IDC PERSPECTIVE

Robotic Process Automation Game Changers Advance Financial Services Institutions Toward Intelligent Digital Workforce

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EXECUTIVE SNAPSHOT

FIGURE 1

Executive Snapshot: Overview of Intelligent Digital Workforce

IDC Financial Insights' *Intelligent Digital Workforce* comprises intelligent digital workers — essentially software robots that can perform both deterministic and nondeterministic tasks by continuously understanding and analyzing structured and unstructured data. They represent rules and judgement-based automation, and, like their human counterparts, they are both self-learning and self-healing workers that can discover patterns and even offer recommendations to improve them.

Key Takeaways

- When it comes to vendor selection for automation needs, selecting an intelligent digital workforce solution based on six core characteristics — simple, usable, and reusable by business users, ability to deliver enterprisewide scale, security and governance as the foundational tenets, availability of "real-time" operations analytics, intelligence powered by cognitive/AI technologies and innovative tools, and strong support extended by the ecosystem — typically delivers more favorable results.
- By 2021, we expect that every 60% of tier-1 Asia/Pacific banks and insurance companies will deploy intelligent digital workforce solutions for increased automation, intelligent decision making, and improved operational efficiencies to achieve an exceptional business value and deliver a more real-time and contextual CX.

Recommended Actions

- Change management is critical for the success of any automation project.
- Institutions will have to address the legacy way of doing work to achieve best results from their intelligent digital workforce solutions. It is important to redesign most of the workflows and processes to make them suitable for automation.
- Institutions must carefully evaluate how the shortlisted vendors can fundamentally solve their business problems and optimally support them in their intent to achieve hyperscale and hyper-performance with automation.
- As the new approach to intelligent automation (particularly AI) takes hold, the institution will create demand for new roles and skills and must also be ready for a level of reskilling it has never seen before.

Source: IDC, 2019

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SITUATION OVERVIEW

Overview

IDC Financial Insights continues our series of reports on automation in financial services. This report is second in the series, where we start by looking at robotic process automation (RPA), and how the proposition around it has steadily moved toward intelligent automation and leveraging an intelligent digital workforce. In our report *Robotic Process Automation in Asia/Pacific Financial Services: Key Learnings from 10 Early Adopters* (IDC #AP43545718, February 2018), we emphasized that RPA has often been cited as the essential first step toward automation but could more accurately be described as part of a continuum of technology-enabled initiatives to bring intelligence into the automation of business processes. IDC defines this continuum of technology-based initiatives focused on process automation capabilities as the Intelligent Automation Value Chain. This value chain underscores a notable evolution of demand toward an intelligent digital workforce from the rules-based digital workforce.

Many financial services institutions (FSIs) in Asia/Pacific (excluding Japan) that embraced RPA have not been able to scale their automation deployments. Moreover, many early adopters that tried to imbue intelligence with Cognitive/AI technologies and innovative tools in the automation of their business processes haven't gotten the value they expected from their intelligent automation initiatives. The purpose of this IDC Perspective is to support Asia/Pacific financial services institutions (FSIs) in their automation journey by addressing these challenges and assisting them, especially in their vendor selection exercise, by identifying and analyzing the core characteristics of a good intelligent digital workforce solution. This report also presents the profiles of eight vendors that provide intelligent automation offerings in the region for the financial services industry. The perspective focuses on their unique propositions and capabilities around the core characteristics and their resolve to deliver an end-to-end intelligent automation and optimization for their customers. This IDC Perspective addresses the following three questions:

- What are the core characteristics of a good intelligent digital workforce solution?
- Who are the key vendors in this region and what are their unique capabilities?
- What are the key considerations for financial services institutions when they embark on and/or advance in their automation journey?

Although we expect to see most of the traction and advancement (in terms of currency) toward intelligent automation from leading FSIs, we will also see a compelling growth in demand from small to midsize institutions that are about to take their first step in embracing digital workforce solutions. In our opinion, the markets to watch out for both intelligent and digital workforce solutions in the region are Australia, Singapore, India, South Korea, Thailand, Hong Kong, Malaysia, Indonesia, and the Philippines (with Australia and Singapore quickly advancing further toward intelligent digital workforce). These markets are hotspots for various digital trends, driving institutions to invest in everything digital to increase business growth, enhance customer engagement, and improve operational efficiencies.

Defining Intelligent Digital Workforce

The financial services industry in Asia/Pacific is transforming at an ever-increasing pace. Equipped with innovative tools and rapidly evolving technologies, the industry is now intent on achieving hyperscale and hyper-performance with an "intelligent digital workforce." This report series points to the growing interest of institutions to pursue an intelligent digital workforce to help them deliver better customer engagement and experience while reducing their operating inefficiencies, improving their employee productivity and morale, and ensuring robust security, governance, and compliance.

What is digital workforce in financial services? Broadly defined, IDC Financial Insights' *Digital Workforce* comprises digital workers — essentially software robots that, when initiated at predefined times or triggered by an external event, can automatically execute deterministic, repetitive, standardized, high-volume, and rules-based tasks by capturing and analyzing structured data and working across several interoperable systems (such as applications and other technologies). The term "RPA" is also used by the industry to point to digital workforce. Treated like their human counterparts, the digital workers are assigned separate IDs and passwords to sign in to company applications to complete their allocated tasks. We have seen examples of banks and insurance companies that are anthropomorphizing their digital workers (making them more human-like) by naming them and making them accountable for security and governance purposes. For example, OCBC Bank (Singapore) in 2017 named its first digital workers "Bob" and "Zac." Other examples include "Amy" and "Eve" at UOB Bank (Singapore), and "Alex" at AXA Affin General Insurance (Malaysia). Some of the tasks performed by digital workers in financial services include billings and collections, loans processing, credit card applications processing, performance and financial reporting, insurance claims handling, and policy administration and servicing.

The digital workers help to significantly reduce the turnaround time to complete a process – early indicators point to a reduction of 50–90% (see *Robotic Process Automation in Asia/Pacific Financial Services: Key Learnings from 10 Early Adopters*, IDC #AP43545718, February 2018, for more benefits for Asia/Pacific financial services). Employees are freed up from mundane tasks, allowing them to focus on more critical initiatives that require judgement and complex decision-making. For example, they can now focus more on improving customer engagement or engaging in business development. Deploying a digital workforce helps improve employee morale by awarding more enriching and rewarding jobs to human employees. Digital workforce can also be seen as a preemptive action considering the future workforce, as there seems to be little to no inclination from younger talent to do mundane, repetitive tasks that can be easily executed with the help of technology. It is important to note that these digital workers can exist in both attended and unattended forms and can be delivered on-premise or on the cloud.

But what is intelligent digital workforce? IDC Financial Insights' *Intelligent Digital Workforce* comprises intelligent digital workers — essentially software robots that can perform both deterministic and nondeterministic tasks by continuously understanding and analyzing structured and unstructured data. They represent rules and judgement-based automation, and, like their human counterparts, they are both self-learning and self-healing workers that can discover patterns to predict decisions and even offer recommendations to improve them. In other words, the intelligent digital workforce is progressively graduating from merely mimicking human actions to augmenting human intelligence, as well as evolving quickly to achieve the potential of autonomously emulating this intelligence. The term "Intelligent Automation" is also used by the industry to point to intelligent digital workforce. This workforce has the potential of delivering meaningful customer support, improved decision making, and valuable customer insights. Some of the key enabling technologies for intelligent digital workforce solutions are message-oriented middleware, RPA software, API management, predictive analytics, business process management, workflow management, content management, streaming integration, screen scraping, optical character recognition (OCR), cognitive/AI , rules engines, and data management. For more clarity on the definition of AI, IDC defines *cognitive/artificial intelligence* as systems that learn, reason, and self-correct. The system hypothesizes and formulates possible answers based on available evidence, can be trained through the ingestion of vast amounts of content, and automatically adapts and learns from its mistakes and failures. Some of the technology components of cognitive/AI include machine learning, or ML (both supervised and unsupervised machine learning), natural language processing (NLP), Q&A processing, dialogue-based interactions, natural language generation, structured data analysis, speech recognition, and visual processing.

It is worth noting that, before we get to a future state where the use of AI is more pragmatic, responsible, and customer-centric, there are many considerations that need to be addressed (e.g., customer consent, data quality, biases, ethics, and security) to realize its truly transformational results. Although we do have some time before we experience that state of truly ethical and infallible AI (which we will cover in our next report), there is a burgeoning interest from FSIs to understand and experience how AI can help them to create new products and services, improve customer engagement, and deliver exceptional business value.

Based on IDC Financial Insights' various discussions with FSIs and leading vendors and service providers in the market, we list below some noteworthy trends that are shaping the automation market, especially in relation to the buildup of both digital workforce and intelligent digital workforce:

- **Rising demand for intelligent digital workforce**. IDC Financial Insights is currently seeing considerable interest from FSIs in evaluating and leveraging an intelligent digital workforce to solve their business problems. One of the top 5 priorities for management teams across Asia/Pacific FSIs is to drive significant business value, improved operational efficiencies, and enhanced customer engagement with intelligent automation. Line-of-business (LOB) and IT teams need to analyze and evaluate which automation solution (from among a variety of options: for example, digital workforce solution, intelligent workforce solution, document and data capture solution, and so forth) will be best suited to solve their problems at hand.
- **Rise of bot marketplaces and vertical/function-specific offerings**. Many vendors are helping their FSI customers to speed up the time to realize business value and avoid a redundancy of resources by launching prebuilt bots that can be downloaded from bot stores or bot marketplaces. These bot stores also address the demand for vertical- and function-specific offerings for automating vertical and functional processes. For instance, leading vendors have prebuilt bots for "order to cash," "procure to pay," and document processing. They have also launched bots that connect with various applications such as SAP, Salesforce, and Oracle to automate repetitive tasks.
- **Introduction of process mining and discovery features**. Built on a collection of log files (dark data) of human employees' or digital workers' keystrokes, mouse clicks, and applications accessed, process mining and discovery features identify and recommend processes that are suitable for automation with a higher probability of delivering targeted business results. Although process mining is not new, it has definitely become much easier now with the availability of structured log files and the inclusion of client-side logging in some RPA solutions.
- **Introduction of mobile apps, free trials, and trainings**. As a corollary of the aforementioned trend, many vendors in the region are trying hard to differentiate their offerings and improve their market competitiveness. As the game to win customers intensifies, 2019 will see more mobile apps, free product trials, and free trainings being launched. Mobile apps will allow business users to manage and control their digital workforce from their mobile devices, as well as monitor their performance in real time. Free trials are being offered by some leading vendors to allow more customers to experience their solutions. Even free access to trainings and certifications for developers and professionals has become a notable trend. This is done particularly to address the shortage of automation talent in the Asia/Pacific region.
- **Emergence of new automation roles.** Now this is big. As FSIs expand their automation to multiple teams and take an enterprisewide approach, we will see the rise of new formal roles such as Executive Sponsor, Automation Change Manager, Automation Program Manager, Automation Process Analyst, Automation Trainer, Automation Developer, Head of Intelligent Automation CoE, and even Chief Automation Officer. This will be visible especially in FSIs that are serious about achieving significant business value from their automation strategy.

