KPMG

# Transforming the in-house tax function in China through technology

## A practical guide to 2020

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# Part C

# A glance into the future

***Bots are another way of using process and technology to solve a problem. They are best implemented when there is (or can be) high standardization and high volume.***

In this publication we described a framework which helps to determine, deploy and deliver on a tax technology strategy.

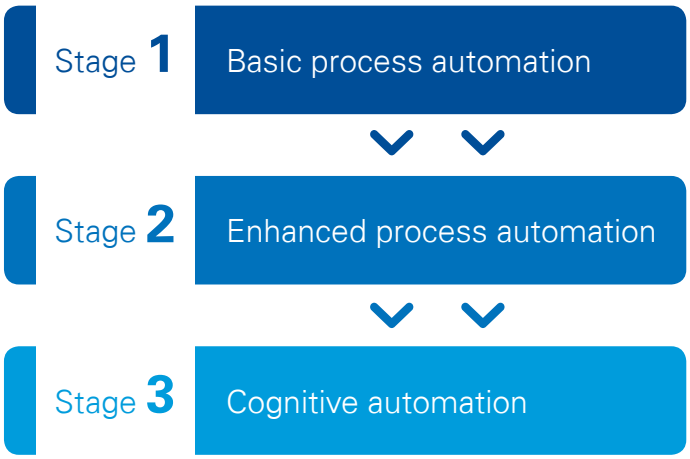
The "why" question is fundamental and effectively provides the basis for the other three key questions (what, who and how), independently of the type of technology being used. As such when we talk about new and emerging technologies, these do not really affect the reason "why" we deploy them – the "why" is still to achieve benefits in areas such as efficiency, optimisation, accuracy, insights etc. However, new and emerging technologies typically impact "what" is being deployed, as well as "who" you will need to deploy them, and "how" to deploy them.

To better understand some of these new and emerging technologies, and how these can help the tax function in the future, we have grouped a vast array of new and emerging technologies into two main categories – intelligent automation technologies and distributed ledger technology (commonly referred to as 'blockchain'). While these two categories may not perfectly encapsulate the full spectrum of new and emerging technologies, it does provide a framework through which to understand an increasingly complex and fast changing environment.

# Intelligent automation technologies

Readers may have heard of new and emerging technologies with buzzwords such robotic process automation (RPA), machine learning (ML), enhanced process automation, natural language processing (NLP), artificial intelligence (AI) and cognitive automation. It is not difficult to feel intimidated by this vast array of terminology which sometimes feels like it belongs to a dystopian universe.

In a recently published article in the Tax Executive[11], our KPMG colleagues in the US helpfully clustered these solutions under the banner "intelligent automation", and then equally as helpfully, plotted the timeline for their usefulness to tax and finance functions. The summary below is extracted from that article, though with minor modifications to remove US specific references:




[11] 'Bots, Natural Language Processing, and Machine Learning', Rainey, S, Brown B and Kirk, D, Tax Executive, 21 September 2017, http://taxexecutive.org/bots-natural-language-processing-and-machine-learning/

# Stage 1 – Basic process automation

Robotic process automation, RPA, bots, process automation, basic process automation, basic robotic process automation—these terms describe essentially the same thing. Confusion often arises from the term "robotic" in robotic process automation; why call such a solution "robotic" if the automation doesn't use physical robots?

The short answer is that "robotic" describes the underlying process, not the automation. In other words, we are automating a process that is naturally robotic, even if humans perform it with manual labor. Such work is done the same way over and over, like copying content from field A and pasting it into field B. When we apply automation technologies to this process—that is, we automate it—we consider that solution a software robot.

**Basic process automation** (or, for simplicity's sake, a "bot") leverages a class of technology to automate rudimentary processes found in almost all organizations today. Many tax departments have begun exploring the use of bots to automate repetitive tasks.

You may be familiar with creating a macro within Microsoft Excel. That macro typically automates sequential mouse clicks within Excel. By analogy, in its simplest form, a bot is also a macro. However, the bot is a macro that can sit atop multiple software programs rather than be confined within Excel. In this way, bots appear to integrate various software programs.

In the past, a computer programmer could always write software code to integrate disparate software programs. However, the newer class of bot software has a user interface where a tax professional can more easily program a bot. As a result, professional software programmers may be unnecessary.

