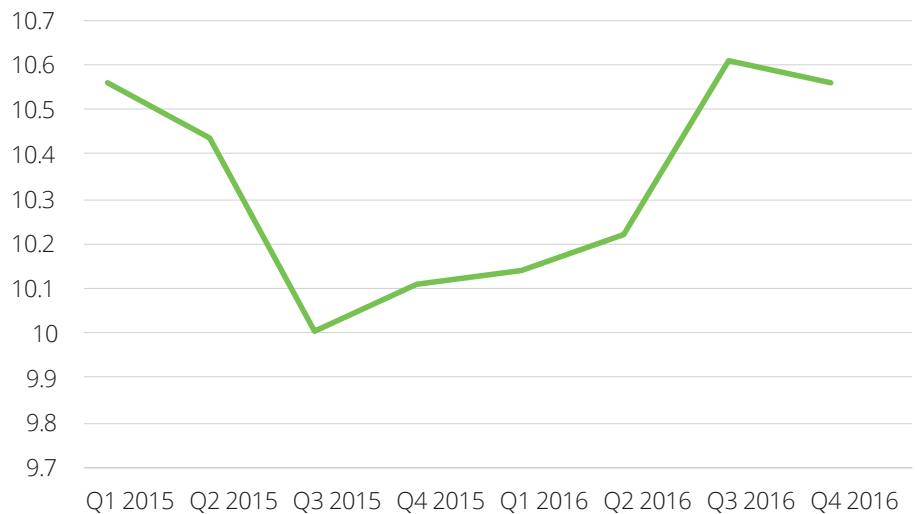
Asset servicing today

Why is asset servicing standing squarely in disruption's path? The industry employs approximately 200,000 people² worldwide. Many providers are still constrained by the legacy of acquisitions, poor integration, multiple technology platforms, and a high level of customized manual activity. Some of the technology platforms still in widespread use date back twenty years or more and asset servicers still receive tens of millions of instructions by fax every year. It is argued that the industry employs such a large number of people due to inefficiencies that accumulated in its systems and processes over many decades. Many of the fulltime employees (FTEs) in asset servicing perform manual, repeatable tasks that automated technology can now cost-effectively replace.

The challenge for asset servicers is considerable: since 2008, the regulatory environment has been the dominant consideration, thereby inhibiting the industry's development.

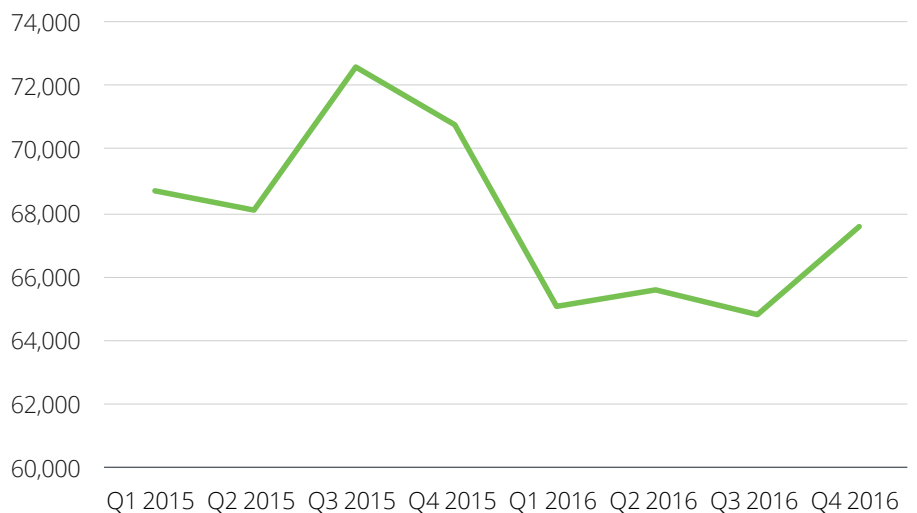
The value of assets under management has been rising over the past two years, however asset servicers have been unable to keep expenses under control which are on the rise again. It's felt that while technology has evolved, the industry has failed to keep pace. With the market driving asset servicers to achieve operational excellence, it's clear that some of these processes tied to legacy technology are the first in the firing line. Opportunities have emerged for new technologies to replace back- and middle-office repetitive, manual and cost-inefficient processes, with improved process automation—delivered on a continuous basis.

Global outsourced assets under management (AuM) (US\$ trillions)



Source: Research by Deloitte - information sourced from top 20 asset servicers' annual reports.

Top global asset servicers' expenses (US\$ in millions)



Source: Research by Deloitte - information sourced from top 20 asset servicers' annual reports.

Disruption uncovered

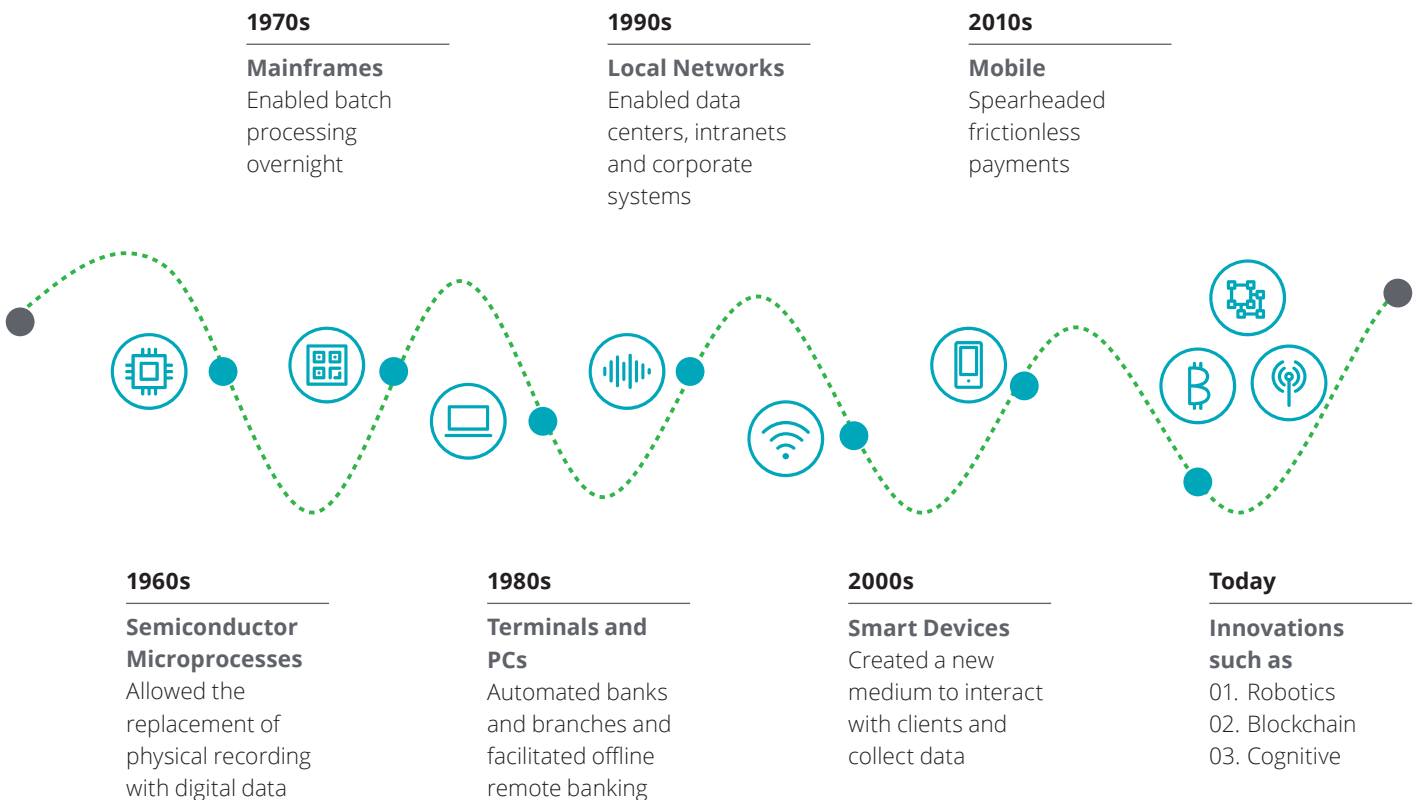
What are disruptive technologies? They are technologies that do not develop in a linear way, but evolve much faster and have a greater impact than traditional technologies. We have chosen to look at three technologies in this paper because we believe that each represents the greatest disruption posed in the short-term