- **Growing inclination toward multivendor strategy**: IDC Financial Insights expects that a multivendor strategy will gain more prominence in the next two years. Institutions will choose to work with more than one vendor for their different automation needs and a multitude of reasons, some of these being the growing demand for more intelligent automation offerings and key capabilities (especially around core characteristics), the need to reduce concentration risk on a single vendor, and to achieve better licensing terms. However, exceptions will exist here, and there would still be those that prefer to work with one vendor for all their automation requirements. This decision will entirely depend on the institution's vision for its automation and the ability of its vendor to offer end-to-end intelligent automation.
- **Market consolidation**. As the demand for automation is advancing quickly along with the convergence of business process management (BPM) and RPA tools and the emergence of new automation vendors, there is significant overcrowding in the market. Though the consolidation has been unexpectedly slow to date, IDC Financial Insights believes that this overcrowding will lead to more mergers and acquisitions in the automation space (for both software and services players) in the next two to three years. One recent and notable acquisition happened in November 2018, when Contextor SAS, a European leader in the design and integration of RPA, was acquired by SAP. With this acquisition, SAP intends to help accelerate the development and expansion of its SAP Leonardo Machine Learning portfolio and offer more automation capabilities out of the box. 2019 is expected to see similar acquisitions by other players that are looking to expand their current solutions portfolio and existing capabilities in automation.
- **Pressure on licensing fees**. Multiple factors and trends such as market overcrowding, adoption of multivendor strategy, introduction of free trials, and increased commoditization will place a downward pressure on licensing fees. Concurrently, these factors will also enhance the quality of automation offerings by vendors and raise the automation efficiency and capacity utilization of FSIs.
- **Increasing focus on co-innovation through ecosystem partners**. Automation vendors are increasingly focusing on co-innovation through their ecosystem partners to deliver an end-to-end automation solution for their customers. To build and deliver an expansive intelligent solution, they are partnering and incorporating solutions from third-party technologies and applications vendors. For example, they are integrating and embedding capabilities and solutions for data analytics and business intelligence (BI), cognitive/AI, and cloud deployments. They are also partnering with consulting and advisory firms and systems integrators (SIs) on the services side.

The Six Core Characteristics of an Intelligent Digital Workforce Solution

This section focuses on the six core characteristics of an intelligent digital workforce solution IDC Financial Insights highlights that FSIs that have chosen an intelligent digital workforce solution based on the below listed characteristics have typically achieved more favorable results from their automation deployments.

Simple, Usable, and Reusable by Business Users

Although many in the automation landscape prefer to discount or completely ignore the advantage of simplicity, it is a characteristic crucial to an automation solution when a business user is trying to build and train a bot to perform a series of tasks based on predetermined rules. Consequently, this need for simplicity also drives more demand for no-code automation. This does not mean that the IT team should not be involved and support business users for automation projects; rather, the objective is to reduce the dependency on IT when it comes to identifying the right processes to automate, defining

the business logic in the workflow, and training and governing the bots. The argument holds up even for global in-house centers (shared-services centers) of FSIs, where the digital workforce tries to address the "swivel chair" activities that involve working across multiple applications to solve customer questions or requests. As aforementioned, many leading vendors are now offering free trials to encourage potential customers to experience the simplicity and usability of their solutions. Moreover, we are seeing more announcements related to the launch of bot marketplaces or bot stores, where reusable preconfigured bots with process-specific knowledge and capability are available to handle simple, as well as complex, tasks among dependent applications and help to avoid a repetition of efforts and redundancy of resources. IDC Financial Insights acknowledges that the availability of reusable components encourages faster robot design, testing, and deployment. For instance, for a process that handles a million transactions per day, the use of reusable components for automation can deliver extra substantial savings in time, effort, and costs.

Many solutions offer a recorder capability that monitors, records, and stores the actions and manual steps of a user — which are then repeated in production with the help of automation. In other and more complex cases, solutions offer a graphical tool (model-driven) that provide a mechanism to drag and drop an action object into a low-code environment and wire that to a next action and onward until the automation is completed, tested, and moved into production by deploying the automation into the desktop agent (see *Robotic Process Automation Software Overview*, #US43927018, for more details). Additionally, e the solution must include a systematic and smart sequence for escalation and resolution assignment to a human employee for rules-based exception handling.

It is important for institutions to note that when they advance toward an intelligent digital workforce solution (from a digital workforce solution), they might face initial complexities and challenges due to greater use of cognitive/AI technologies and innovative tools. This would also call for improving data quality, redesigning processes and automation workflows, interoperability and integration with the core systems and strategy, and finding the right talent, among other things. However, over time, we will see these complexities gradually diminish as better-connected systems and data are set in place and enough talent becomes available and trained in handling complex situations. We also believe that the advanced training and certifications offered by the vendors will play an important role in addressing this rapidly evolving environment.

Ability to Deliver Enterprisewide Scale

In 2019, we expect to see more and more Asia/Pacific FSIs agreeing that a piecemeal approach to automation will only accrue limited results and in some cases, even outright failure. This acceptance has encouraged management and business teams to expand these deployments from a single team or few teams to an enterprisewide scale. In addition, IDC Financial Insights highlights a massive change in the perception of capabilities of RPA tools and a greater realization among institutions that RPA is an essential step toward achieving a more successful intelligent automation. For all these reasons, there is a rapidly growing demand for an automation solution that can offer a single unified platform with a centralized view and management of enterprise-level automation across various IT systems and technologies. The centralized management ensures that when an institution expands from a couple of bots to hundreds or thousands of them, the implementation and maintenance along with associated risks can still be centrally managed and controlled. Otherwise, think of a situation where the business users must individually start, monitor, and stop each of the hundreds or thousands of bots. This centralized management also means better governance and compliance in an enterprisewide automation. And thanks to the feature of queue management, these users can schedule and delegate jobs and automate the distribution of the intelligent digital workers for their efficient utilization, whenever the workload changes.

It is important that the solution should offer scalability in a true sense — both the ability to scale up and scale down centrally. Reliability will also play an important role: what happens when things start to change in the environment, for example, there are new versions of automation solutions or updates in enterprise applications. A reliable solution will ensure that there is a systematic contingency plan and workflow process for handling such chaotic situations and maintaining the health of the systems. Most of the leading solutions now offer integration and compatibility with multiple technologies such as Mainframes, Java, and .Net; enterprise applications such as SAP and Oracle; and virtual environments such as Citrix. They also offer business continuity with high availability (HA)/disaster recovery (DR) enterprisewide, where a recovery mechanism is offered for each digital worker and each automated process across multiple locations. Currently, vendors in the market support on-premise, hybrid, and cloud-based delivery models. With these discussions around scale, the option for cloud and as-a-service models is timely. IDC Financial Insights foresees greater demand for the cloud model as part of a bigger enterprise move by Asia/Pacific banks as they up the ante for cloud utilization and consider it a critical foundation for present and future technology innovation. It is worth noting that with greater automation efforts, FSIs must expand and change their internal infrastructure to operate effectively. Network and server latency can become critical bottlenecks when an institution is building its intelligent digital workforce.

In the next two years, we will also see more investments from FSIs in establishing centers of excellence (CoE) to drive best practices in automation and enable a more robust management and control, security and audit, and overall governance of the intelligent digital workforce. With a CoE setup, the institutions will enjoy the leverage and knowledge in negotiating with the vendors, setting up KPIs, executing maintenance of solutions, and developing training methodologies. We will also see institutions focus more on change management, redesigning business processes, and reskilling/upskilling to achieve enterprisewide scale.

Security and Governance as the Foundational Tenets

The mere utterance of the terms "artificial intelligence" and "robotics" in boardroom meetings or in fact any meeting is enough to bring up unrelenting questions about security and governance, including concerns about securing customers and their data and even the institution itself against rogue automation. Contrary to popular opinion, robots improve the accuracy and consistency in transactions and processes as they do not commit human-like errors and operate within well-defined rules. In the past, FSIs have paid a huge price for costly errors or incorrect reporting, especially in regulatory reporting and compliance. The use of digital workers ensures that there is better compliance with higher due diligence and precision. With new regulatory compliance mandates that focus on the governance of business processes, there is a strong, supportive view of how a digital workforce can ease compliance for institutions. However, all these are based on an underlying assumption that institutions can ensure stricter security and governance controls to secure the automation from bad internal and external actors — basically machines work as planned and these actors do not influence them for their own advantage. To build more confidence in their security and audit controls, many vendors are voluntary complying with data security and privacy regulations such as the General Data Protection Regulation (GDPR), Federal Information Security Management Act (FISMA), Health Insurance Portability and Accountability Act (HIPAA), and European Union Agency for Network and Information Security (ENISA). The competence of the intelligent digital workforce to deliver best quality outcomes, advice, and decisions also depends on institutions' ability to address the issues around data quality, data usability, and data governance.

Our advancement toward a more digital world and digital workforce fundamentally requires that we start treating our digital workers like our human employees. Like our human employees, digital workers must be accountable and responsible for their actions and therefore, all security parameters including access, control, and auditability must apply to them as well. To support this viewpoint, vendors offer granular role-based access, control, and management across all key aspects of the solution. The role-based access approach ensures that only the authorized users can access sensitive data and/or execute bots. The objective is to provide a secure and effective way for an institution to manage its digital workforce. More so for the financial services industry, it is absolutely critical that the vendors ensure that no sensitive data is stored by the automation solution. It must also provide a secure storage of credentials in the credential vault. All credentials and sensitive data, including data at rest and data in motion, must be encrypted; even all channels and communication between servers, applications, and bots must be protected by encryption and SSL protocols. Most solutions offer full integration with existing LDAP/Active Directory Identify Infrastructure to maintain single sign-on credentials. A good digital workforce solution must offer comprehensive audit logs for all user and system activity. To achieve auditability and traceability, the solution must track changes made to a bot, data, system, and user's permissions. These logs will not only help identify errors and bottlenecks in the automation process but also detect fraud or misuse by bad actors.