The processes most suitable for basic process automation are typically repetitive, involve multiple systems, and follow very explicit steps, such as when a human captures (cuts) information from one system (e.g., the trial balance from a legacy mainframe system), possibly reformats that data, and then enters (pastes) it into another system (e.g., an Excel spreadsheet).

***The real power of cognitive computing is its ability to ingest massive amounts of data about which to formulate hypotheses.***

These tools leverage capabilities such as work flows and rules engines to automate existing manual processes. A particular bot program may reside on the desktop and run at the user level (acting as human users, with system logon credentials like users have), or it may be deployed on a server and accessed by multiple users.

***Tax functions are often seen as being more compliance-driven with less focus on adding value to the core revenue driving processes.***

As an example, suppose your new tax software requires that you set up a folder for every unique branch. The setup involves selecting (or clicking) the same six options for each folder. You click once to create the folder, click again to select which branch you want, then again to indicate that you want all the subfolder options, and so on.

Without being augmented with a bot, a tax professional would be required to click 60,000 times just to set up the folders needed to ensure compliance. But with a bot, because the process is standard and repeatable, it can be automated using the bot software, thereby reducing 60,000 clicks to a single click. Once programmed, with a press of a button, the bot will go through all 60,000 steps in a fraction of the time that, and far more precisely than, any human could.

In general, these basic automation tools can be thought of as quick-hit technologies that allow for an incremental approach to automation. Bots are another way of using process and technology to solve a problem. They are best implemented when there is (or can be) high standardization and high volume. Like all tools, they have strengths and weaknesses. Bots should be viewed as a supplement to other technology tools; they may be great tools in specific situations, but may not be the best in others.

## Stage 2 - Enhanced process automation

**Enhanced process automation** leverages capabilities beyond those discussed above. The tools/platforms involved with enhanced process automation typically can:

– understand natural language (through natural language processing, or NLP) and therefore interpret unstructured data (i.e., data that is not organized in a predefined structure, such as free-form text); and

– use "machine learning" (ML) to develop a knowledge base by consuming significant amounts of data to learn and develop a set of algorithms. This set of algorithms is then used to make predictions about data.

With these abilities, tools in this category can deal with processes that may involve many complex transactions and require a deeper level of analytics involving both structured data (e.g., a database) and unstructured data (e.g., free-form text). At the same time, these tools can leverage years of experience gained across multiple sets of data, information, and knowledge.

A combination of natural language processing and machine learning makes it possible to automate the capture, array, and analysis of unstructured data and transform it into structured data that may be used in a tax application. Hence, the tax filing process may be expedited, and quality and consistency can be enhanced by reducing the likelihood of manual errors.

In general, enhanced process automation tools are more complex and take longer to develop and implement than basic process automation. These tools typically also take longer to integrate into the environment, do not reside on the desktop, and may require connections to the cloud to gain the maximum benefits.

## Stage 3 - Cognitive automation

**Cognitive automation** is probably the most confusing and most hyped technology but also holds the greatest potential to revolutionize how you work. Not surprisingly, it also requires the largest investment in time and dollars.

What is cognitive automation? Cognitive software mimics human activities such as perceiving, inferring, gathering evidence, hypothesizing, and reasoning. And, like humans, cognitive software is taught rather than traditionally programmed.

In other words, while we program explicit steps into a traditional computer to solve a problem, in a cognitive solution, we teach the tool the area of interest, or "domain." Once the base domain knowledge is established within the software, the cognitive solution typically continues to learn and solve problems within that domain, generally all on its own.

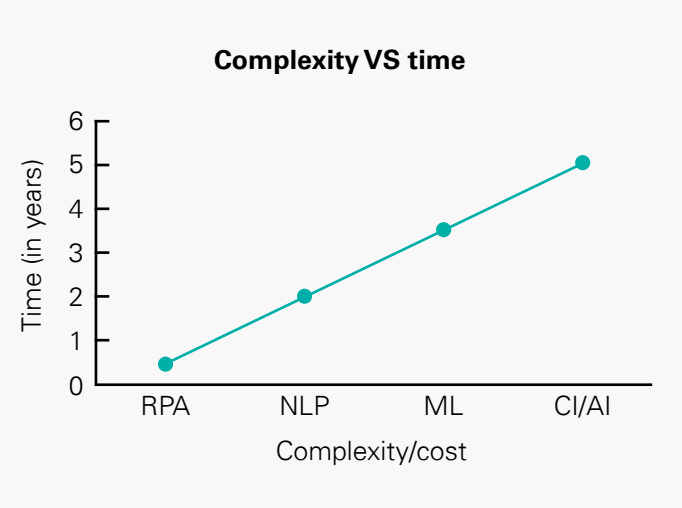
A domain may include all or a portion of a tax regulation or rule.