(automation), medium-term (blockchain) and long-term (cognitive).

While all three technologies pose a potential disruption to the industry, what is important to note is the exponential impact of such developments. Singularity University, in partnership with Deloitte,

emphasizes the impact of exponentials on businesses as unprecedented opportunities as well as existential threats. The group warns leaders to understand that waiting for exponentials to manifest as mature technology trends before taking action may be waiting too long.³

The evolution of technologies



Robotic process automation (RPA)

RPA refers to a set of software tools called robots or 'bots' that perform routine or repetitive business processes—the kind that are typically carried out today by shared service centers or transaction processing teams. Bots mimic how people interact with software applications, but in a smarter and more efficient way. They are ideally suited to the challenge of business processes which straddle multiple IT systems that don't always talk to each other, or are too time-consuming for humans to perform. Some typical processes which RPA can be applied to include:

- Highly manual and repetitive work
- Rules-based processes
- Electronic readable structure products
- High transaction volumes
- Low expectations
- Process complexities
- Unpredictable peaks and troughs
- Mature and stable processes
- System changes

RPA explained



Robots are

- Computer-coded software
- Programs imitating human interaction with applications
- Cross-functional and cross application software



Which can interact with all application types

- Enterprise Resource Planning
- Windows/iOS/ Mac OS/Android
- Microsoft Office
- Mainframe
- Citrix
- Internet Explorer
- Business Process Management Software



Robots like processes that are

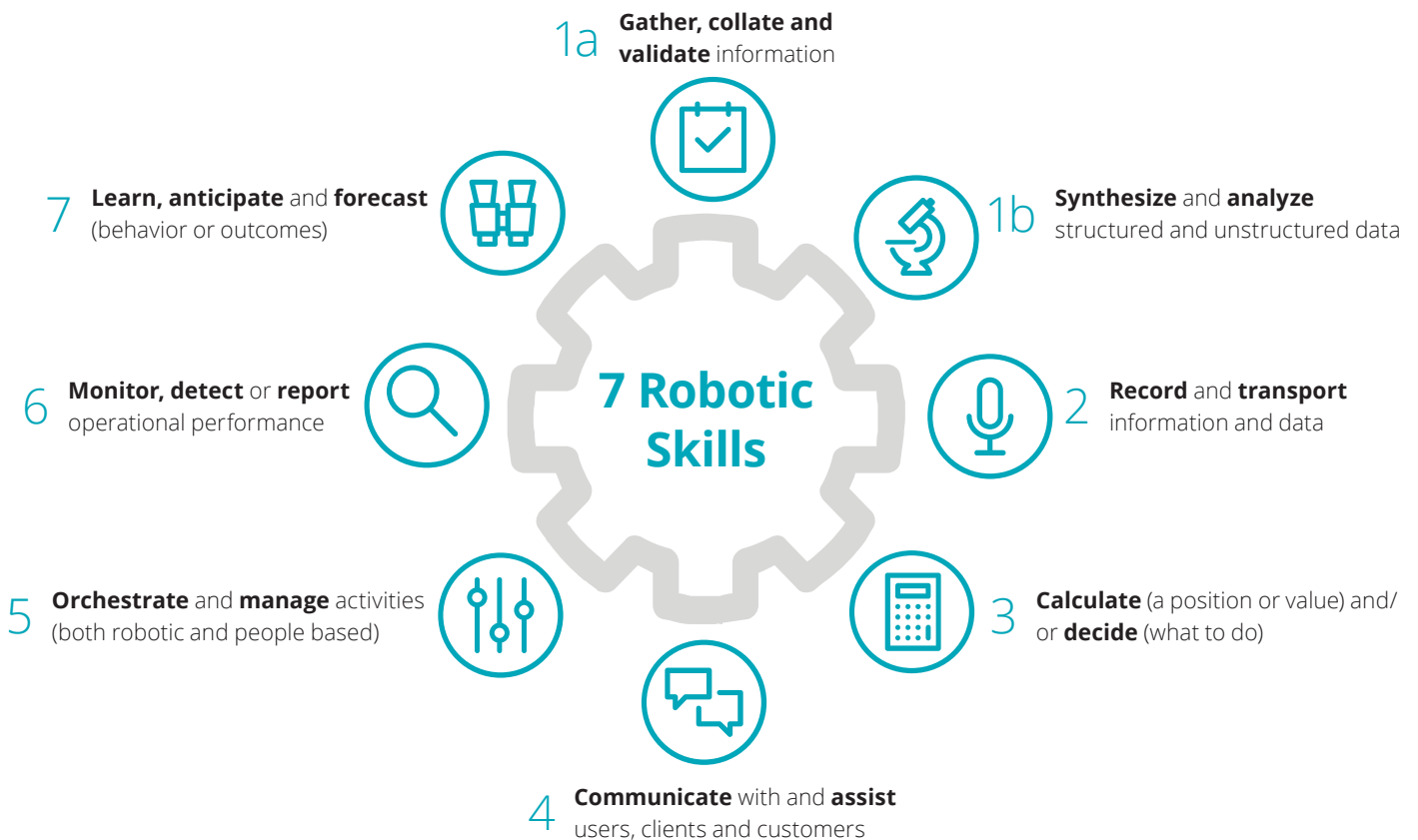
- Rule-based and repetitive
- Based on structured input data
- Mid-to-high transactional volume
- Prone to human error
- Low exception rates and process variation
- Fluctuating demand

RPA could replace much of the manual work involved in asset servicing to handle post-settlement tasks like trade processing, reconciliation and reporting—both for clients and regulators. The technology has been maturing over the past decade to a point where it is now suitable for enterprise-scale deployment, and can be rolled out quickly and at low cost.

