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# FROM AUTOMATION TO AI

## KEY GOVERNMENT STRATEGIC CONSIDERATIONS FOR EXECUTION OF AUTOMATION AND AI SOLUTIONS



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# Abstract

This paper examines the threats and opportunities offered by automation and AI software. It argues that the largest risk for government is not to act at all and resist the change that this software brings with it. The argument presented is that disruption is inevitable so planning and investing for the future is the key to capitalizing on the opportunity offered by automation and AI software.

This paper will outline the full spectrum of automation software through to super artificial intelligence (AI) computing. It explains the key characteristics of each type of software and what makes them different from each other. Examples of functions being automated today are provided and the new value created for customers and government departments. The paper outlines how artificial intelligence can help government deliver better services for citizens.

Finally, the key strategic considerations are outlined to help government departments properly execute automation and AI solutions.



# THE RISE OF THE MACHINE & FALL OF HUMANITY

World Economic Forum economists have labelled this period of history the **Fourth Industrial Revolution**<sup>1</sup>. The label signifies two major ideas: The first idea is that current and emerging technologies will have a significant impact on industry, and the second idea is that this technology will revolutionize many traditional ways of conducting business.

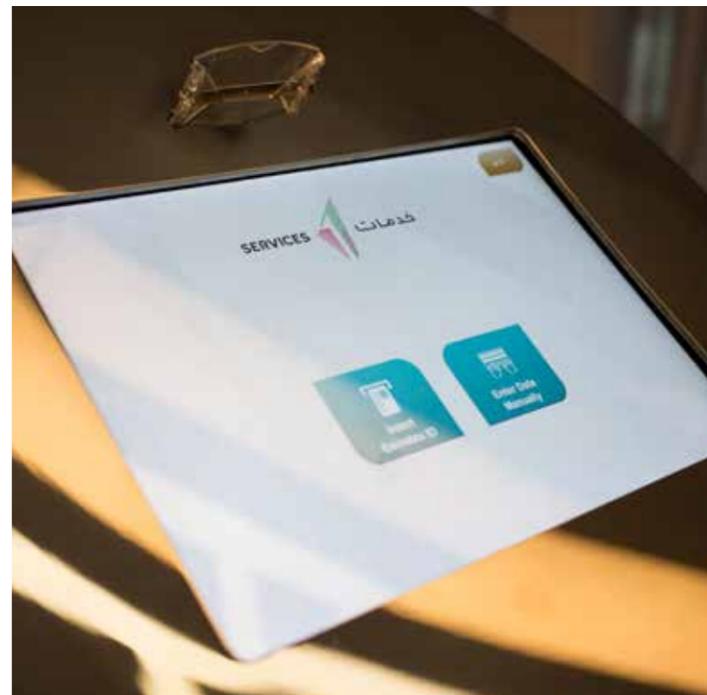
The basis for this argument is simple: There has never been a period in our history when so many emerging technologies are becoming commercial realities. The convergence of multiple new technologies creates significant commercial opportunities and threats for government and organizations. A technological tsunami is coming in the next ten years, and those businesses that are unprepared could feel the impact severely and negatively. But those that are prepared and are able to capitalize on changing citizen or customer expectations will have the opportunity to dominate markets and new industries. Leading this wave of digital disruption is software that automates business processes and artificial intelligence designed to replicate and supersede human problem solving capabilities.

According to a 2015 survey by the Global Centre for Digital Business Transformation, business leaders from twelve industries in thirteen of the world's largest economies predicted four out of ten highly ranked global companies would fold sometime in the next five years—victims of rapid technological change, shifting business models, and compelled mergers. **“Not just lone companies, but entire industries are being side-swiped by these effects,”** said **James Macaulay**, co-author of the study. “Digital disruption now has the potential to overturn incumbents and reshape markets faster than perhaps any force in history.”<sup>2</sup>

<sup>1</sup> The term was first used in April 2011 at the Hanover Fair, the world's biggest industrial trade show. By October 2012, the Working Group on Industry 4.0, chaired by Siegfried Dais (Robert Bosch GmbH) and Henning Kagernann (acatech) had developed a set of recommendations for companies implementing Industry 4.0.