The real power of cognitive computing is its ability to ingest massive amounts of data about which to formulate hypotheses. The human brain cannot handle this volume of data and does not have the time to absorb it, let alone process it.

When cognitive solutions are combined with automation, these systems can be trained to execute judgment-intensive tasks.

# What this means

When plotted on a graph, the evolution of these technologies may appear something like this:




A concrete example for a tax function is to use RPA software for periodic (often time-consuming) VAT/GST reconciliation processes. These processes are repetitive and contain relatively simple tasks: run ERP reports, load into Excel, compare and match certain data points and produce a list of non-reconciling items. By using RPA, the time to run such a process can be reduced from 3-4 hours to a matter of a few seconds.

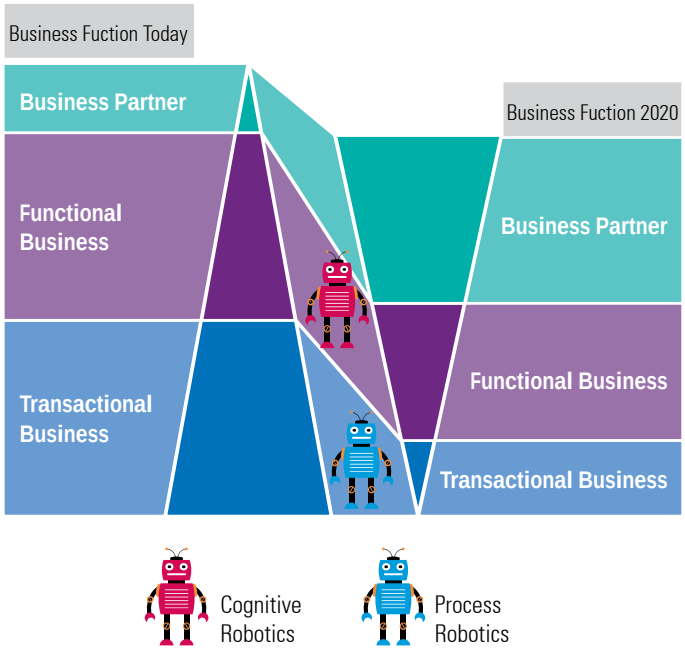
The diagram on the right illustrates how we foresee that tax functions will change over the next five years and the role which basic automation (RPA) and cognitive automation will play.

At this moment, most time in organizations is spent on transactional (task-driven) and functional (reasoning) processes. These functions are usually more internally oriented, since they aim to support internal business operations. Less time is spent on activities that truly add value which is associated with being a business partner in the organization. This is why tax functions are often seen as being more compliance-driven with less focus on adding value to the core revenue driving processes. Importantly though, the use of RPA and cognitive solutions will enable those transactional and functional processes to be largely automated, thereby allowing more time to be spent on value adding activities, more closely associated with being a business partner in the organization.

Right now, as much as 80 percent of the world's data is unstructured.[12] What's more, 90 percent of this unstructured data has been created since 2011.[13] The ability to leverage this data, meaningfully consume it, and build the associated knowledge ontology in an automated fashion changes the promise of this technology.

While the tremendous upside of cognitive automation tools is tantalizing, they generally require a much more significant investment in time and resources, including personnel, training, and dollars. The contextual learning stage alone can represent an investment measured in years, not months. These are not back-office tools for which you can write a script and fire off an automation program.

The role of cognitive automation in the tax profession, and in the business world in general, is still evolving. But we are still in the early days of the evolution of these technologies, and much has to be learned, developed, and tested—and these are not inexpensive endeavors.




[12] 'Structure, Models and Meaning: Is'Unstructured Data Merely Unmodeled?' Seth Grimes, Information Week, February 7, 2005, www.informationweek.com/software/information-management/structure-models-and-meaning/d/d-id/1030187?

[13] 'Big Data, for Better or Worse: 90% of World's Data Generated Over Last Two Years', SINTEF, Science Daily, 22 May 2013, www.sciencedaily.com/releases/2013/05/130522085217.htm.