A license for a software robot is likely to cost less than an onshore or offshore staff member, so the commercial attractiveness of this approach is self-evident. There are

non-financial benefits too, as robot-based process performance is designed to be more predictable, consistent, and less prone to errors as compared to a human process. Moreover, a robot workforce can typically be deployed in a matter of weeks. Once in place, new processes can often be assigned to them in days, if not hours. A range of robotic tools can provide powerful skills to an integrated workforce:

- Gather, collate and validate information
- Synthesize and analyze structured and unstructured data
- Record and transport information and data
- Calculate (a position or value) and/or decide what to do
- Communicate and assist users, clients and customers
- Orchestrate and manage activities (both robotic and people based)
- Monitor, detect or report operations performance
- Learn, anticipate and forecast (behaviors and outcomes)



Impact, challenges and risks

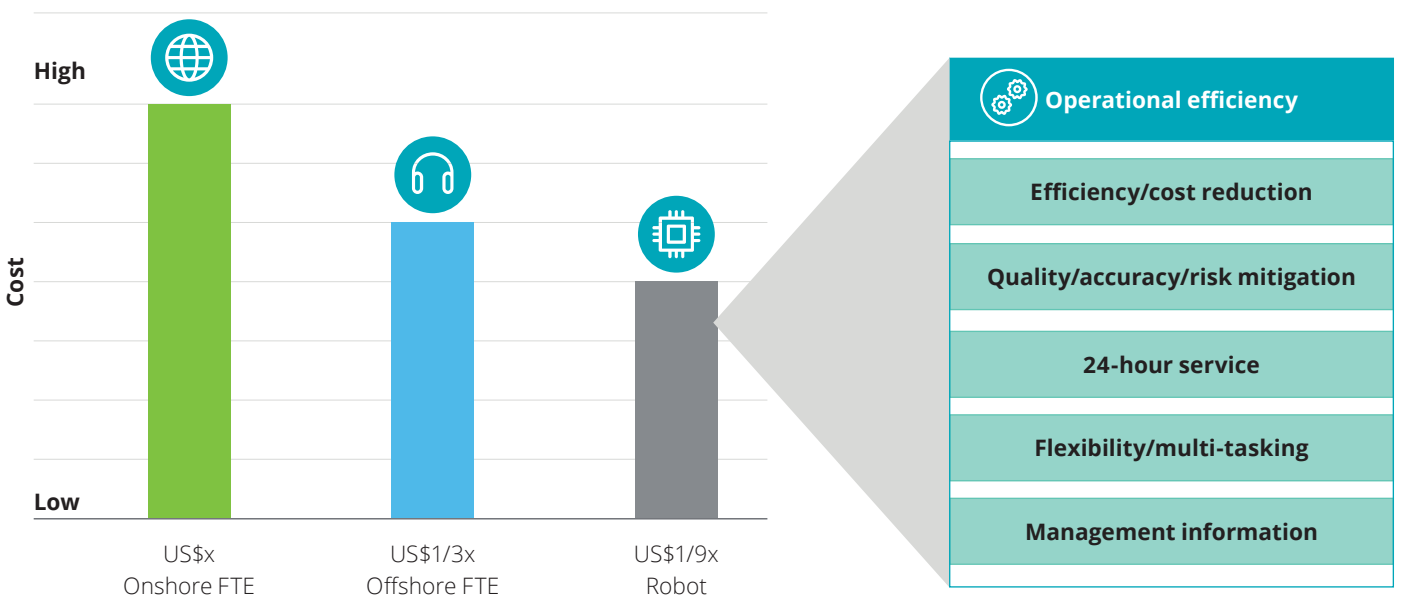
We believe RPA will be the first of the disruptive technologies to truly impact the asset servicing market. Simply using RPA tools to automate the processing of trade instructions has the potential to create significant value for any asset servicer. In addition, possible benefits also include identifying revenue leakage where invoicing processes were not aligned with price points for fund accounting and custody. "The core idea of automation in asset servicing is to replace a large amount of manual work to solve post-settlement challenges such as trade processing, reconciliation, reporting, and tax. Automation holds tremendous potential to clean up a massive amount of the chain," says Sridhar Rajan, a principal with Deloitte in New York.

India is one of the locations most impacted by disruptive technology, as it's where many of the large global asset servicers including Bank of America, HSBC, JP Morgan and Citi have significant operations employing thousands of people as a result of the large-scale offshoring initiatives over the last number of years.⁴ The tasks and processes that have been offshored were identified, documented and transferred—making them ripe for rapid automation. Some of the leading asset servicers have already started deploying RPA on a large scale to handle high-volume repeat tasks, and India's banking and financial services sector is a popular location for these early-stage exercises. ANZ Banking Group has spent the past year refining its program of work in the emerging field of RPA and their Bengaluru Hub was recently

awarded "Excellence in Automation" 2017 at the Shared Services & Outsourcing awards ceremony held in Florida.⁵ In an interview with *The Australian Review* Simen Munter, former general manager of ANZ Group Hubs, says it is not a job reduction strategy, rather it is a move to existing operations and to refocus human workers on new areas.⁶

"The hunger to do this is huge and India seems to be the place that is experimenting."

Vaishali Kasture
Deloitte India



Source: Deloitte analysis

Some proof-of-concept projects have identified the reconciliation function of asset servicing as a target for RPA. There is strong interest among asset servicers with a presence in India, through shared service centers or third-party outsourced partners, for carrying out high-volume repeat tasks. “On average there are hundreds of people doing reconciliations so that’s the first point of attack, particularly where it takes two or three days. Some elements of reconciliations are automated, but there’s also a huge piece that’s manual,” says Vaishali Kasture, a partner with Deloitte India.

The range of cost savings varies widely, but indications suggest an average of 30–40 percent is achievable. Kasture warns that although automation will deliver much higher efficiency, some error rates will remain—driving the need for four-eye and eight-eye checks. As a result, cost savings cannot be the sole measure of RPA success. In echoing this thought, it is important for organizations to be mindful of the limitations of RPA and not overestimate its capabilities. While RPA reduces the need for repetitive human effort, there are still distinct limitations in the type of work it can carry out.⁷ Prior to deploying RPA, organizations need to spend time developing their automation strategy; beginning with the idea of a proof of concept or

“Two metrics that people are excited by are improvement in quality of work and dealing with the high attrition rate in asset servicing. RPA can alleviate the headache of having to recruit and train new people.”

David Shatto
Deloitte United States

pilot implementation. Taking time to understand the critical success factors for RPA implementation, and building the business case around same, can help avoid implementation disappointment.

Globally, Deloitte member firms have had success in taking this technology and focusing it on complex customer contracts on the revenue side of the equation. According to David Shatto, Deloitte United States partner and investment management consulting leader, asset servicers and trustees have bespoke large complex global contractual arrangements with their customers. In many cases, the customized nature of these contracts restricts their ability to get the revenue

and billing correct. It also restricts their ability to process portfolios daily, or to bill based on specific events and to automate calculations to capture the revenue correctly, given for example, the unique nature of drivers around transaction volumes.

Rajan expects automation to be fully embedded in asset servicing within five years. “It won’t have replaced people entirely, but it will have supplanted some roles. If a service provider has 1,000 people doing reconciliations, I could see automation cutting that into half, or maybe more. Automation could reduce the headcount by between 60 and 70 percent, leaving FTEs to focus on the last 30–40 percent of the task—focused on real exceptions that tools cannot solve, or focused on real risk.”