<sup>2</sup> Global Centre for Digital Business Transformation, Digital Vortex: How Digital Disruption Is Redefining Industries, June 2015, 1.

The threat of human displacement from the adoption of automation and AI software is real. However, the threat of mass job losses and economic downturn from high unemployment rates is not linked to the adoption of automation and AI software. It is directly linked to the lack of planning and investment that is required to create and develop the new industries made possible from the increasing new demand for the software. Governments have the opportunity to create a better future for their citizens by embracing AI and encouraging new companies to establish their business and create new jobs to support this growing industry. As more jobs are automated more people will be needed to work on the automation and AI software itself. Jobs can be created for building, maintaining, and fixing complex software and hardware systems. In addition, people will be required to generate training data on which to do machine learning and handle business process exceptions not managed by automation software.



In an interview by McKinsey, Leslie Willcocks, Professor of technology, work, and globalization at the London School of Economics' Department of Management, tells us we don't have to worry about job loss – automation software is meant to elevate roles - and even may be a stress-reduction strategy<sup>3</sup>. “The average knowledge worker employed on a back-office process has a lot of repetitive, routine tasks that are dreary and uninteresting,” says Willcocks. Automation software has the capability to eliminate these types of repetitive functions currently performed by humans.

Repetitive customer facing functions are also being replaced by AI software in the form of chatbots. They are not yet perfected but the advancements in artificial intelligence are rapidly enabling chatbots to become digital workers that can replace front-line contact centre agents. Some of the analysts such as Gartner have predicted that by 2020 more than 85% of all customer interactions will be handled without a human. An industry report by Cushman and Wakefield estimated that approximately 500,000 jobs could be vulnerable to automation in the Business Process Outsourcing (BPO) and Shared Services industry in the next decade.

What makes our current industrial revolution different from the previous revolution, during which technology liberated people from physical labour, drudgery, and constraints of mass production, is that this latest revolution has technology displacing people and industry. Past industrial revolutions tended to create new economic growth by enabling new industries to produce more and better-quality goods and services.

Job growth was a normal by-product. However, unlike previous revolutions, this one has the potential to disrupt our lives, industries, and governments, and to detract jobs from the world's economies. The threat is real. However, the opportunity lies not in resistance to this new technology but embracing it, developing it and creating new job opportunities for the future. The threat of automation and AI software as a catalyst for the demise of humanity is directly linked to poor planning and investment for what the future will bring. The wave is coming and governments have the option of standing still or riding the wave.

<sup>3</sup> <http://www.zdnet.com/article/robotic-process-automation-the-latest-promise-to-liberate-back-offices/>

<sup>4</sup> Where in the World?: Business Process Outsourcing and Shared Services Location Index 2016