# Distributed ledger technologies (i.e. blockchain)

One of the most hyped technologies over the past year or so is distributed ledger technology, often referred to as blockchain. The most widely known example of blockchain technology is Bitcoin. However, while many people may have heard of Bitcoin and some may have a rudimentary understanding of blockchain, its use in the tax function is less well known.

In its simplest form, **blockchain** technology or distributed ledger technology (DLT) refers to a distributed database – that is, data not being stored in a central place but rather, decentralised across multiple platforms. At the core of the blockchain are "digital ledgers" that are distributed amongst all network participants to serve as a common source of truth – all parties store, and access their copy of the database, but with no single control hub holding a master key. In this respect, one of the key advantages of blockchain is that databases can be shared across many users without having a central administrator who proves and validates all transactions. Instead, blockchain transactions contain their own validity proof so that the role of an intermediate authority in that transaction (for example, a bank) may become obsolete.

The technology ensures that access to records in the database is granted to the users that own the specific part or a "block". Blockchain therefore also feeds demand for transparency, as the ledger may be public and searchable. It is also almost impossible to change the information in the blocks because all blocks refer to other blocks (the chain) and are cryptographically protected.

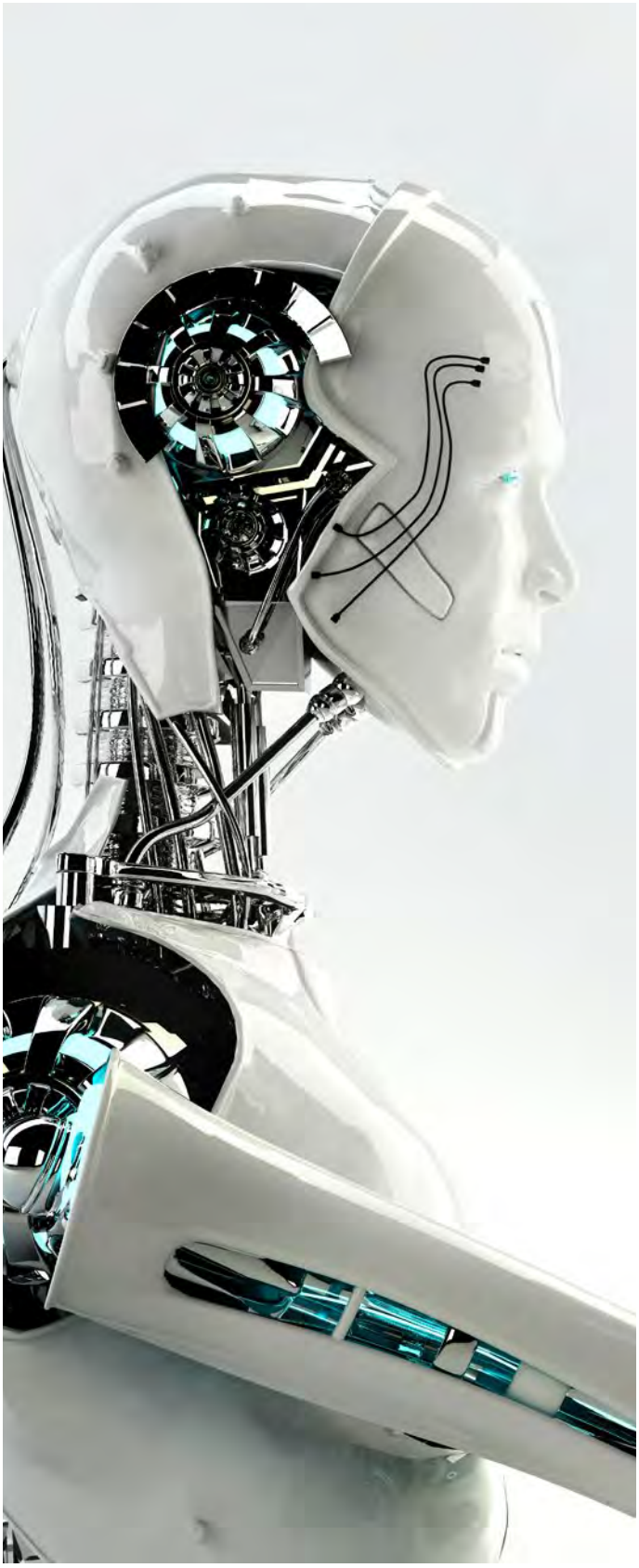
The best analogy to describe how blockchain works is to relate it to how real estate transactions may occur. Assume you are buying a parcel of land. However, in order to buy that parcel of land, you will want to prove that the seller owns the land so that they can convey good title to you. Likewise, when that seller wanted to prove title to the land they purchased, they also sought proof of ownership of the land from the seller they bought from. This process of proving each owner of the land may repeat itself until such time as we establish good title to the land right back to the original grant of the land use rights by the local government. This is effectively what blockchain is. It is a series of blocks which establish or record ownership or title to an asset between parties. In reality though, this proof of ownership is managed for us through the system of property registration managed by the government. The variation in the analogy in this case though is that blockchain allows private parties to do this directly between them, without the need for a governmental authority acting as an arbiter.