RPA has also been an important area of focus for Bank of New York Mellon. Echoing Rajan’s sentiments, John Theuerkauf, Managing Director of Performance Excellence for Bank of New York Mellon, has emphasized in an interview with Process Excellence Network that robotics “is applying technology to do work in a way that is more accurate, helps us reduce risk, is more efficient, and is more effective. We then can use our talent—for better purposes within our institutions. And I think that’s a big plus for us going forward.”⁸

Blockchain

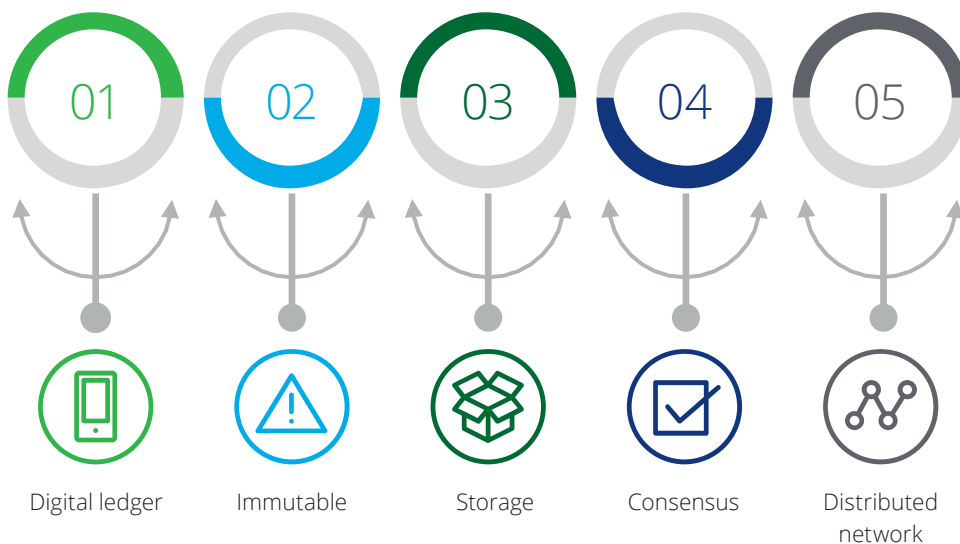
The World Economic Forum has forecast that by 2025, at least 10 percent of global GDP will be stored on blockchain platforms.⁹ One of the most widely hyped technologies right now, a blockchain is one form of a distributed database for recording transactions where every participant on the network shares a copy of each transaction. By design, blockchain doesn't need a centralized trusted authority to validate transactions. A blockchain stores data in 'blocks,' or fixed structures, comprising a header, which includes metadata, such as a unique block reference number, the time

the block was created and a link back to the previous block. A block's content typically contains a validated list of digital assets and instruction statements, such as transactions made, their amounts and the addresses of the parties to those transactions. It uses cryptographic functions to ensure the security of its data. Many industry observers see this aspect as revolutionizing how we interact and do business. It makes trading and post-trading processes more efficient, while improving regulatory control.

Impact, challenges and risks

When applied to asset servicing, blockchain would result in a completely redesigned value chain. Lory Kehoe, a director at Deloitte Ireland and head of Deloitte's EMEA Blockchain Development Centre in Dublin, believes that blockchain may eventually go so far as to eliminate the requirement for multiple onerous reconciliations. If funds are selling directly to investors, and this is recorded on the blockchain, it may also remove the need for the transfer agent to monitor subscriptions and keep a share register of participants in the fund, further streamlining the whole process.

Blockchain overview



Peter Cherecwich, President of Global Funds Services at Northern Trust, anticipates blockchain will significantly reduce the volume of paperwork associated with asset servicing, and will lower the costs of processing information internally in the business, as well as lowering the cost to the client. Northern Trust recently revealed they have co-developed what may be the world's first functioning private equities blockchain along with IBM. The regulatory node is being overseen by the UK based Guernsey Financial Services Commission and the most significant business advantage of the blockchain solution is an accelerated time to market for a new crop of high-tech private equities funds.¹⁰ Northern Trust have also been involved in the completion a proof of concept as part of the CEV Banking Consortium.¹¹ R3 is a financial innovation firm that leads a consortium partnership with over 75 of the world's leading financial institutions. The Irish Funds industry have also looked into developing a blockchain proof of concept around their regulatory requirements and submissions, exploring how a shared blockchain platform could benefit the industry as a whole.

The function of a custodian is to safe-keep securities and make sure they are assigned to an owner. "Tomorrow, if that relationship

is in the blockchain and is immutable, and all the transactions are in the blockchain, then that gives you the same value that a custodian bank provides today from an ownership point of view. That piece of their business can be replaced by a blockchain solution," says Eric Piscini, a principal in Deloitte United States and Deloitte's global blockchain leader.

A second group under threat is any risk management function that is working on trade activities, Piscini adds. "Trading securities today takes about three days to settle which requires a lot of people to manage potential risks such as exchange risk fluctuation. Piscini points out that— notwithstanding the capital impacts—if same day settlement occurred, the risk is greatly reduced, and as a consequence, so is the headcount. In exploring this further, JPMorgan Chase has teamed up with Digital Asset Holdings on a trial blockchain initiative that aims to make the trading process more efficient and cost effective.¹²

Four of the world's biggest banks including BNY Mellon and Deutsche Bank have also teamed up to develop a new form of digital cash that they believe will become an industry standard to clear and settle financial trades over blockchain. The Utility Settlement Coin, based on a solution

developed by Clearmatics Technologies, aims to let financial institutions pay for securities, such as bonds and equities, without waiting for traditional money transfers to be completed. Instead they would use digital coins that are directly convertible into cash at central banks, cutting the time and cost of post-trade settlement and clearing.¹³ Others, such as Peter Randall of SETL, favor using existing regulatory tools and issuing fiat money on the blockchain as this will ultimately allow transactions to settle directly in central bank money.¹⁴

"Many order processing and cash reconciliation jobs would disappear if we were to encapsulate everything in a blockchain-like solution. The number of FTEs in the industry will decrease but the controlling functions will probably increase."

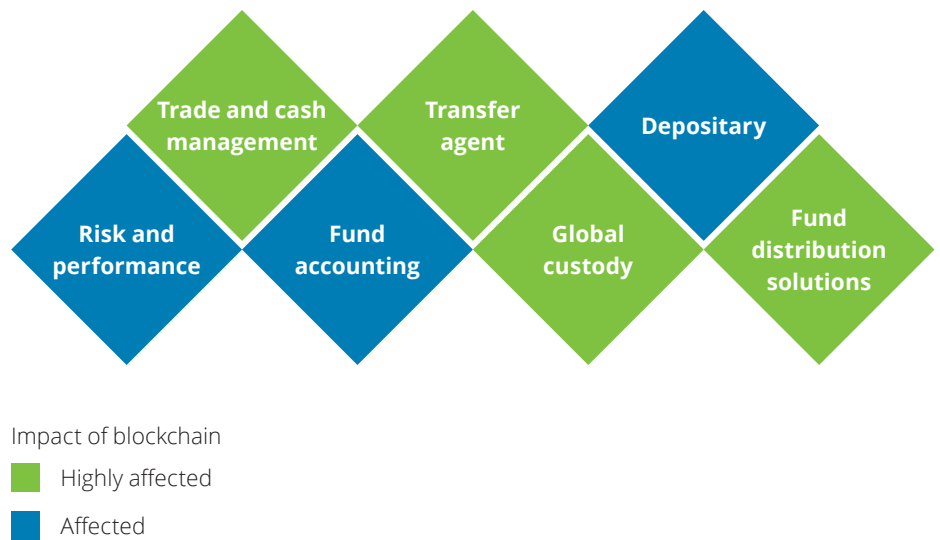
Benjamin Collette
Deloitte Luxembourg

Shatto also believes blockchain could have large ramifications for some of the key tasks that asset servicers carry out today. "A lot of what asset servicers get paid for is to reconcile transactions for institutional clients. In a perfect world virtual ledger scenario, if I can manage those functions on a costless basis, the price point and possibly the entire function potentially goes away as products because there is a free virtual ledger that allows these things to be done."