Availability of "Real-Time" Operations Analytics

With operations analytics embedded into their intelligent digital workforce solutions and made available via dashboards, the vendors are making it easier and seamless for the institutions to monitor and evaluate their workloads in real time. This way, teams can gain insights on the performance (e.g., volume of transactions, utilization, efficiency) of their digital workers and factually decide on how to optimize their workforce. When combined with audit trails and logs, these actionable insights can provide process intelligence and streamline automation by identifying bottlenecks and errors for improvements. These insights can also help to make faster informed decisions and more accurately predict future outcomes. Most of the leading solutions also support integration with third-party BI tools for customized reporting and data visualization with highly personalized dashboards.

Process mining and discovery can help identify tasks that are ripe for automation. Process mining collects and processes log files to produce a statistical as-is perspective of a process, including the applications used in the process and how much statistical variance there is in process execution. Process mining provides a clear, fact-based path to organize task automation priorities by the highest value, whether automation is aimed at a single application or a set of applications that combine to execute a process, and should be a key planning tool that creates a business case for why a particular automation is needed. Client-side mining and separate server-side process mining solutions can be combined for a total view of process performance. We will see more vendors add process mining and discovery in their automation solutions in 2019. In our opinion, process mining will not be replacing large-scale engineering but only serve as a prelude to it.

Intelligence Powered by Cognitive/AI Technologies and Innovative Tools

To be sure, most of the deployments in Asia/Pacific FSIs until now are at the basic level of automation, which is not at all a bad thing for a start. We are steadily advancing toward a future state where the use of an intelligent digital workforce will be more common and an efficient automation of complex, non-standardized, and less-repetitive tasks will be possible. As mentioned earlier in the report, this workforce has the potential of delivering decision-centric process automation by solving nondeterministic tasks. We will soon see more intelligent digital workers in FSIs in the form of intelligent robo-advisors, intelligent chatbots, and virtual agents that are self-learning and self-adapting

and offer intelligent assistance and advisory services to improve customer retention and loyalty. With its ability to deal with various types of data (both structured and unstructured) from multiple and disparate sources, this intelligent digital workforce can recommend, design, and launch on-demand, usage-based products that align with current market expectations. FSIs can also deliver improved onboarding experience across channels and greater personalization of services. It can also speed up decision-making by sharing valuable information and improve the responsiveness of customer service. In the case of insurance, intelligent digital workforce can be used to develop predictive models for insurance claims, expense management, and loss analysis. Next-generation security will also gain attention, as these workers can monitor activity in real time and capture "bad actor" transactions even if they are outside of the rules-based or heuristic capabilities of other fraud prevention systems. Additionally, the convergence of automation technologies, especially AI with other technologies such as big data, IoT, and blockchain, will also deliver transformational results for FSIs — however, as noted earlier in the document, it can be difficult and time-consuming to achieve these results.

Today, most of the leading solutions in the market have added technologies such as ML, NLP, and machine vision. One particular use case where FSIs have started to see improved results is intelligent invoice processing, where the information is extracted from a physical or unstructured format with the use of OCR and ML. OCR captures and digitizes data from documents and images, and may also include text analytics capabilities, while ML analyzes, groups, and looks for patterns in invoice data to enable faster and more accurate processing. When exceptions arise, they are still addressed by humans but fed back to the ML algorithm, so it can continuously learn and make improvements. This allows for more complete and accurate data to be processed by the invoice payment system using various automation and data capture technologies. It is important to note that most of the vendors offer these capabilities through third-party partnerships; only few have proprietary solutions. Where the vendors do not have proprietary solutions, they offer integration with other applications and workflow processes with REST API/web services.

Even if the institutions do not intend to use the "intelligent" element of the intelligent digital workforce solution in the near term, it is still important that they evaluate today the current intelligent automation capabilities of their shortlisted solutions, as well as the product road map toward adding and enhancing these capabilities in their vendor selection and analysis process. Currently, vendors offer their intelligent digital workforce solution in the market either as a separate offering (with a higher price tag and a separate set of KPIs) or as a more advanced version of their current digital workforce offering. IDC Financial Insights expects that these intelligent digital workforce offerings will accelerate how AI is consumed within financial services. We should also emphasize that jumping straight to using autonomous AI might not be a good idea for FSIs that have not even started with RPA. The latter will deliver quick wins, optimize processes, reduce cultural resistance against the use of robotics and AI, and concurrently, develop automation talent. Subsequently, progressing to more advanced automation technologies will stand a higher chance of delivering better business value and success.

Strong Support Extended by the Ecosystem

IDC Financial Insights believes that the strength and depth of the support extended by the ecosystem will be one of the key differentiating factors that will drive the demand of one automation solution over another. Like any other ecosystem, the most important component of the intelligent digital workforce ecosystem is partners, which offer related services and technologies that complement the features and functionalities of the solution. It is necessary for institutions to now evaluate the overall ecosystem of the shortlisted vendors in their vendor selection process. The vendors will continue to form alliances and partnerships with both local and global consulting, advisory, and services partners, as well as

third-party vendors (for OCR, ML, AI, NLP, and BPM) to expand their market presence and reach, as well as enhance their solutions' features and capabilities. We are also seeing leading AI platform vendors such as Google, IBM, and Microsoft undertaking partnerships with intelligent digital workforce vendors at the same time that they are developing their own cognitive/AI-enabled process automation capabilities. IDC expects that these efforts and partnerships will accelerate throughout 2019 and into 2020.

Finding the right automation talent is a challenge faced by many institutions in Asia/Pacific. To address this challenge, vendors have launched their own certification programs (both online and offline) to instill confidence in end users that the certified professionals are both available and competent in their solutions. They are also forming alliances with training institutes and schools to accelerate the availability of this talent. Leading vendors have also launched their own universities and academies to show their commitment to building automation skills in the market. Although these courses are mostly available in English, many are also in the process of building the content in other languages such as Spanish, Japanese, and Korean. To underline their focus on customer experience, some vendors assign a dedicated point of contact to each of their customers — this employee manages overall customer experience and becomes a go-to-person for customer service and support needs.

Ready Propositions for Intelligent Digital Workforce Solution

Based on our research on automation projects in the Asia/Pacific region, IDC Financial Insights highlights that the early adopters in the region are choosing their automation solutions based on the core characteristics, demonstrated use cases, local references, licensing terms, and the availability of local support and skills. In this report, we look at the propositions of eight players that offer intelligent digital workforce solutions for the financial services industry in this region. Each of these vendors' offerings differ significantly in terms of the design, technology, and architecture of the solutions, as well as the key functionalities and features. We also note that their product road maps inevitably speak of offering and integrating the best-of-breed components into a single solution to offer an end-to-end intelligent process automation. We emphasize that this is by no means a definitive and exhaustive list of vendors to consider. However, their various approaches to key characteristics discussed in the previous section underscore that institutions in the region have an array of excellent options to choose from to meet their automation requirements. The profiles are arranged in alphabetical order.

AntWorks

Founded in 2015, AntWorks is a Singapore-headquartered integrated intelligent automation and AI solutions provider. Its proprietary platform, ANTstein, is a full stack enterprise-class platform with a digital workforce control center, which can be consumed in full or in a modular fashion. Antworks' product and solutions are powered by fractal science-based AI & ML. The vendor also highlights its competency and differentiation of Fractal Science–based pattern, shape, and contour recognition by using what it calls "Fracted Text." ANTstein has ML-enabled Cognitive Machine Reading for advanced multiformat data ingestion (structured, unstructured, image or inferred), intelligent RPA for industry agnostic automation and insights providing end-to-end intelligent automation. ANTstein helps in accelerating time-to-production and enables deployment in cognitive decision-making environments. The platform's management and orchestration modules come with features such as auto-scalability, low code-no code GUI-based configuration, enrichment, training, QC modules, multi-level and centralized access control, high security and multitenancy, among others. AntWorks' customers include some leading global Fortune 500. The vendor offers off-the-shelf full stack vertical solutions called Point Bots. For Financial Services these include Trade Finance, Retail Banking Account Maintenance, AML, Account Opening, KYC for Banking & Capital Markets; New Application

Processing, Title Search, Legal Description, Mortgage Lifecycle for Mortgage; and Title Insurance, Claims, Insurance Broking, New Account Set, Policy Maintenance, Claims Handling, and KYC for Insurance. AntWorks offers platform subscription and point solutions licenses.

ANTstein eliminates the need for coding or specialized developer requirements (like Java/ VB Script), enabling business users to drag-and-drop prebuilt components into canvas – i.e. 80% of the bot can be made ready, deployed, and executed by the business user himself – and integrate them into workflows. If the user does not find a prebuilt component, they can use scripting layer to create scripts. This scripting language is proprietary and English like. Software developers can access the inner layer to build custom components, as needed. ANTstein's architecture supports On-Demand Scalability through instant birth of instances by predicting the trend on volumes and facilitates multiple versions to co-exist in the same enterprise environment. The platform supports multi-tenancy through a powerful profiling technique. The profiles are enriched and bound to the bots, thus liberating the bots from unified task/processes. All bots are capable of all the processes by such profile enrichment, thus achieving higher bot productivity. While running in any desktop, the bots do not run dedicated node and share the machine with the human simultaneously. ANTstein's orchestrator supports remote deployment of processes and has a centralized monitoring, control, and management system. This provides flexibility and top-down view of the processes/bots and the target machines in terms of the utilization, load, and other key parameters for effective governance and management of the automation solution. The built-in business rules module within the data ingestion platform helps to enrich data as per business requirements. Its knowledge mapping capability maps well-trained data capture models to new processes and clients, reducing the overall configuration timelines. ANTstein is compatible and can be delivered both on-premise and on the cloud.