***Blockchain transactions contain their own validity proof so that the role of an intermediate authority in that transaction (for example, a bank) may become obsolete.***

While this analogy may be helpful to explain the concept of 'blockchain', let's use a different analogy to explain how it also serves as a common source of truth.[14] If we remember back to our school days in the playground playing lunchtime football with our classmates. Typically there was no referee, or in transactional terminology, there was no intermediary. Similarly, there was no scoreboard. Instead, the 'source of truth' in terms of the score would always be the collective decision of the players on the field. This means that if a goal was scored and accepted as being legitimate, both teams would acknowledge the score was 1-0. In this sense, the source of truth lies in all participants, and no single participant would be the arbiter. This is again how blockchain works. Where the transaction follows the rules laid down by the participants, the outcome of the transaction in terms of how it is recorded in the blockchain itself would be the source of truth.

Now there is one further concept which needs to be understood before we examine the application of blockchain in a tax context. And that is the concept

[14] This analogy is adapted from the following blog - https://martinjeeblog.com/2017/10/10/the-best-blockchain-analogy-ever/



of 'smart contracts'. This is a term which we do not particularly like, because it firstly implies that other contracts are somehow 'not smart', and secondly, it suggests some kind of shortcut way to contracting. In reality, even things like standard terms which are used by many companies to manage straightforward commercial arrangements for the supply of goods or services do not replace the need for negotiation, in certain circumstances.

The concept of **smart contracts** really only refers to contracts which underpin how the blockchain works, and are entered into, verified and settled automatically. In the analogies used above, the blockchain acts as the source of truth in terms of the ownership of the land, or in terms of the score on the football field. But what 'smart contracts' seek to do is to expand the blockchain beyond merely recording ownership or title to an asset, to actually executing the transactions. In other words, 'smart contracts' attach to, and form part of, the blockchain transaction to record not only the transfer of title but also the commercial terms of such a transfer.

Although the concept of blockchain is very complex and its potential application in the field of taxation is yet to fully emerge, we believe it may serve in the following areas:

- **Helping to prevent VAT fraud**.[15] Blockchain technology can be used to link purchase and sale transactions and therefore to ensure that the output VAT of the seller is matched by the input VAT of the buyer;
- **In facilitating the collection of taxes** (like VAT) based on the place in which goods or services are consumed, for example, by validating the residency of the consumer. While its application in China is currently limited to VAT, over time it is expected that taxes such as CIT will move more from a source basis to a destination basis;
- **In withholding individual income taxes**, in terms of both separating withholding taxes from salaries and wages, and in automating the collection of those taxes from employers;[16]
- **In transfer pricing**, in facilitating profit splits on individual transactions for transfer pricing purposes, rather than on an aggregated basis;[17]
- **Generally in supporting the tax collection process by tax authorities**: tax authorities in various jurisdictions have expressed ambitions to make the entire tax process digital. This means providing 100

[15] 'Blockchain Technology might solve VAT fraud', Ainsworth, Richard T, Shact, Andrew, Tax Notes International (Volume 83, no 13).
[16] 'New Frontiers: Tax Administrations Explore Blockchain', Johnston, Stephanie Soong, Tax Notes International, 2017.
[17] 'New Frontiers: Tax Administrations Explore Blockchain', Johnston, Stephanie Soong, Tax Notes International, 2017.

percent real-time access to tax authorities systems for taxpayers which enables tax authorities to improve the tax collection process significantly. For tax authorities this will have a big impact on how they are organized in terms of managing data, which technology to use and which (new) people skills are needed to support the digital tax process. The application of blockchain in this area serves to provide secure and auditable access to tax authorities' applications;

- **In a stamp duty context**, it may be questioned whether blockchain potentially poses a threat to it. Given that stamp duty is traditionally levelled on documents, a shift may be needed to ensure its continued application in an entirely electronic environment of blockchain transactions;
- **In electronic invoice issuing**: the Chinese government recently announced that it will be using blockchain technology to support the process of electronic invoicing. Over the years, the Chinese government has attached great importance to the emerging blockchain industry and listed it in the "Thirteenth Five-Year" National Information Plan. This makes China one of the first countries globally that has openly expressed the importance of blockchain as part of their future plans.