Whereas RPA can be bolted on to existing technology platforms, blockchain represents a more fundamental, transformational change to asset servicers' IT infrastructure, somewhat similar to 'open heart surgery.'

Debate rages over blockchain's readiness for the kind of wide-scale adoption that asset servicers need. Tim Bosco, Head of Innovation Strategy at Brown Brothers Harriman, believes that blockchain has the potential to be transformational, but is actually not disruptive in any way. That's because the new private and permissioned versions built for financial services require collaboration between banks, which takes time and patience. Sceptics say the technology has yet to be proven at anything other than lab scale; right now it can currently handle around five or six transactions per second which isn't sufficiently fast enough for what service providers need. Performance and throughput issues will improve, but there are some more fundamental problems around anonymity and aggregation: blockchain potentially discloses sensitive information regarding nominee accounts for example, which could lead to confidential information being leaked into the market.

Impact of blockchain on the asset servicing industry



Asset/Investment Management Program use cases



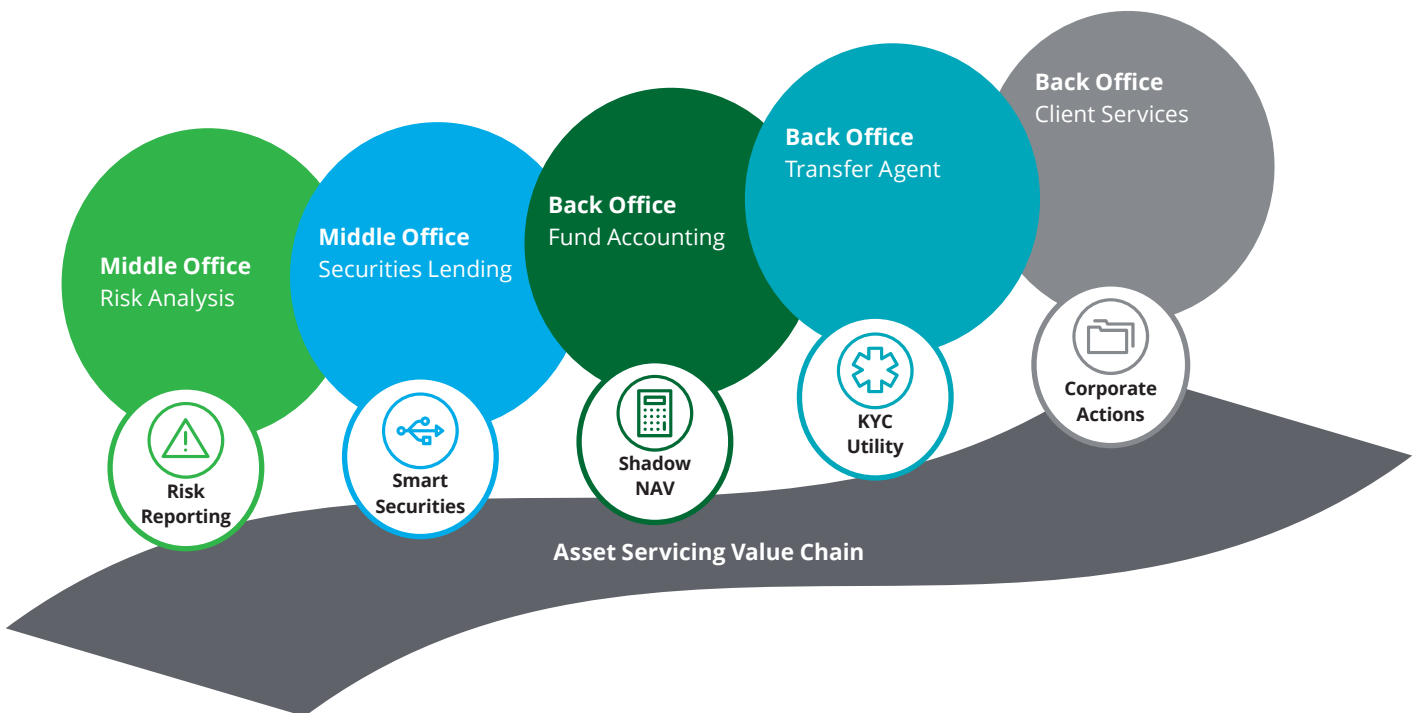
Benjamin Collette, partner and leader of strategy, regulatory and corporate finance at Deloitte Luxembourg, expects investors to be the principal beneficiaries of savings resulting from blockchain, with a smaller amount going to the service providers. "Most of the costs will be reduced because automation will streamline the older processing costs and cash settlement value chain, which will result in massive cost savings to the client. We will see the ongoing charges within funds going down

dramatically. I think there will be half a billion dollars of savings directly as a result and if you include the potential blockchain impact, you could double or triple that."

Several use cases for blockchain within the asset servicing industry have been identified which are primarily aimed toward streamlining and improving back and middle office tasks such as know your customer (KYC) utility, risk reporting, securities settlement and corporate actions.

Collette also expects blockchain will result in an industry that looks very different from a headcount perspective five years from now. The number of FTEs in the industry will decrease, as many manual tasks such as order processing and cash reconciliation will be encapsulated in a blockchain-like solution. However, Collette anticipates that although there will be significant job losses, there will be job creation in "satellites around the traditional asset servicers" in the form of positions required to operate and run blockchain systems which do not exist in asset servicing today.

Asset Servicing Value Chain



Cognitive technology

Born out of research into artificial intelligence (AI), cognitive technology comprises several areas including natural language processing, computer vision, speech recognition, and robotics. These tools and technologies are also known as intelligent automation. More advanced than bots which just perform process-based, repeatable tasks, cognitive technology mimics human judgement in its ability to recognize handwriting, identify images, and use natural language processing to interpret information. Machine learning capability allows these tools to improve over time.

Though not yet as mature as RPA, we believe cognitive technology has huge transformational potential. An important emerging trend is where enterprises are starting to employ RPA together with cognitive technologies such as speech recognition, chat-bot, natural language processing, robo-advisors and machine learning to automate perceptual and

judgment-based tasks, which were traditionally performed by humans. Integrating RPA and cognitive technologies extends the automation potential to processes that require perception or judgement and unlocks new areas within the organization to deliver business outcomes such as greater customer satisfaction, increased revenues and increased efficiency. The decreasing costs of data storage and processing power are enabling rapid developments in the field of AI.

Today, wealth management firms use intelligent automation to review and analyze portfolio data, determine meaningful metrics, and generate natural-language reports for their customers on the performance of each of their funds. The uses of AI are potentially limitless, but the tools are also more expensive to deploy than RPA tools and they take months, rather than weeks, to implement.