Customers can view ready dashboards to have a quick glimpse of the accuracy, confidence, and other metrics of the digital workforce. User reports and audit logs are available for governance; even drill-downs are available on a batch/ file/ field level for custom reports. For Process Mining, ANTstein has recorders available for recording web applications, windows, and remote applications; these can be used to record applications representing the customer business environment in a non-invasive manner. ANTstein can be integrated with all web-based enterprise platforms such as SAP HANA S4 and Oracle e-business. It also offers a dedicated exception handling function, with the capability to handle known and unknown exceptions, which are logged and learned through ML techniques. Unknown exceptions are handled with the knowledge base co-created and with the safe handler components available for that purpose. In case of system downtime or application downtime, automatic instances are born and initiated in the designated target machine to continue the automation process. In terms of security features, the abstraction layer is used to store the data in the database provided by the client and the solution ensures enterprise-level security is provided in the database. ANTstein has an inhouse highly secure credentials vault available out of the box without additional license costs and also offers integration with industry standard CyberArk. The credentials are encrypted with MD5 encryption technique. All data-in-motion is secured with TLS 5.2 standards and all stored data are two-key encrypted with AES 256 standards. It also includes built-in user management module with LDAP/AD integration capabilities.

ANTstein uses fractal network approach to data analysis, which looks for patterns in data and applies the learning about these similarities to wider data sets. In this case, as the data set gets bigger, the self-similarity becomes amplified. More traditional neural network approaches work their way through nodes and division trees, which becomes cumbersome at scale because it slows down as the number of combinations increases. The proprietary ML engine results in high yields of learning with lighter infrastructure for deployment. AntWorks harvests data using integrated ML-based Cognitive Machine

Reading capabilities built on Content Based Object Retrieval (CBOR) methods, which is suitable for recognizing multi-format documents and delivers superior performance and accuracy over OCR. The Cognitive Machine Reading works on zoning methods based on pattern/ shape/ contour recognition that gets the engine to learn what its reading than pure OCR based full document extraction and exact matches. The elements of fractal science like decomposition, dimensionality reduction, and network genesis are used to achieve Document Indexing, Document Classification, Natural Language Modelling, and predictive confidence measures. The Machine Vision combined with deep learning allows the engine to train for different process documents in very short periods of time with minimal data sets. The Natural Language Modelling capabilities help in inferring data points from running text/paragraphs. AntWorks highlights that various inference logic can be built and plugged into the system to minimize the dependence on custom code development.

AntWorks currently has a network of 50+ partners consisting of major SIs for implementation. ANTstein platform is intuitive and does not demand a specific RPA skilling. The vendor offers online and classroom training on its own, as well as through its training partners. AntWorks trains clients' support teams on basic trouble shooting mechanisms and provides self-service documentation to handle up to Tier 2 support. For unresolved incidents, the vendor provides priority/severity-based Tier 3 support.

Automation Anywhere

With over 1,600 clients worldwide across various industries, Automation Anywhere Inc, or AAI, is the world's largest provider of RPA software and the pioneer of the intelligent digital workforce. Headquartered in California, USA, the company was founded in 2003 and delivers products and services in over 90 countries. The latest version of its RPA solution, Automation Anywhere Enterprise 11.3, was released in November 2018 - as an alternative to its client-server architecture, in which the Enterprise is deployed inside the corporate infrastructure and behind the firewall. In September 2018, AAI announced its cloud strategy with support for all leading global cloud platforms, including Azure, Google Cloud, AWS, and IBM Cloud. It has a full portfolio of digital workforce, including IQ Bot (cognitive-enabled intelligent solution), Bot Insights (analytics and insights), Bot Store (plug-and-play bots for horizontal- or vertical-specific tasks and processes, including for BFSI), and its Mobile App (bot control, real-time dashboards, and alerts). The vendor offers both attended (front-office) and unattended (back-office) automation. Its 100s of customers in the region include ANZ Bank in Asia/Pacific, Mastercard and Société Générale in India, Manulife in Hong Kong, and Suncorp in Australia. The vendor offers licensing on an annual subscription basis. Automation Anywhere Enterprise, Control Room, Bot Runner, Bot Creator, and IQ Bot are all licensed separately; the minimum configuration available to customers today is one Control Room with 10 Bot Runners. AWS hosted 30-days free trial is available online. For its focus on customer success, AAI has achieved a Net Promoter Score® (or NPS®) of +67 (source: NICE Satmetrix 2018 Consumer Net Promoter Benchmark Study), the highest in the RPA category and more than triple the average NPS score for the business-to-business technology industry.

AAI offers a simple drag-and-drop interface for bot creation with no codes and native recorder technology that works for Windows (traditional client/server), Citrix (e.g., Cerner, Bloomberg), and native web (e.g., Salesforce, Workday). To demonstrate its solution's simplicity, AAI helped 120 non-technical attendees at a recent industry event to build their first bots ever in under 20 minutes. To further facilitate learning and rapid design, AAI offers a built-in workflow designer to provide a visual way to model, orchestrate, and manage complex business processes. It can incorporate building blocks, business rules, and logic pathways to create different branches or process variants. The

Control Room — a mobile-ready web application that provides a single admin interface for enterprisewide bot deployment, user management, and enterprise-wide security and control — uses a stateless microservices architecture that can horizontally scale using any network load balancer (e.g., Citrix NetScaler, F5 BigIP), and automatically flexes to use available server resources. This enables admins to leverage increasingly high-performance servers without reconfiguration or redeployment. For example, the largest single deployment of its enterprise platform supports over 6,000 concurrent digital workers at one of the world's largest banks. Once initial pilots are ready to scale up, the centralized control room delivers automated provisioning, orchestration, governance, and actionable analytics for enterprisewide implementation. Bot Insight automatically captures real-time data that is passing through each bot during execution, through a simple method of tagging the required data variables and presenting both operational and business-oriented metrics in easy-to-read dashboards, requiring no effort on the part of the team creating the bots. AAI logs all the data needed for process mining to enable enterprises to optimize their processes and to automatically launch new bots. In addition, the vendor offers the Bot Store with a catalog of over 500 prebuilt bots — the reusable components, many of which are specialized for vertical or horizontal BFSI processes that users can download and import into the platform and integrate into their workflows (including Oracle and SAP environments) to accelerate their automation initiatives. The Bot Store also features new Digital Workers, predefined collections of bots that reflect the range of tasks typically associated with particular type of employees. In January 2019, AAI launched the Automation Anywhere Mobile App (currently in beta) to empower business users to automate and control bots and their digital workforce from the palm of their hand.

AAI's Enterprise platform has a comprehensive set of security features, including fine-grained role-based access control (RBAC) applied to all RPA components (including credential vault, bot runners, and schedules), credential vault for storing access credentials, and bank-grade encryption (TLS 1.2 for data at rest, and AES 256 for data in motion and in memory) for all credentials. The credentials management supports certified integration with third-party credential stores such as CyberArk, combined with SSO support with SAML and Kerberos, as well as integration with sophisticated enterprise authentication systems. For a CoE setup, the key features built into its platform include Bot Lifecycle Management (BLM) for DTAP, TasktoXML for automated code governance, credential vault for bot application credential security, workload management, BotFarm for on-demand scalability, and built-in CoE dashboard. These features also demonstrate compliance with regulations such as the General Data Protection Regulation (GDPR), Sarbanes-Oxley Act (SOX), and Payment Card Industry Data Security Standard (PCI DSS). All actions taken by all actors within the platform are logged for auditing, including bot creators, bot runners, operators, business analysts, and administrators. One of the platform's key capabilities in virtual desktop integration (VDI) is AISense, an AI-enabled solution for working with VDI client software that copes with changes in the application look/feel and screen layout without having to recode the bot, bringing high resiliency to the process. It supports the broadest range of Citrix configurations including (non)persistent desktops, Citrix Cloud, XenApp + XenDesktop, on-server and on-client (via Receiver) and are fully automated via API. The Enterprise platform can be deployed on-premise, in a hybrid cloud, or on leading public cloud platforms.

IQ Bot, AAI's cognitive automation solution, intelligently extracts decision-making information from semistructured data (e.g., invoices, purchase orders) and unstructured data (e.g., contracts, stock certificates). Its native capabilities include computer vision to recognize and classify documents automatically, NLP to understand unstructured content, fuzzy logic to correct common digitization/human errors, and ML to continuously learn and improve based on human feedback. This combination allows AAI to automate more complex processes more quickly and accurately. For

example, a leading Fortune 500 company was able to automate 60% of its order processing volume, redeploy 30 FTEs to higher-value tasks, and save US$3M annually, using IQ Bot. In addition, the vendor supports integrations with multiple third-party AI platforms. The vendor has a comprehensive road map to expand ease of use, scalability (including on-demand in the cloud), bot velocity (speed of bot development), security, cognitive, analytics, and Bot Store. Its core philosophy for its RPA road map is to deliver truly enterprisewide scale - spanning operations, bot development, and integration. AAI also plans on strengthening its predictive analytics and data mining capabilities and testing integrated applications of deep learning techniques to create a self-learning RPA system. Currently, AAI's Enterprise platform is going through FedRAMP certification and will support function-based security policies to help enterprises meet the most stringent of governance and regulatory compliance requirements.

AAI delivers training under the umbrella of Automation Anywhere University (AAU), which offers access to a comprehensive RPA training ecosystem that includes a library of RPA courses, certification programs, an elearning platform including 9 role-based tracks, a network of certified training partners, customized onsite training, and universities that offer AAU's RPA courses as part of their curriculum. It has a dedicated training staff of over 200 direct employees and also partners with 4 organizations, including Acronotics and AiTrickz in APEJ to train on its behalf. This training ecosystem has trained 100,000 AAI-certified RPA developers with an additional 7,500+ undergoing certifications. AAI plans to train over 1 million developers to help meet its goal of deploying 3 million bots by 2020. Its partners offer a breadth of services including support, delivery, third-party and full technology integration, and productized services in on-premise, off-premise, and hybrid models. The vendor also runs a global Customer Success Manager program called A+, where each client is assigned a Customer Success Manager that handles the end-to-end customer experience — including onboarding, issue resolution, training, and product upgrades — ensuring timely responses and providing a single source of truth for the customer.