Overall, we see more and more use cases for the application of blockchain technology, though we do not expect that it will radically change the tax function within the next 2-3 years. However, when thinking about your tax technology (digital) strategy we recommend keeping an eye on the potential benefits and developments in blockchain for your organization and whether your organization has the required skillsets to adapt to the application of these new technologies. This is especially true in countries like China which we foresee will be early adapters of this technology. There may also be opportunities to obtain a competitive advantage by finding a way to use blockchain technology for better interactions with business partners and even tax authorities. Finding the right technology alliance partner may be a very good first step in this journey.

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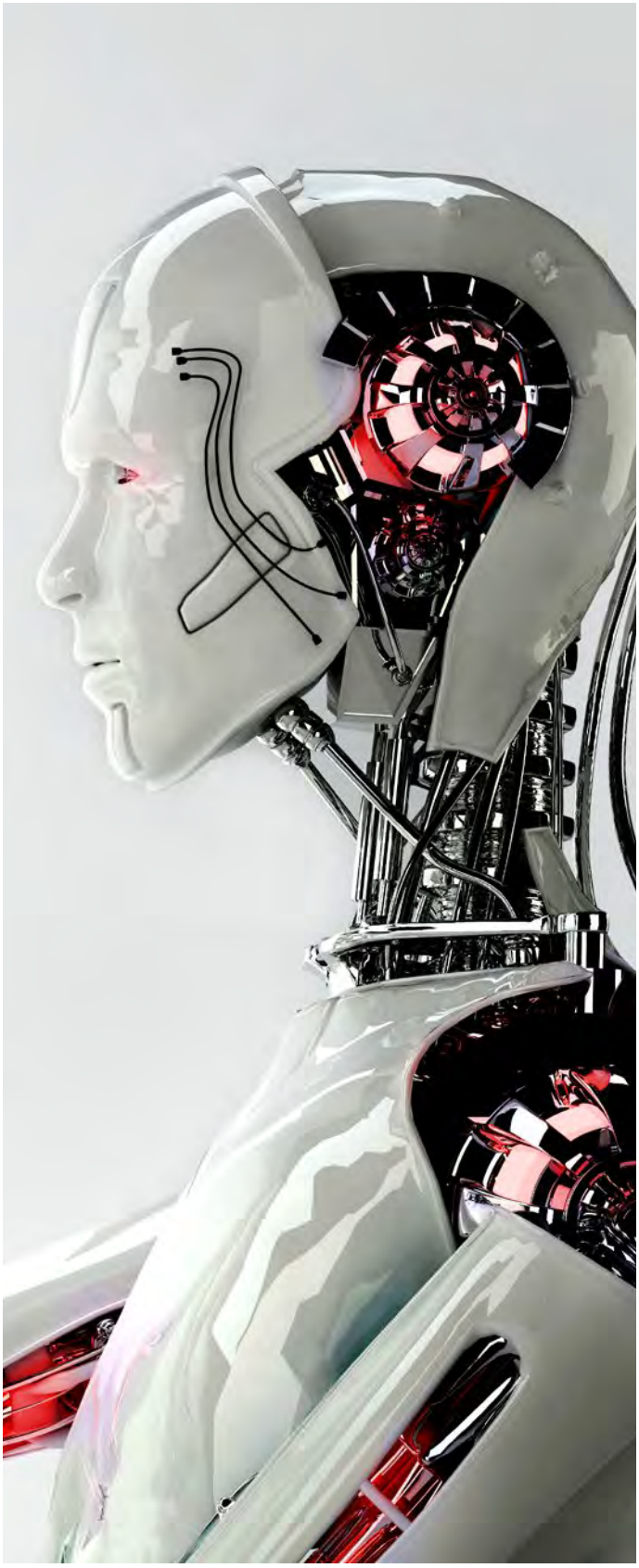

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