Impact, challenges and risks

Deloitte describes cognitive technology as a stage in a journey—an evolution of RPA seen on a continuum. According to Rajan, RPA is around “taking functions that are automated by using software as if it was a human interacting with a machine, and joining the dots. Cognitive systems take their place at the more complex side of the journey. It has some drawbacks: whereas it’s possible to walk back through a process to track an error, that’s not so easy to achieve with cognitive systems.” Notably, in discussions with Hu Liang, Senior Managing Director and Head of Emerging Technologies Center at State Street, he views RPA as neither emerging nor disruptive, and believes that augmented interfaces are where the next real disruption resides.



Asset manager Bridgewater Associates has been quick to recognize the power of cognitive computing. They now have a dedicated AI unit which is responsible for developing trading algorithms that make predictions based on historical data and learn how to respond to changing markets.¹⁵ Other asset managing firms are advancing in the AI space as well; Goldman Sachs is investing heavily in financial analytics firm Kensho; Blackrock purchased Digital Investment Manager, a future advisor; and Invesco has purchased the platform Jemstep which is a robo advisor that enhances the way financial advisors run their business.¹⁶

It is believed that cognitive solutions will be more enterprise-wide, rather than be deployed to address specific areas in asset servicing. We have seen many case studies of organizations that have deployed automation and which suggest that the majority of organizations are focused on increasing the efficiency and effectiveness of their workforce rather than eliminating it, and the people relieved of routine tasks are re-focused toward more valuable or rewarding activities. Interestingly, with more advanced and complex automation comes not only increased efficiency, but also an increased dependency on the accuracy and skill of the human operators involved.

Therefore automation of tasks does not necessarily lead to loss of jobs. Workforce augmentation, rather than replacement, may be a more likely outcome. By freeing up a person's time, employees can now focus on more advanced and engaging tasks, and over time, organizations could see lower turnover, higher morale, and increased internal innovation. We expect to see further efficiency gains when RPA, blockchain and cognitive technologies converge, and service providers will face a choice of what savings to pass on to clients, and what to retain as profit.

Lower FTE costs are the logical conclusion from introducing increased automation into a system, but there is increasing evidence to show that the leaders in this area have identified other initial benefits. Cormac Dinan, Director in Deloitte Ireland's Investment Management team highlights that early movers, such as Business Process Outsourcing, feared their model was threatened by RPA. After studying it, many formed the view that the bigger benefits are increased efficiency and improved customer service. Bots improve processing quality and they enable 24/7 service—cost saving is not necessarily the number one priority.

Some proof of concept initiatives were deemed failures simply because the sponsors didn't define what success looks like. If it's seen as a pure cost play and the cost doesn't reduce, then the project is considered a failure. As noted by Kasture, it is better to set multiple goals, such as the ability to function with reduced headcount, to take quality of process from 90 to 99 percent, or to reduce operational incidents by half.

According to Singularity University, as each generation of technology improves over the last, the rate of progression speeds up. Further, as a technology becomes more effective, it attracts more attention. The result is a flood of new resources—such as increased research and development budgets, recruiting top talent, etc.—which are directed to further improving the technology. This wave of new resources triggers a “second level” of exponential growth, where the rate of exponential growth also begins accelerating. However, there are strong arguments in favor of creating safeguards and standards in advance to better defend against any potential negative consequences of exponential technologies, particularly AI. Research has emphasized the need to create AI that demonstrates core human values and is fundamentally on our side. In the business world, this means that ultimately the winning formula is humans-plus-AI processes.¹⁷

Preparing for the wave of disruption

Five years from now, the asset servicing industry will look very different. The onward march of disruptive technology calls for a profound shift in thinking among asset servicing providers. Regulation was the driver for the past decade's activity; the next five years will see technology at the forefront of providers' strategic thinking. This means scaling investment in technology and the technology organization within their business. In the age of fintech, tomorrow's asset servicing organization will be a technology-enabled utility rather than today's service provider model.

The alternative is obsolescence. "Asset servicers have to view themselves as a technology company, not just as an asset servicer that might be part of a broader bank. They need to make changes to their infrastructure or else they will struggle," says Cary Stier, global leader of Deloitte's investment management group.

"Without question, they need to dive in, create a proof of concept and they need to step back and understand the impact of this technology on their business. You can't just define yourself by what your competition is doing. You want to define yourself by how you want to be perceived in the market, and show you have thought through how these technologies will transform your business."

Upskill senior management

Change the profile of your senior management team to include more technology-aware, technology-focused senior executives.

"Heads of function such as the CEO, CFO, CRO and CMO all need to understand the implication of technology, which requires people with a different skillset and experience, and a more technology focused culture in the organization."

David Dalton

Global investment management consulting lead

Shift hiring plans

Asset servicers will also be significantly smaller from a human resources perspective. We believe there will be significant FTE reduction in traditional roles, with technology potentially eliminating functions like reconciliation and transfer agency. On the other hand, as technology becomes more embedded in asset servicers, they will need developers to program and maintain robots.

Automation will replace functions, not jobs, and technology will augment, not replace, the role of humans. We foresee a hybrid workforce of autonomous FTEs and bots. Service providers should start thinking about the skills required around governance and managing this resource pool. This also raises questions around retaining knowledge within the business and how to develop the people without becoming exclusively reliant on technology.

"This is not just about eliminating a certain percentage of the workforce. It is a shift in the importance of technology and it could mean competing for a different type of resource than asset servicers have competed with before. But you can't change recruitment strategy until you know what your vision is and how you build it," says Cary Stier.

Recruit expertise

"Hire an innovation leader who will be very close to the executive committee of the company, and give real substance to the strategy business unit of asset servicing," says Simon Ramos, a partner at Deloitte Luxembourg. In practice, this could mean moving power from the COO to the strategy and innovation function.

Move up the value chain

Disruption is an opportunity to strengthen client relationships. "Asset servicers should focus more on how they provide more value added services—spending more time talking to the client, more time providing them with market and regulatory intelligence and becoming the trusted business partner of the asset manager instead of just being its back office," notes Ramos.

Define success

Defining multiple project goals clearly and avoid focusing solely on cost reduction will increase the likelihood of a project being determined a success. Experiments led from the bottom-up rather than top-down work in most cases. As highlighted earlier, joint ownership between technology and operation also increase the chances of project success and avoids silos.

Get faster, fast

It's critical for asset servicers to form a point of view about the technology that

threatens to disrupt their market. Many asset servicers rely on big, monolithic technology platforms. It's no longer acceptable to use 18-month IT deployment windows. You've got to come to market faster, so you need to architect your IT to iterate faster. "Every quarter isn't fast enough. How do we move to automated testing and deployments so your time to market for change reduces? If you have that agility, you can react to what's happening on the periphery and that leaves more space to think about blockchain, because that's like performing heart surgery for

current IT platforms," says Mark Heaton, senior manager, Deloitte United Kingdom.