Kofax

Headquartered in California, USA, Kofax software enables organizations to "Work Like Tomorrow — today." Kofax's Intelligent Automation software platform helps organizations transform information-intensive business processes, reduce manual work and errors, minimize costs, and improve customer engagement. Kofax combines RPA, cognitive capture, process orchestration, mobility and engagement, and analytics to ease implementations and deliver dramatic results that mitigate compliance risk and increase competitiveness, growth, and profitability. The current release of Kofax RPA integrates a cognitive document automation functionality that enables bots to collect, classify, and extract data and content from unstructured documents for inclusion in automated processes. Its licensing is based on a concurrent model: customers are free to build as many robots as needed to run/execute processes and are charged based on how many robots they intend to run simultaneously. Typically, customers purchase a higher volume of concurrent licenses to execute their processes side by side.

The Kofax RPA designer is a user-intuitive, visual, and no-code design solution, making it a flexible tool for both non-technical business analysts as well as technical teams and developers. Using the Kofax RPA design tool, users can build robots via a series of point and click actions, emulating the keystrokes they would take to complete a process manually. Once a robot process has been outlined, technical teams can use the same graphical UI designer to test and debug the solution, where they can then also adjust code directly and perform more advanced tasks without ever leaving the design screen. Another notable feature is that for most situations, digital workers can operate in what is called

a "headless" state — a state in which they don't require an assigned desktop machine (physical or virtual) to execute processes, as most processing can happen internally within the bot itself. Through this model, customers can scale their digital workforce with significantly less infrastructure overhead than through traditional models that require a separate desktop machine for each robot. From a design perspective, developers can also package reusable steps across automations as "snippets," which can be centrally maintained and managed. Snippets make the process of modifying a set of actions used across several automated processes far less tedious. Operations and business analytics dashboards are provided via Kofax Insight, a product built to work tightly with Kofax RPA. Kofax Insight allows enterprises to monitor automation in detail, including the usage of licenses, processing power consumption, and process execution data in workflow and swim-lane format. This allows users to remediate problems faster and quickly identify bottlenecks and improvement opportunities. Kofax supports both on-premise and cloud environments.

All Kofax RPA execution is managed and controlled from a central Management Console. The access to this Console is role-based and can be integrated with LDAP. The solution offers a built-in credential vault, but it also supports the ability to leverage third-party solutions. As everything is run and orchestrated from the server, auditability and traceability are built-in for governance purposes. For automation within Citrix environments, Kofax Intelligent Screen Automation (ISA) or sometimes referred to as Computer Vision, uses an artificial neural network to analyze images of an application. This is particularly useful when applications are running on Citrix or other remote desktop environments and only image information is available; there is no direct access to the application and its objects. As virtualization is used almost everywhere, this becomes an increasing issue for an RPA solution to connect and work with environments that only return image information. Kofax RPA's ISA addresses this issue by automatically creating user interface objects for the robot designer to build a software bot. This results in significantly faster robot development and avoids the need for screen resolution standardization as the robot no longer depends on screen position to select menu items or buttons when performing tasks.

The vendor has added its intelligent document automation capabilities to its Kofax RPA solution. Kofax will also be adding more advanced NLP capabilities by 3Q19 that will support on-premise and cloud-based solutions. Kofax RPA has been applied to many use cases across the banking, insurance, and capital market industries including rules-based account opening processes, price monitoring (equities), and claims processing workflows (insurance). The claims processing and insurance processing vertical solutions exist on top of the Kofax Total Agility Product, its digital transformation platform that works well alongside its RPA solution. Over the next 12 months, Kofax is set to make technology enhancements across its RPA, cognitive capture, process orchestration, advanced analytics, and mobile and engagement products to further support the integrated deployment of these products as an Intelligent Automation platform. The process mining/discovery features and robot version controls will be included in the March 2019 release of the Kofax RPA solution.

Kofax offers a wide variety of product training classes in multiple formats such as classroom, free and paid on-demand, and private event trainings, which include certification exams. Kofax also offers a free, one-year trial of a full production version of Kofax RPA, where prospects can develop multiple robots in a test environment on a single desktop. Most of the trainings offered are provided in-house by Kofax Education professionals except for a few official training partners in Mexico, Central and South America, and Caribbean Islands. The training courses are primarily in English with a few offered in Spanish. Kofax aims to provide the highest-quality support to its partners, resellers, and customers. The vendor offers Kofax Customer Portal, an online case submission and tracking method available 24 x 7 to its customers. Other key support features include 24-hour access to the Kofax Knowledge Base, which contains answers to common problems and known issues, quick response time to initial request, and accelerated response time for production incidents.

Kryon

Founded in 2008, Kryon offers integrated business-friendly RPA with an intuitive interface, one-touch process-recording capability, and Kryon Process Discovery technology for accelerated deployment and continuous process optimization. Its AI-driven platform is currently used by a wide variety of enterprises worldwide, including financial institutions such as AIG Insurance, Allianz, Ascensus, LTCG, and Validus. The platform empowers businesses to maximize their ROI through their choice of desktop-based attended automation, virtual-machine-based unattended automation, and a hybrid combination of attended and unattended automation. Headquartered in Tel Aviv, Israel, Kryon currently holds five patents for AI technology, including image recognition (IMR), OCR, and ML. Its solutions have incorporated proprietary OCR and IMR algorithms since 2009. For all of its solutions, customers pay an annual fee for each robot, plus a flat annual rate for access to the platform.

Kryon's enterprise RPA solution has a drag-and-drop interface and one-touch process-recording capability for simplicity and usability. Once the automation workflows of work processes have been created, an RPA manager can use the Kryon Console to delegate, prioritize, and schedule these tasks. Processes can be triggered by specific events, scheduled to run at certain times, or both, and then, the Kryon Console can automatically assign a task to the next available robot (or, if the customer prefers, to either a specific robot or the next available robot from a given group of robots). The automatic queue management assigns a priority level to each task without any need for coding. With server-side triggering of automated processes based on changes to databases, folders, or email servers, there is no need to assign a robot to monitor systems and initiate processes. Kryon's solutions work seamlessly with Citrix, legacy systems, and any other computer application. With analytics, customers can monitor the digital workers' performance and task success and utilization of attended, unattended, and hybrid workforces, including automatically generated audit trails and system logs (with no need for overhead RPA development). Moreover, Kryon Process Discovery evaluates identified processes, recommends which one to automate next based on key criteria affecting potential ROI, and creates an automation workflow for each process, working far more quickly than process mining tools and saving customers the time-consuming step of creating a workflow from scratch. This helps customers to scale these deployments enterprisewide quickly and easily. Apart from customizable report templates, the Kryon Console includes multiple dashboards displaying both real-time smart analytics and historical data on robot activity, performance, and availability. Kryon supports RESTful APIs right out of the box, even for easy out-of-the-box (OOTB) integration with any third-party BI tool for customized reporting.

Kryon offers role-based permissions, single sign-on, username/password management, and a credentials vault that enables digital workers to enter usernames and passwords (with a proprietary visual algorithm preventing them from entering passwords into nonpassword fields). The permissions mechanism allows administrators to establish permissions per user or group for creating, editing, publishing, and/or executing automation workflows. Kryon is compliant with Federal Information Processing Standard (FIPS), supports SSL/TLS security, and periodically uses a third-party service to check for product penetration. It allows RPA managers to easily govern their automated processes on an enterprise scale with capabilities including separation of concerns, roles, and permissions. Additionally, Kryon Studio tracks user actions, continuously logs automation workflow changes, and displays the change history for each workflow, including the time/date and owner of each change. For RPA, Kryon's attended robots run on a user's desktop, while the customer can choose whether to run unattended robots on-premises, on a private cloud, or on Kryon's secure cloud. For Process Discovery, discovery robots run on the user's desktop (monitoring actions performed on desktop-based software, web-based applications, or virtual machines), and the customer can choose whether to run the Process Discovery server on-premises, on a private cloud, or on Kryon's secure cloud.

Kryon's ability to work with structured and unstructured information helps financial institutions to manage their paperwork more efficiently, while ensuring compliance with relevant rules and regulations. Because of the proprietary computer vision embedded in its RPA and Process Discovery solutions, Kryon robots are able to work with any computer program or set of programs. Furthermore, its platform supports multi-tenancy and offers customers the option of grouping their robots into teams. Among other uses, finance and accounting departments can utilize these capabilities to automate the processing of printed invoices and tax forms. The platform also supports integrations with third-party NLP technologies, enabling robots to manipulate unstructured information such as emails, instant messages, and other types of text. In 2019, Kryon plans to introduce an in-platform center of excellence designed to streamline the communication between a customer's RPA developers, RPA managers, and relevant stakeholders while helping them to follow RPA best practices. The aim is to develop and manage processes that are better organized, more transparent, and executed faster. It plans to introduce a web-based version of its development studio, launch a catalog of various prefabricated automation workflows for different verticals, and enhance the scope of processes that Process Discovery can identify automatically by extracting the business logic of customers' decision trees and identifying the events that trigger specific work processes. Kryon is working on enhancing Process Discovery's recommendation engine, so it can recommend the best processes to automate to optimize a specific business objective (such as maximizing output, maximizing speed, or minimizing worktime). It will also augment its OOTB analytics and management capabilities.

The Kryon Academy offers free online training courses covering RPA development and all automation solutions, where customers and developers can earn a certificate for their expertise. It also offers intensive week-long, onsite training courses to its customers to help them with the knowledge required to set up an in-house center of excellence. To date, over 300 developers have completed training and are certified. After training customers' teams, Kryon follows through with comprehensive customer support as and when needed. The Kryon Community, a free forum for customers and RPA developers, enables them to ask questions, post answers, share their knowledge, and expand their RPA skill sets.

NICE

NICE provides both cloud and on-premise enterprise software solutions that empower institutions to make smarter decisions based on advanced analytics of structured and unstructured data. Headquartered in Ra'anana, Israel, Nice serves over 25,000 organizations in more than 150 countries, including over 85 of the Fortune 100 companies. The NICE RPA solution suite contains both attended and unattended automation solutions that are enterprise-scale and secure. Its broad software portfolio integrates seamlessly with NICE automation solutions, therefore positioning it better to deliver more ways to enhance customer experience. It has deployed more than half a million digital workers (attended and unattended) globally; for FSIs in Asia/Pacific, particularly, the vendor has deployed thousands of bots for at least a dozen accounts. Its financial services customers in Asia/Pacific include SBI Card (India). This platform also includes Automation Studio, Desktop Analytics, Connectivity Watcher, Automation Finder, Automation Designer, and NEVA (NICE Employee Virtual Attendant). Its licensing is flexible with the availability of perpetual, term, SaaS, and per robot or per named agent pricing models.

NICE's automation development is done in a drag-and-drop environment with no requirement for coding skills for simplicity and usability. As an enterprise-level solution, it offers a centralized management (Robots Control Room) that monitors the health of the system and allocates digital workers based on customer needs at any given time. It is fully scalable and provides real-time visibility and control. As part of the Control Room, it recently introduced Unified Admin, a new portal that

centralizes the administration, monitoring, and provisioning capabilities of both attended and unattended bots into a single web-based, easy-to-use, and accessible application. The system tracks task successes and failures and alerts when a supervisor needs to get involved. Every bot activity is logged, and reports can be created from this data. The solution also comes with an OOTB automation portal and reporting tool, which allows the digital workers to be configured to collect any data and aggregate it into meaningful reports and operational dashboards. Powered by a proprietary data-driven intelligent decisioning engine, NICE Automation Finder helps identify the processes best suited for process automation and guidance by mapping, sequencing, and prioritizing captive automation opportunities to achieve maximum ROI. It also offers built-in integration with other NICE and third-party workplace applications to provide a seamless delivery of automation projects. Automation Studio, a new addition in the latest version of the NICE RPA suite, simplifies the automation design phase to enable developers to continuously acquire new features and capabilities from the cloud. The built-in intelligence and real-time guidance given to developers during designing of automation shortens development time and enables faster return on invested capital. In addition, it allows less technical users to develop process automations themselves, thus offering the agility to extend automation design to more business users.

NICE has developed its automation solutions according to software development life cycle (SDLC) methodology to ensure that the features are designed, developed, and tested according to the best security practices. The vendor ensures that server access is enforced and authenticated. The client session is token-based. The automation portal supports advanced authorized role-based access to the application for administration and access to data, where the role is based on functionality, actions, and teams. As it offers centralized management, applications, usernames, and passwords are configured in the server, where passwords are encrypted, and bots pull them on demand. It also offers a distributed local management of passwords and integration with enterprise vault (CyberArk). It has integration with Active Directory/LDAP and Windows Single Sign-On based on Kerberos. It also supports multiple environments and ensures that roles and authorization can be different per environment.

NICE has an open robotic automation framework that drives smarter customer service by integrating with leading AI technologies. The process automation robots can learn, understand, and execute processes based on unstructured data, such as scanned documents, chats, and text messages, while improving themselves over time. They can communicate with all of the organization's bots — from virtual agents to chat and voice bots — providing an end-to-end service by performing back-end actions in real time. To do this, the platform has an embedded OCR engine and supports integrations with any NLP tool. It has also added unique proprietary capabilities such as Shape Analysis, an AI-powered feature for providing connectivity to previously inaccessible virtual desktop environments and uniquely enabling application-based recognition of screen elements based on shape and text. NICE has NEVA, a virtual assistant that improves employee performance and leverages desktop automation, desktop guidance, RPA, and pre-integrated conversational bots (chat and voice) for activation. With a built-in Amazon Lex ready integration, NEVA's intelligent decisioning engine translates an employee request into structured workflow–driven actions and performs them on behalf of the employee by interacting with desktop systems in the background. In terms of product road map, NICE is heavily investing in enhancing AI and cognitive automation themes, including NEVA, unstructured data ingestion, automation discovery and creation, exception handling, and cognitive decisioning. Other themes include simplifying Automation Designer to increase its usability by less technical users and improving OOTB integration with other NICE solutions, such as NICE Actimize Risk Case Manager and Nexidia (real-time speech analytics).

Most of NICE's training services are delivered directly by NICE education services and are done through multiple education programs that are based on blended learning — a mix of self-paced elearning, online live elearning, as well as in-class instructor-led training. NICE also offers a formal certification program. Over the years, more than 3,000 individuals have been trained on its automation solutions. The vendor offers Automation Developer Support to augment the developers' automation skills and knowledge. This service shares knowledge and guidance on various issues such as troubleshooting complex automation scenarios in existing projects, maintaining existing automations while adding new capabilities, tapping advice and consultations on how to achieve best-practice standards, and supporting specific connectivity analysis cases.

Option3

Founded in 2012, Option3 offers JiffyRPA, an enterprise server–based RPA platform and JiffyRPA - Enterprise+, a cognitive version of JiffyRPA that can implement self-learning intelligent automation using ML and NLP. The cognitive version helps enterprises achieve higher automation coverage and impact by combining the power of automation, AI, and analytics in a single platform. Option3 is headquartered in Bangalore, India, and its current clients include global and Asia/Pacific banks, insurers, and payment processors. Defining what a bot is in JiffyRPA, Option3 highlights that it is an execution client that runs on a desktop without accruing any server, orchestrator, or back-end bot costs. In this definition, the number of concurrent desktop installations are more relevant than the number of steps executed in each process. In terms of licensing, JiffyRPA is licensed annually at a very disruptive commercial model. The licensing is for bots: attended, enterprise, and Enterprise+ with the intent of making Intelligent Automation affordable for all. There are additional costs for disaster recovery (DR) or high availability (HA). It also provides optional modules such as Secure Vault, Visualization Server, Machine Learning Studio, NLP Studio and an Intelligent Document Processing Engine that can be purchased as optional packages. Option3 also offers JiffyTest, a solution for new-age DevOps-ready end-to-end test automation.

Option3 provides complete drag-and-drop for all automation (for UI as well as back-end) for simplicity and usability. For all UI automation, JiffyRPA understands multiple object-level properties for more accurate object identification with Deep Field learning techniques. JiffyRPA provides the ability to automate the most complex UI applications across Web, Desktop, Mainframe, Java, Citrix, and PuTTY . This enables UI automation to be robust irrespective of small UI changes or product upgrades. The vendor also offers reusability at multiple levels: master data, UI objects, custom expressions, VBA macros, UI Components for a sequence of UI steps, or task nodes to encapsulate a series of tasks across applications. It includes built-in version-controlled repositories for UI elements, nodes, and tasks to ensure a high level of reusability and single-point maintenance. The nodes for all technologies and deep integration capabilities are easily configurable using REST-, SOAP-, and QUEUE-based components. The vendor highlights that its RPA platform is built on a client server model and its pull mechanism for digital workers ensures their optimal utilization. It also includes a built-in intelligent orchestrator for managing workload across available digital workers and supports horizontal scaling and remote execution without the need for any porting. The enterprise architecture enables horizontal scalability and enhanced security as everything can be centrally controlled and managed. The Jiffy Data Interface (JDI) provides operational users a powerful mechanism to monitor and manage their exceptions and operational data. The bot designer can create portal screens for the operations users to provide revised inputs for the digital workers to reprocess in case of failures. All of this is, made possible with little to no scripting. Additionally, JDI provides an interface for the operations users to monitor the actions being carried out by the bot. JiffyRPA offers an Open API–ready platform to integrate across the enterprise landscape. It includes built-in integration for SAP and supports integration with Oracle (by proper object identification) and Citrix-based applications (by a combination of image, OCR, and anchor elements).

The vendor provides several levels of data security; it comes with a built-in industry-standard secure vault. This could be used to manage all sensitive information using a pseudo-name mechanism. Secure vault can be invoked from multiple locations in Jiffy: system configurations, UI automation steps, and so forth. Compared with a standard credential store, the vault enables an RPA implementation where complete control of bot execution lies with the owner of the bot. Sensitive data is linked to the user account triggering the task, ensuring finer control over sensitive data. JiffyRPA also offers integration with external products such as CyberArk and best-in-class security with AES256 for data at rest and TLS1.2 for data in motion. The security vault enables a complete segregation of duties. Its centralized credentials store helps with easier maintenance and ensures that the bot designer has no access to actual credentials. Other features include role-based access and detailed logging and audit trails for both user and application levels. It includes an exhaustive real-time reporting /visualization module with real-time business KPI dashboards and storage of large volumes of reporting data.

Option3's Enterprise+ offers the ability to process unstructured and semistructured data, advanced bot management, load balancing, and security vault. The latest version can define and run a ML model including performing data ingestion, data cleansing, and executing ML models in real-time to convert unstructured data into structured information — without the need to code. Bot designers can build their own machine learning models with ease or even leverage existing models. The solution has intelligent OCR capability, with which it runs cognitive search to validate the OCR output against business data to improve confidence level. It has an integrated NLP engine that can process unstructured data in the form of documents (e.g., contract comparison use cases). The cognitive platform of the Enterprise+ version includes a visualization layer, in-memory engine and a petabyte scale storage platform. This allows business users to derive exhaustive real-time reporting/visualization with real-time business KPI dashboards and reports. JiffyRPA also has OOTB features that enable it to read any PDF documents. Its current vertical-specific offerings include KYC validations, bank reconciliations, and customer onboarding. It offers cognitive models for document processing such as invoices, claims, and underwriting. Option3 has introduced in its 3.0 release an intelligent document processing engine including a dynamic understanding of documents (including tables), enhanced object recognition including OCR-based recognition, and a disruptive pricing model. In upcoming releases, Option3 will include process miner, enhanced OCR/ICR cognitive capabilities, advanced bot monitoring and proactive production monitoring to reduce support effort post-implementation, more NLP and ML prebuilt libraries, and a bot store for commonly used processes.

Option3 provides an instructor-led and self-learning training programs with three levels of certification. The courses are currently available in English. Though the training is currently entirely done by internal staff, it intends to provide training services through third-party local partners and academic universities. The vendor has trained 500 professionals, with many more currently undergoing training. For customer service and support, the vendor offers a 24 x 7 support desk including self-service support. In the latest version of its solution, the vendor has also introduced a chat-based support that raises an issue that cannot be solved through existing documentation to the support group. L1/L2 support is provided by Option3 and/or its implementation partner while L3/L4 support is provided by Option3.