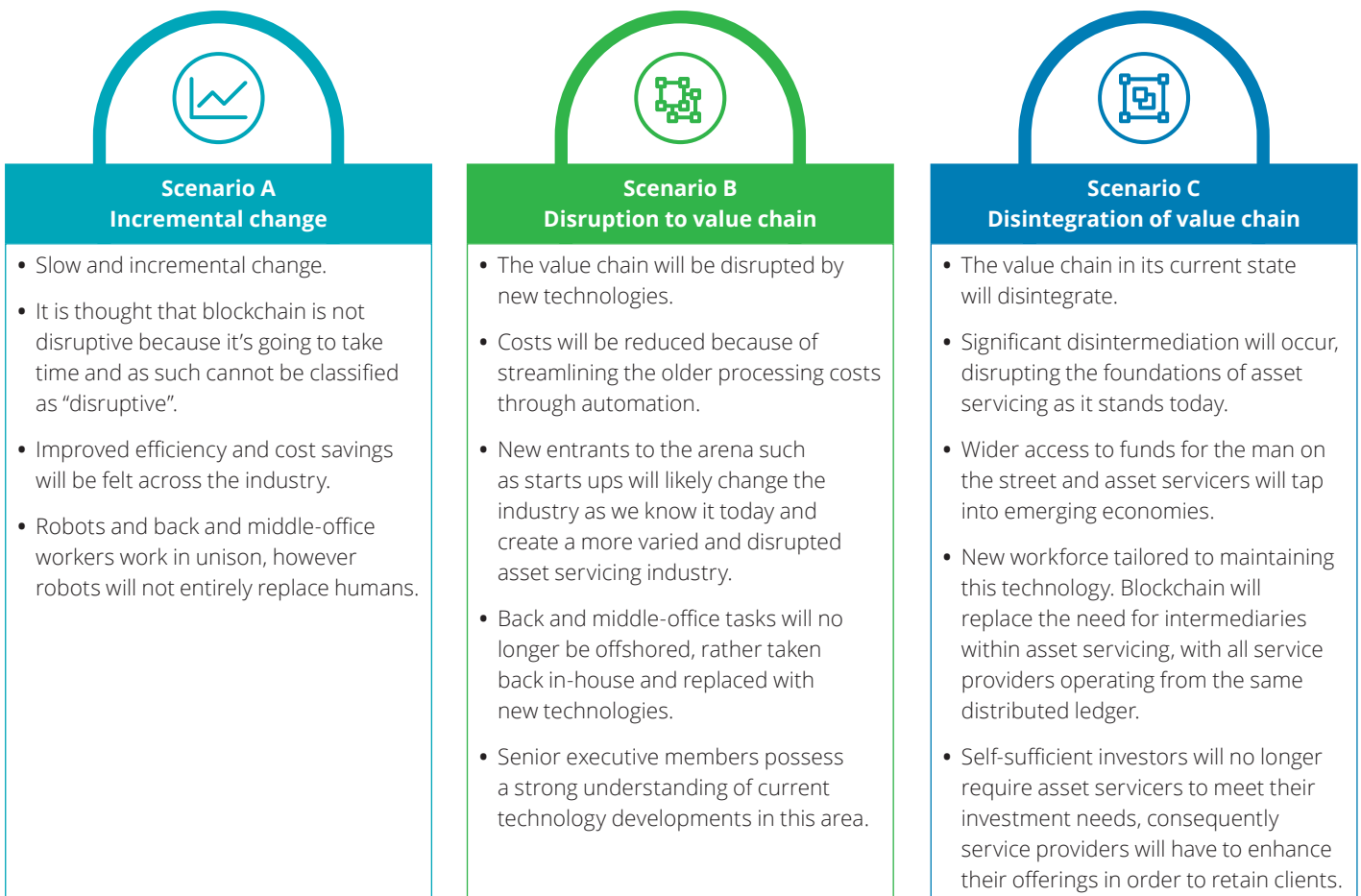
Split divisions

Organizations should consider setting up a purely technology-focused operation with high levels of automation and no legacy systems and processes, possibly as a joint venture with a fintech play. This would run in parallel with the existing asset servicing business, and could even be separately branded. It could be scaled up while winding down the legacy operations over a similar time period.



Possible outcomes

Three outcomes have been identified as possible avenues that the asset servicing industry will take over the next number of years. Scenarios A, B and C discuss what the potential impact that disruptive technology will have on the value chain of the asset servicing industry.



We believe scenario B to be the most likely outcome, whereby the value chain will be disrupted, but not disintegrate entirely. However, in order to capitalize on the upward growth trend and increase profits, asset servicers will need to invest in new technology to meet the needs of their evolving client base. RPA, cognitive systems and blockchain will create an asset servicing industry that looks very different from what we see today, but this disruption will happen in stages over the next three to five years. We anticipate a domino effect whereby asset servicers will begin implementing RPA to tackle low-level, repeatable, process-based tasks. They will follow this with blockchain as this technology matures. As RPA becomes embedded, it will pave the way for introducing cognitive technology and AI that applies rules and human-like judgement to asset servicing roles.

It's always better to be the disruptor than to be disrupted. Now is the time for asset servicers to start formulating tactical and strategic plans, in order to be ready for when the technologies' tipping point arrives and the waves begin to crash down on the industry.

End notes

1. "Robots will strike investment management first," Bloomberg, May 3, 2016
<https://www.bloomberg.com/news/articles/2016-05-03/cfas-warn-asset-management-firms-should-fear-fintech-most>
2. Deloitte Research, 2017
3. "Exponentials watch list: Science and technology innovations on the horizon," Tech Trends 2017, Deloitte, January 2017. <https://dupress.deloitte.com/dup-us-en/focus/tech-trends/2017/exponential-technology-digital-innovation.html#my-take>
4. "Banks offshoring more than 80,000 tech jobs," efinancialcareers.com, 20 February 2013
<http://news.efinancialcareers.com/ie-en/134803/banks-offshore-as-many-tech-jobs-as-apple-employs/>
5. Shared services & Outsourcing Week, <https://www.sharedservicesweek.com/awards>
6. "Rise of the machines as ANZ brings in robot workers to do the 'boring' jobs," AFR, August 2015.
<http://www.afr.com/technology/rise-of-the-machines-as-anz-brings-in-robot-workers-to-do-the-boring-jobs-20150820-gj3fp6#ixzz4cbn7jiYE>
7. "The line between hype and reality for Robotic Process Automation," Genpact. 2014.
<http://www.genpact.com/docs/default-source/resource-/the-line-between-hype-and-reality-for-rpa>
8. "Why Robots are coming soon to a process near you" (2016)
<https://www.processexcellencenetwork.com/pex-tools-technologies/interviews/why-robots-are-coming-soon-to-a-process-near-you>
9. Deep Shift Technology Tipping Points and Societal Impacts, World Economic Forum, 2015.
10. "Northern Trust Goes Live With IBM-Powered Private Equities Blockchain", CoinDesk.com, 22 February 2017
<http://www.coindesk.com/northern-trust-goes-live-ibm-powered-private-equities-blockchain/>
11. "What does the integration of blockchain mean for mutual funds?" Pete Cherecwich, July 2016. <https://www.northerntrust.com/documents/articles/asset-servicing/what-does-the-integration-of-blockchain-mean-for-mutual-funds.pdf>
12. "JPMorgan Partners With Digital Asset for Blockchain Trial," CoinDesk.com. 1 February 2016.
<http://www.coindesk.com/jpmorgan-digital-asset-blockchain-trial/>
13. "Big Banks Band Together to Launch Settlement Coin," CoinDesk.com, 24 August 2016.
<http://www.coindesk.com/report-banks-band-together-launch-settlement-coin/>
14. "Deloitte, SETL create blockchain-based contactless payment card," Reuters UK, 15 November 2016.
<http://uk.reuters.com/article/us-banking-blockchain-payment-idUKKBN13A00T>
15. "Five key trends in disruptive technology - No1: Watsonisation," Private Equity Wire.com, 19 September 2016.
<http://www.privateequitywire.co.uk/2016/09/19/243769/sei-identifies-five-key-trends-disruptive-technology-no1-watsonisation>
16. Artificial Intelligence: "I, fund manager", Funds Europe.com, February 2016.
<http://www.funds-europe.com/february-2016/17602-artificial-intelligence-i-fund-manager>
17. "Technology feels like it's accelerating – because it actually is," Singularity University, 22 March 2016.
<https://singularityhub.com/2016/03/22/technology-feels-like-its-accelerating-because-it-actually-is/>