UiPath

UiPath is an RPA vendor providing a comprehensive software platform to help organizations efficiently automate their business processes. Founded in 2005, UiPath started its operations in Bucharest, Romania. The BFSI vertical accounts for 40% of its client base and some of its Asia/Pacific customers include Mizuho Bank (Singapore), Australian Unity (Australia), Nomura Services (India), AJU Capital

(South Korea), and Sumitomo Mitsui Banking Corporation (China). In the region, the vendor has deployed over 5,500 digital workers, 1,500 of which are for BFSI customers only. The UiPath Intelligent RPA Platform, with its advanced capabilities, enables global enterprises to design, deploy, and manage a fully-fledged digital workforce. The vendor offers an annual subscription license model with various types of licenses such as node locked, user locked, and concurrent licensing. The UiPath concurrent license enables easy scalability for both attended robot users and unattended robots.

In its Studio, UiPath offers a prebuilt drag-and-drop automation for simplicity and usability. To validate the usability of its solution, the vendor highlights that its annual recurring revenue (ARR) grew from US$1 million to US$ 100 million in 21 months and that it now counts 55% of the global Fortune 500 as customers. Business users control their digital workforce using UiPath Orchestrator, a browser-based server application that enables customers to centrally deploy, manage, and monitor robots (both attended and unattended) for processes and offers operational scalability across global business units. In attended automation, Orchestrator acts as a repository for processes, managing version control, publishing and deleting bots, and aggregating logs. In unattended automation, in addition to the above, Orchestrator can be separated into multiple secure tenants; this means that by using more than one tenant, users can split a single instance of Orchestrator into multiple environments, where each can create a customizable mix of users and roles to manage its own robots, processes, logs, and so on. The customers typically require only one person to manage and can therefore maintain a large deployment of unattended digital workers. A single digital worker can perform multiple process automations and multiple bots can even work in parallel on one virtual machine. The platform can be installed on the cloud or on-premise and on physical or virtual machines. As a virtualization solution, it runs on VMWare, Microsoft Hyper-V, Citrix XenServer, XenDesktop, Windows Azure virtual machine, and Amazon Cloud virtual machine. For Citrix automation, the vendor currently relies on image recognition and intelligent computer vision to automate. In its next release, it will provide an agent that can be deployed in Citrix and enable native automation (the same as working on a live desktop). Recently, the vendor launched UiPath Go!, an easy-to-use collaboration platform for customers, partners, and the community to facilitate the exchange of RPA reusable components for free. UiPath has API integration with Oracle, SAP, Salesforce, and other applications, making them available in UiPath Studio as prebuilt activities or in UiPath Go! as downloadable components.

Every step of each process can be centrally logged, monitored, and aggregated into the database, including all informational events, errors, and warning messages relevant to the application. UiPath analytics (Kibana is offered in conjunction with Elasticsearch) reveal correlations that act as actionable insights and triggers for the operational improvement. Creating customized logs based on each client's requirements is also available. For intelligent operations and business analytics, UiPath has developed sophisticated queuing and scheduling systems for the bots' activities that allows their full utilization. With the help of Kibana or Tableau reporting tool embedded in the platform, customers can benefit from a powerful log interpretation tool, customized reporting, and data visualization of highly personalized dashboards. The vendor uses process mining as an intelligent big data technology that analyzes and visualizes every process in customers' companies. It has also developed a Process Discovery Recorder that records all the user's interactions with the desktop.

For security, the UiPath RPA solution follows the client's security requirements and ensures that it does not retain any access to the platform or handle any client process data. It only stores robot-related activity reports either locally or on the Orchestrator side. It offers integration with the client's Active Directory for user identities. All data is stored, encrypted, and secured. UiPath uses FIPS compliant AES 256 algorithm for encrypting data at rest and HTTPS secure port 443 for the data in transit. It can also encrypt the configuration files of the different server components or the database

connection string only. In UiPath Orchestrator, a user is an entity that stores the assigned role(s) and email settings and enables them to log in to Orchestrator — a user's view of Orchestrator differs based on the assigned role. Orchestrator comes with only one predefined user: admin. Its username cannot be changed, and it cannot be deleted. It comes with the Administrator role, but customers can add other roles to it and even deactivate it. The Users page displays all available users, enables the manager to edit their details or remove them, and import users from Active Directory groups. The solution adds value by ensuring access control, execution monitoring, and auditing and reporting, which are in full compliance with enterprise security and governance best practices.

For cognitive intelligence, UiPath customers can leverage Python ML models directly from within the Studio while designing their processes. These ML models will drive predictions and decisions to automate more processes and raise fewer exceptions. The platform is also fully integrated with Google Cloud NLP & Stanford Core NLP solutions. With embedded Stanford NLP, the platform has created a new dedicated set of activities, which allows organizations to perform text analysis and entity extraction and automate processes by capturing intent from unstructured content in emails and documents. UiPath has cognitive activities already integrated into the 2018.2 Product Suite (Google Text Translate, Google Text Analysis, IBM Watson Text Analysis, Microsoft Text Analysis). These features provide language detection, named entity recognition, and sentiment analysis. The UiPath product road map is focused on five major pillars: security, scalability, path to AI, ease of use, and open platform. The future releases will include ML capabilities including self-learning (e.g., possibility for the robots to auto-update the automation workflows), intelligent recording through process discovery features, more NLP and voice recognition, integration with virtual assistants, dynamic case management integration, and automated process workflow generation. For training, the vendor was first to offer an open and free elearning platform, UiPath Academy that speeds up the learning and proficiency curve. It also has a community forum with 7,000 active users. There are currently 55,000 certified developers who have been through UiPath Academy and/or through one of its training partner programs. In 2019, the vendor plans to release courses in more languages, including Spanish, French, German, Japanese, and Korean. UiPath also allocates a Technical Account Manager to each client for customer service and support. It also offers UiPath Community Forum, a forum for users/developers to collaborate, share their success stories, post their queries, and help others about the posted queries.

WorkFusion

WorkFusion's AI-driven automation software creates and manages software robots for knowledge work. Built for data-first companies, its products automate business processes by combining AI, RPA, and people in one intuitive platform. The company was founded in 2011 based on research at MIT's Computer Science and Artificial Intelligence Lab (CSAIL) and is headquartered in New York, USA. WorkFusion offers two automation products: RPA Express and its AI-driven automation platform, Smart Process Automation (SPA). WorkFusion SPA offers bots that serve as an enterprise intelligent digital workforce and uses ML to learn, adapt, and adjust in real time from the available data so that there is no need for massive data, data scientists, or coding. Its other features include business logic machine learning and workforce automation insights. Among other leading FSIs in Asia/Pacific, Société Générale (India) is one of its key customers.

WorkFusion SPA combines RPA, OCR, analytics, AI, and workflow built-in to enable end-to-end automation on a single platform. This single platform with all critical automation capabilities circumvents the need for multiple tools to license, deploy, and maintain. The vendor aims to make its customers fully enabled to configure, operate, and administer its products with development approaches that suit a range of users, from business professionals with no technical skills to

developers who prefer coding environments. It offers no-code automation via an object-based RPA Recorder (also included in SPA as part of the Studio). Even its AI model can scale up with no need for additional programming and can run on standard hardware to make automation portable across functions, business units, and geographies. Workforce insights deliver live data on entire processes, teams, and operations, helping drive better decisions across business operations. Predictive analytics provide full visibility and centralized view of automation across bots and processes so that users can better plan cost and capacity. Customers can set SLA levels for their automation and track performance and cycle times to make sure SLAs are met, as well as track key impact areas such as hours saved and straight-through processing (STP) percentages.

WorkFusion ensures the centralized governance of digital workers, people, and processes with maximum control, auditability, and predictability to allow customers to bring the existing workforce and operations governance protocols into automation. Preemptive controls provide in-process controls that work in real-time to avoid look-backs and rogue automation. WorkFusion delivers security at the data level, so the customer's data is never exposed. Deployed as a single platform behind the customer's firewall, the risks associated with cloud and third-party APIs are eliminated. The differential privacy allows the sharing of models without exposing the underlying core data. SPA offers built-in RPA capabilities to create automations for a variety of application types. This includes thick-client applications, web applications, and applications hosted by Citrix, databases, web services, Excel, and other file formats. It offers both on-premise and cloud-based deployment models; the former accounts for 80% of its customer deployments.

SPA offers WorkFusion's proprietary AutoML, a capability that analyzes process data using input and output data from completed tasks to pick algorithms, train models, and insert models into the automation in a seamless, nondisruptive fashion. It lets business users refine automation models using basic logic on patterns, rules of thumb, and so forth, so there is no longer any need to label every piece of data. Importantly, WorkFusion's AutoML in essence embeds the ML development life cycle into the smart bots, making the creation of smart bots faster and easier, solving the challenge of creating smart bots at scale, as well as resulting in greater ROI. SPA provides multiple methods for integrating into other applications including API-based integration. OOTB solutions available in the software today are Invoice Processing and Negative News for Anti-Money Laundering (AML). The vendor is constantly working on adding more OOTB use cases, for example, it has planned to add Ultimate Beneficial Ownership, Source of Wealth, and Legal Entity Structures for AML. NLP assists in extracting data for ML models to process. For example, the vendor highlights that in the use case for entity detection, SWIFT messages content (names, company, address, etc.) results with pure Stanford NER alone are not enough but adding this data to an ML model could provide more accurate results. SPA's AutoQC feature allows for quality control in training, automatically correcting data based on what has been learned by the model.

RPA Express is an RPA platform that can serve as a starting point for company's automation journey. WorkFusion offers both a free Starter version of RPA Express and a free trial of the Pro version that can be deployed and used in the production environment. It is based on the same line of code as SPA so that customers can seamlessly migrate as their automation needs grow. The vendor offers both on-premise and online trainings through Automation Academy by WorkFusion. Courses are currently available in English, Spanish, and Japanese. Its full range of training options, operating models, and support options are available for in-house CoE models and other partner-led implementations. To date, Automation Academy has enrolled over 25,000 professionals with over 23,000 being certified. WorkFusion also provides enterprise support for all its Intelligent Automation products. Each customer is assigned an Account Manager, who is the main point of contact for the customer and is available for weekly meetings with the customer during setup and monthly during production.

ADVICE FOR THE TECHNOLOGY BUYER

The overall value proposition and significant benefits of automation — particularly with RPA and now even more with intelligent automation — have put many FSIs in Asia/Pacific in a frenzy to know more and even adopt these solutions. As we acknowledge that this curiosity has led to a double-digit and even triple digit-growth for many vendors, we should also note that, surprisingly, most of the automation deployments in Asia/Pacific FSIs have been for less than 15 processes. A siloed, piecemeal approach to automation is still more common than an enterprisewide strategy and it is one of the reasons, many institutions have not been able to scale these deployments. Moreover, many early adopters that tried to instill cognitive intelligence in the automation of their business processes have not been able to deliver steady and accurate results or justify ROI from these deployments. This IDC Financial Insights report tries to address these challenges by helping FSIs to identify and choose suitable intelligent digital workforce solutions based on their core characteristics and as a result, achieve successful and sustainable results with their automation deployments.

Aside from monitoring the automation implementations of over 30early adopters, we also note many more implementations in POC and pilot stages in 2019. We are seeing many FSIs in India, South Korea, Thailand, Hong Kong, Malaysia, Indonesia, and the Philippines fervently waiting to make their first step toward digital workforce. At the same time, we are witnessing Australia and Singapore steadily progressing toward adopting intelligent digital workforce solutions. The next two to three years will be crucial as more and more institutions appreciate the achievement of significant benefits, more successful functional- and vertical-specific use cases are presented in the market, and more advanced features and product propositions are made available by the vendors. By 2021, IDC Financial Insights expects that 60% of tier-1 Asia/Pacific banks and insurance companies will deploy intelligent digital workforce solutions for increased automation, intelligent decision making, and improved operational efficiencies to achieve an exceptional business value and deliver a more real-time and contextual customer experience. As highlighted earlier in this report, we also believe that these intelligent digital workforce solutions will significantly accelerate how cognitive/AI technologies are consumed within financial services.

As Asia/Pacific financial institutions decide to start and/or steadily progress in their automation journey, we advise them on the following considerations:

- **Change management is critical for success of any automation project.** Even though this report focuses on the technology aspect of automation, the other two key aspects: people and process just can't be ignored. One of the major roadblocks with adoption of intelligent digital workforce solutions has been the negative sentiment attached to the use of robots and AI and how they will adversely impact compensation and professional growth of human employees or even displace them. To address these concerns, institutions need to focus on concerted communications with their human employees When the value of automation from the people, process, and technology perspectives is effectively communicated, business owners can foster a culture of automation across their teams and efficiently manage any cultural resistance that may arise. We have also seen this negative stance change when business users experience firsthand the benefits of automation and how these digital workers free them from their manual and repetitive work and help them focus on more critical initiatives.
- **To achieve best results from their intelligent digital workforce solution, the institutions will have to address legacy way of doing work.** Even with institutions trying very hard to drive ROI from their automation deployments, the human employees currently have been able to automate only part of their work. The major challenge here is the way processes have been executed by

human employees for years in the institutions. In an ideal situation, the intelligent digital workforce solution, with its ability to undertake both rules- and judgement-based automation, should be able to automate the entire workflow and processes and thus, freeing employees to focus on more meaningful and valuable work. Therefore, it becomes extremely important to redesign most of the workflows and processes to make them suitable for automation, so that the institutions can truly achieve optimal and transformational results with their intelligent digital workforce solutions.

- **When it comes to vendor selection for automation needs, selecting an intelligent digital workforce solution based on six core characteristics typically delivers more favorable results.** To reiterate, these characteristics are: simple, usable, and reusable by business users, ability to deliver enterprisewide scale, security and governance as the foundational tenets, availability of "real-time" operations analytics, intelligence powered by cognitive/AI technologies and innovative tools, and strong support extended by the ecosystem. Since the solutions differ significantly in their approach to the market, it becomes important that before an institution selects a vendor, considerations must be made on how bots are built, executed, and managed; bot life-cycle capabilities; availability of enterprise-grade security and governance; types of delivery models (on-premise, hybrid, and cloud-based); and advancement toward intelligent automation. Additionally, evaluate the solution on other terms and features such as licensing costs, ecosystem support, real-time operations analytics and insights, interoperability and integration with third-party applications, and product road map. The availability of a bot store, functional- and vertical-specific offerings, and process mining and discovery features by the vendor will further shorten the time to realize business value. IDC Financial Insights recommends that the institutions carefully evaluate how the shortlisted vendors can fundamentally solve their business problems and optimally support them in their intent to achieve hyper-scale and hyper-performance with automation. The competence of intelligent digital workforce to deliver best quality outcomes, advice, and decisions will also depend on institutions' ability to address the issues around data quality, data usability, and data governance, among other things.
- We have been privy to many discussions that start with business users saying, "I want to solve this problem with AI." It is worth mentioning that **not all process automation initiatives require the use of cognitive/AI. However, its use must be considered wherever it increases the chances of attaining more robust automation.** Institutions seeking to build process automation capabilities should consider the entire intelligent automation value chain, including solutions based on self-learning and self-healing systems. IDC has seen institutions in Asia/Pacific turn to digital workforce solutions to manage volume variability, and they are currently exploring intelligent digital workforce solutions powered by cognitive/AI technologies and innovative tools to enhance their customer engagement capabilities. We do acknowledge that AI can create a pervasive impact in institutions; however, effective business buy-in often starts small and considerations (e.g., customer consent, data quality, biases, ethics, and security — which we will talk about in our next report — should be made to deliver accurate, consistent, and transformational results.
- **Invest only in projects where results can be measured.** The KPIs for an intelligent workforce solution will be different from a digital workforce solution. Therefore, it becomes very important that an institution does a more thorough cost and benefit analysis of an intelligent digital workforce solution than it would do for a digital workforce solution. The total cost of ownership (TCO) must be considered — the sum of the cost of professional services, initial and ongoing cost of software, and ongoing employee (both human and intelligent digital workers) and maintenance costs. Institutions also need to go beyond the benefit of costs savings and consider other benefits including improved customer engagement and support, improved employee morale and efficiency, improved accuracy and compliance, and the ability to deliver hyperscale and hyper-performance.

- **IDC Financial Insights expects that a multivendor strategy will gain more prominence in the next two years.** As aforementioned, this will be for FSIs' different automation needs and multitude of reasons, some of them being the growing demand for more intelligent automation offerings and key capabilities around the core characteristics, mitigate vendor concentration risk, and achieve better licensing terms. However, we will also see exceptions to this approach, where some institutions will still prefer to work with one vendor for all their automation requirements. This decision entirely depends on the institution's vision for its automation and the ability of its vendor to offer end-to-end intelligent automation. In case an institution goes ahead with a multivendor strategy, it is worth noting that it will also have to manage challenges and complexities that come with managing multiple vendors.
- **As the new approach to intelligent automation (particularly AI) takes hold, the institution will create demand for new roles and skills and must also be ready for a level of reskilling it has never seen before.** We are seeing new automation roles emerge — Executive Sponsor, Automation Change Manager, Automation Program Manager, Automation Process Analyst, Automation Trainer, Automation Developer, Head of Intelligent Automation CoE, and even Chief Automation Officer. As automation progresses within financial services — thanks to intelligent digital workforce solutions — other technology capabilities in the automation spectrum that we earlier talked about (demand for skills in several areas) will also grow: data science, cognitive/AI specialists, big data and analytics, design thinking, cloud services, cybersecurity, risk management, and compliance and governance, just to name a few. The institutions need to now think of a new organization structure, where the teams will be reorganized to include a combination of human and intelligent digital workers (a hybrid workforce). Leaders and managers will not only have human employees but also intelligent digital workers reporting to them. Institutions will also have to address many new issues including defining new responsibilities of human employees, creating new HR policies including new approach to performance management and growth, and investing in continuous learning and training. Not only FSIs but also Governments, educational institutions, industries, and societies across the region will have to come together to put initiatives in place to encourage and motivate their human employees to re-train and acquire new skills, as well as give them adequate time to prepare for the jobs of tomorrow.

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- *Intelligent Automation Services Value Chain* (IDC #US44127518, July 2018)
- *Robotic Process Automation Software Overview* (IDC #US43927018, June 2018)
- *Robotic Process Automation in Asia/Pacific Financial Services: Key Learnings from 10 Early Adopters* (IDC Financial Insights #AP43545718, February 2018)

Synopsis

IDC Financial Insights continues our series of reports on automation in financial services. This report is second in the series, where we start by looking at robotic process automation (RPA), and how the proposition around it has steadily moved toward intelligent automation and leveraging an intelligent

digital workforce. In our report *Robotic Process Automation in Asia/Pacific Financial Services: Key Learnings from 10 Early Adopters* (IDC #AP43545718, February 2018), we emphasized that RPA has often been cited as the essential first step toward automation but could more accurately be described as part of a continuum of technology-enabled initiatives to bring intelligence into the automation of business processes. IDC defines this continuum of technology-based initiatives focused on process automation capabilities as the Intelligent Automation Value Chain. This value chain underscores a notable evolution of demand toward an intelligent digital workforce from the rules-based digital workforce.

IDC Financial Insights' *Intelligent Digital Workforce* comprises intelligent digital workers — essentially software robots that can perform both deterministic and nondeterministic tasks by continuously understanding and analyzing structured and unstructured data. They represent rules and judgement-based automation, and, like their human counterparts, they are both self-learning and self-healing workers that can discover patterns to predict decisions and even offer recommendations to improve them. In other words, the intelligent digital workforce is progressively graduating from merely mimicking human actions to augmenting human intelligence, as well as evolving quickly to achieve the potential of autonomously emulating this intelligence. The term Intelligent Automation is also used by the industry to point to intelligent digital workforce. This workforce has the potential of delivering meaningful customer support, improved decision making, and valuable customer insights.

Aside from monitoring the automation implementations of over 30 early adopters, we note many more implementations in POC and pilot stages in 2019. We are seeing many FSIs in India, South Korea, Thailand, Hong Kong, Malaysia, Indonesia, and the Philippines fervently waiting to make their first step toward digital workforce. At the same time, we are witnessing Australia and Singapore steadily progressing toward adopting intelligent digital workforce solutions. The next two to three years will be crucial as more and more institutions appreciate the achievement of significant benefits, more successful functional- and vertical-specific use cases are presented in the market, and more advanced features and product propositions are made available by the vendors. "By 2021, we expect that 60% of tier-1 Asia/Pacific banks and insurance companies will deploy intelligent digital workforce solutions for increased automation, intelligent decision making, and improved operational efficiencies to achieve an exceptional business value and deliver a more real-time and contextual customer experience," says Sneha Kapoor, Research Manager, IDC Financial Insights.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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