Global Investment Management contacts

Cary Stier

Global Leader
Investment Management
Deloitte Global
Email: cstier@deloitte.com

Tony Gaughan

Deloitte United Kingdom
Email: tgaughan@deloitte.co.uk

Simon Ramos

Deloitte Luxembourg
Email: siramos@deloitte.lu

David Dalton

Global Consulting Leader
Investment Management
Deloitte Ireland
Email: ddalton@deloitte.ie

Yariv Itah

Deloitte United States
Email: yitah@deloitte.com

Dave Shatto

Deloitte United States
Email: dshatto@deloitte.com

Neil Brown

Deloitte Australia
Email: nbrown@deloitte.com.au

Jagat Patel

Deloitte United States
Email: jagpatel@deloitte.com

Bruce Teron

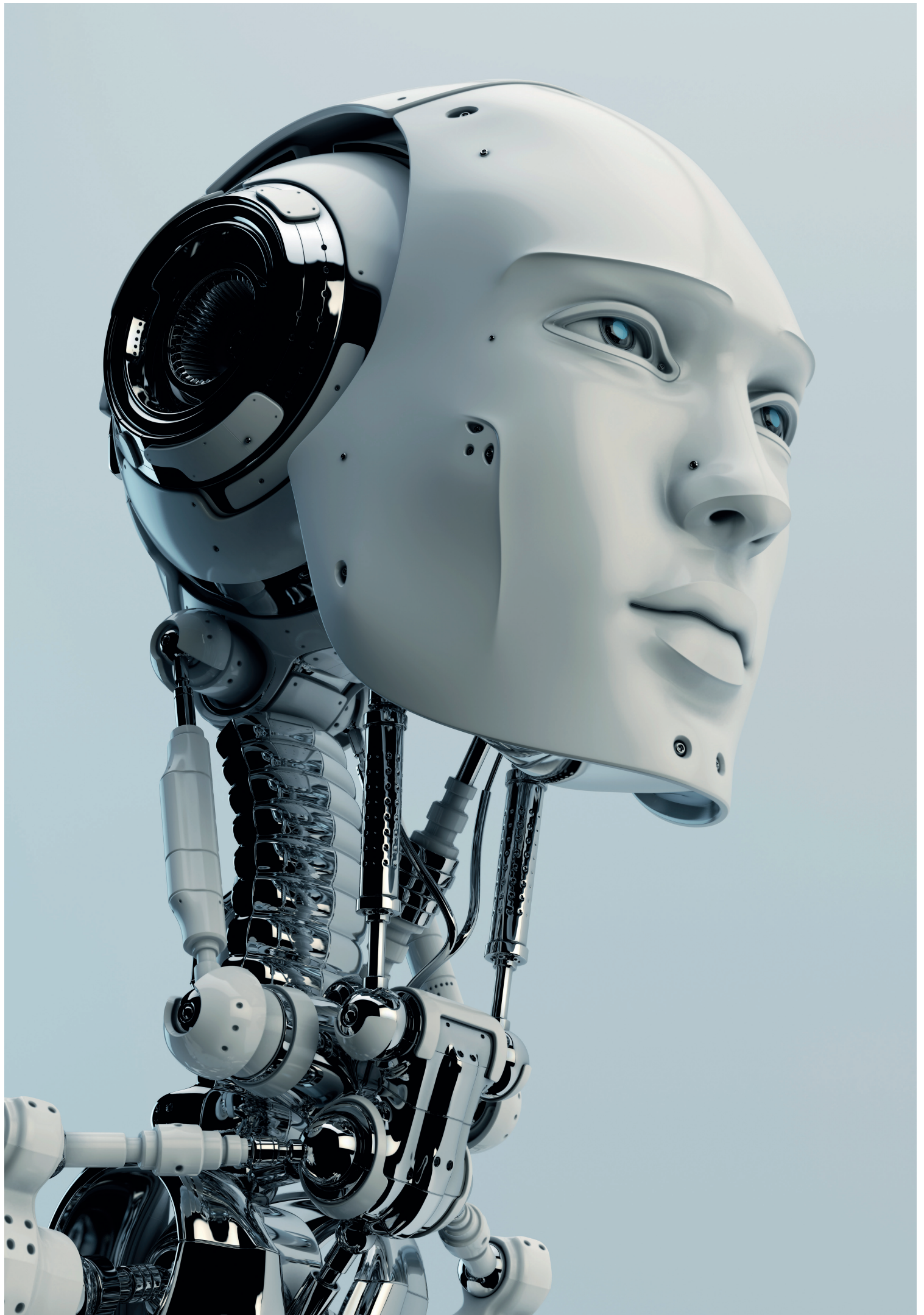
Deloitte Canada
Email: bteron@deloitte.ca

Contributors

We would like to thank the following individuals for their contributions to this report:

- Tim Bosco, Head of Innovation Strategy, Brown Brothers Harriman
- Peter Cherecwich, Executive Vice President, Northern Trust
- Hu Liang, Senior Managing Director-Head of Emerging Technologies, State Street
- EMEA Asset Servicing Centre of Excellence

We would also like to thank Deloitte colleagues for their contributions to this report: Benjamin Collette (Luxembourg); Cormac Dinan (Ireland); Mark Heaton (United Kingdom); Vaishali Kasture (India); Lory Kehoe (Ireland); Eric Piscini (United States); Sridhar Rajan (United States); and Lisa Simpson (Ireland).



Contacts

**Simon Ramos**

Partner - Advisory & Consulting IM
Leader
Deloitte Luxembourg
+352 451 452 702
siramos@deloitte.lu

**Benjamin Collette**

Partner - Strategy, Clients
& Industries Leader
Deloitte Luxembourg
+352 451 452 809
bcollette@deloitte.lu

**Kiesch Lou**

Partner - Regulatory Consulting Leader
Deloitte Luxembourg
+352 451 452 456
lkiesch@deloitte.lu

**Benjamin Lam**

Partner - Investment Management
Leader
Deloitte Luxembourg
+352 451 452 429
blam@deloitte.lu

**François-Kim Hugé**

Partner - Fund Registration Services
Deloitte Luxembourg
+352 451 452 483
fkhuge@deloitte.lu



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee ("DTTL"), its network of member firms, and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as "Deloitte Global") does not provide services to clients. Please see www.deloitte.com/about to learn more about our global network of member firms.

Deloitte provides audit, consulting, financial advisory, risk advisory, tax and related services to public and private clients spanning multiple industries. Deloitte serves four out of five Fortune Global 500® companies through a globally connected network of member firms in more than 150 countries and territories bringing world-class capabilities, insights, and high-quality service to address clients' most complex business challenges. To learn more about how Deloitte's approximately 264,000 professionals make an impact that matters.

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively, the "Deloitte Network") is, by means of this communication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser. No entity in the Deloitte Network shall be responsible for any loss whatsoever sustained by any person who relies on this communication.