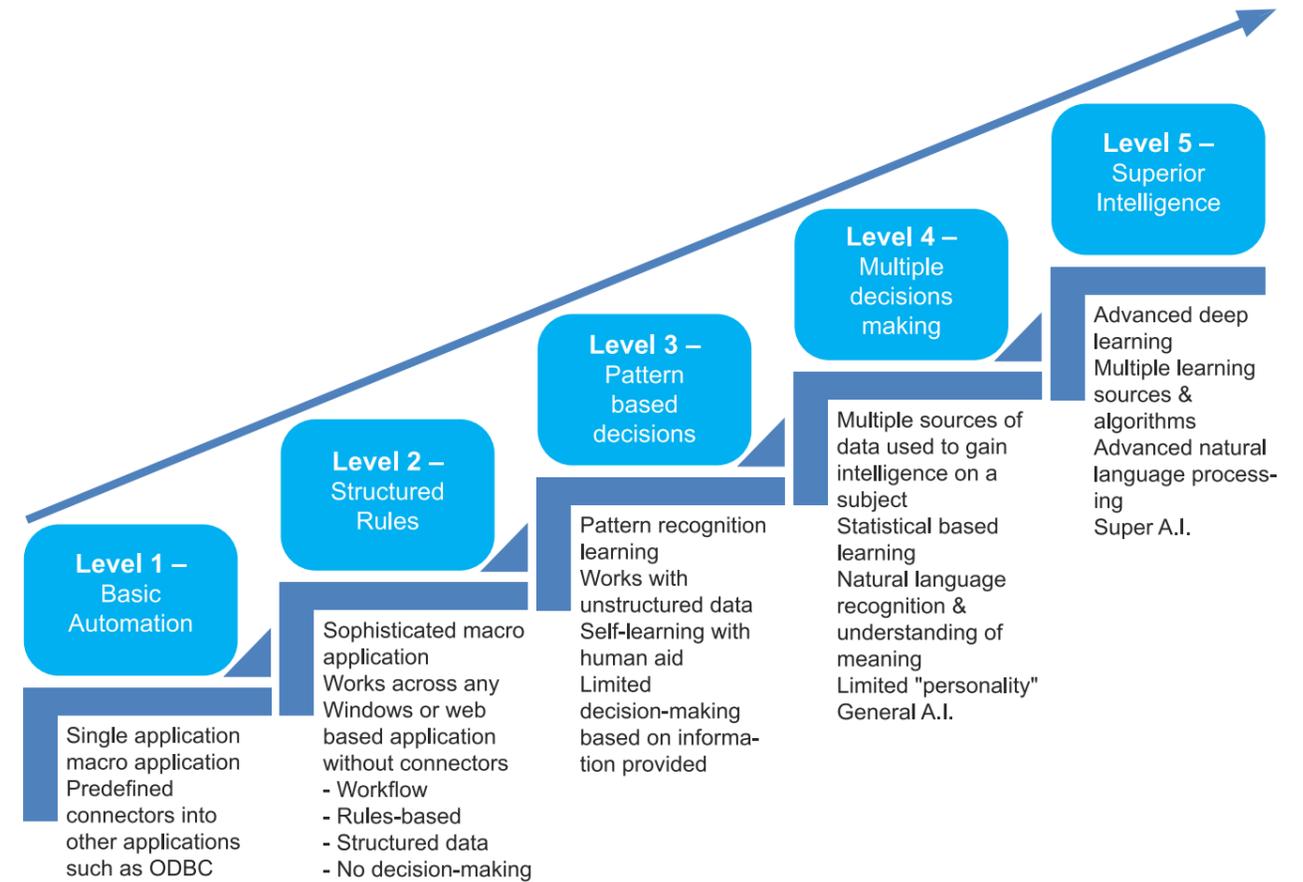
# UNDERSTANDING THE DIGITAL WORKFORCE

The augmentation or replacement of a human workforce with a digital one will impact citizens and create new opportunities for value creation. Digital workers exist in the world of bits and bytes. They are not physical robots, doubt software applications in an IT network. Unlike normal software programs, however, digital workers are defined by their ability to perform multiple tasks in a business process normally performed by a human. They cannot exist as stand-alone programs; they must interface with other data and applications in order to achieve their objectives. Their interdependence on other IT systems is a key characteristic of these programs. This highlights the importance of having good data and applications to execute business processes in the first instance. Without these IT components, the organization will be at a disadvantage when it comes to capitalizing on the business benefits of a digital workforce

The different technologies can be classified into five different categories, each of which measures the software on a certain functional dimension:

1. **Data:** The level of sophistication in dealing with business data (structured or unstructured)
2. **Task:** The type of task predominately performed (rule-based or requiring knowledge from multiple sources to complete the process)
3. **Interoperability:** The level of collaboration (whether work is performed in a single application or across multiple applications and platforms)
4. **Artificial intelligence:** (none, machine learning based on pattern recognition and statistics, or super AI exceeding human capability)

These dimensions enable us to identify the types of tasks performed by the digital workers (DW), the applications they can access, and the level of cognitive computing they offer. The DW capability model (see figure 1 over the page) was designed to provide categories for the key characteristics of each offering based on these dimensions. Examples of typical AI applications have been provided for each category as illustrations of typical industry uses of the software:



The solutions currently available in the marketplace broadly fit into the categories of this capability model. At the lower end of the spectrum, the digital workers simply follow defined business rules and behave like a macro within a defined workflow. On the higher end of the spectrum, the programs display humanlike intelligence by learning and applying knowledge from unstructured data sources. No software company has currently been able to demonstrate true artificial intelligence (a program that has intelligence capable of reasoning, knowledge, planning, learning, natural language processing, perception, and the ability to move and manipulate objects). A number of key organizations such as Google, IBM, and IPsoft are making major inroads into creating true AI, but at this stage there are minimal commercial applications in the marketplace. Google's DeepMind is the company closest to achieving true AI, but at this stage there are minimal commercial applications in the marketplace. Google's DeepMind is the company closest to achieving true AI, but even they acknowledge the challenges in achieving an independent program that is self-aware and capable of manipulating its own environment.

# ROBOTIC PROCESS AUTOMATION

The most widely adopted variety of digital workers is currently the automation of repetitive, rules-based, back-office business processes using structured data. The automation provided by these programs takes place when software “robots” carry out processes or tasks normally completed by humans. Several names are used to define these programs and the function they perform, the most widely of which is robotic process automation (RPA). RPA is positioned in the marketplace as an offering that belongs to the next wave of digital disruption. Because the software has the ability to replace or augment human workers and change business models, these technologies have the disruptive capabilities outlined in Klaus Schwab’s book *The Fourth Industrial Revolution*.

RPA’s adoption rate has been gaining momentum over the past two to three years largely due to the increasing attention these technologies have received from tier-one consulting firms and to the increase in IT vendors providing RPA solutions and releasing more sophisticated versions of the software.

This momentum has increased in countries such as the US, the UK, and Australia largely because of the high cost of labour and the maturity of IT systems in the execution of business processes.

The adoption of RPA is expected to increase in many organizations as its value is better understood. Their introduction into commercial organizations will add value to business processes by increasing the level of analytics and predicting customer and business outcomes in a more insightful, commercially useful manner.

Currently, organizations appear to be comfortable with the introduction of software to automate repetitive business processes, as opposed to the introduction of knowledge-based digital workers. The main reason rests with the low-value aspect of these processes and the minimal impact on internal organizational resources. Typically, the business processes better suited to RPA have some common characteristics:

- Repetitive and rule-based
- Accesses structured data sets
- Utilizes applications on a Windows or web-based platform
- Well documented and standardized in practice
- Three or more staff are hired to complete the process
- Data input is prone to human error

The popularity of RPA in automating back-office processes is growing because previously the only option to cost-effectively deliver these processes was to outsource them. Despite being of low strategic value, these processes are necessary in the daily operations of most government departments. RPA solutions are helping government departments reduce errors and deliver more efficient interactions with their customers, while at the same time freeing up the humans performing those tasks to work on higher-value work.

For example, common transactions, such as retrieving customer data to handle a support or sales inquiry, normally take several applications to process. The delays and errors experienced by customers can be eliminated when an organization implements an RPA program to assist the human employee by performing all the mundane functions of opening applications, retrieving data, and filling in customer information multiple times.

## Finance/Accounting

- Invoice processing
- Accounts payable and accounts receivable
- Reporting
- Bank reconciliation
- Fixed assets analysis
- Master data management
- Vendor and customer account creation
- ERP logging from another system

## Human Resources

- Employee on boarding
- Leave of absence management
- Populating employee data into multiple systems
- Performance appraisal management

## Information Technology

- Creating new accounts
- Software installations and updates
- Batch processing
- Printer setups

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Government departments are constantly looking for ways to improve all aspects of their operations. Business processes over the past decades have undergone multiple revisions ranging from mapping, standardizing, and reengineering to outsourcing and transformation. The most recent big transformation related to extracting value from business processes has focused on cost reduction and improving outcomes by outsourcing, centralizing, and creating global shared services centres. The results from these initiatives have been mixed. Some organizations have been successful in extracting the value from such projects, while others have not.

Offshoring back-office processes to low-cost labour forces in countries such as India and the Philippines has been an option in recent years for any company seeking to optimize its operations and yield a greater result for its shareholders. Over time, however, this strategy has uncovered risks that have organizations reconsidering their offshoring model:

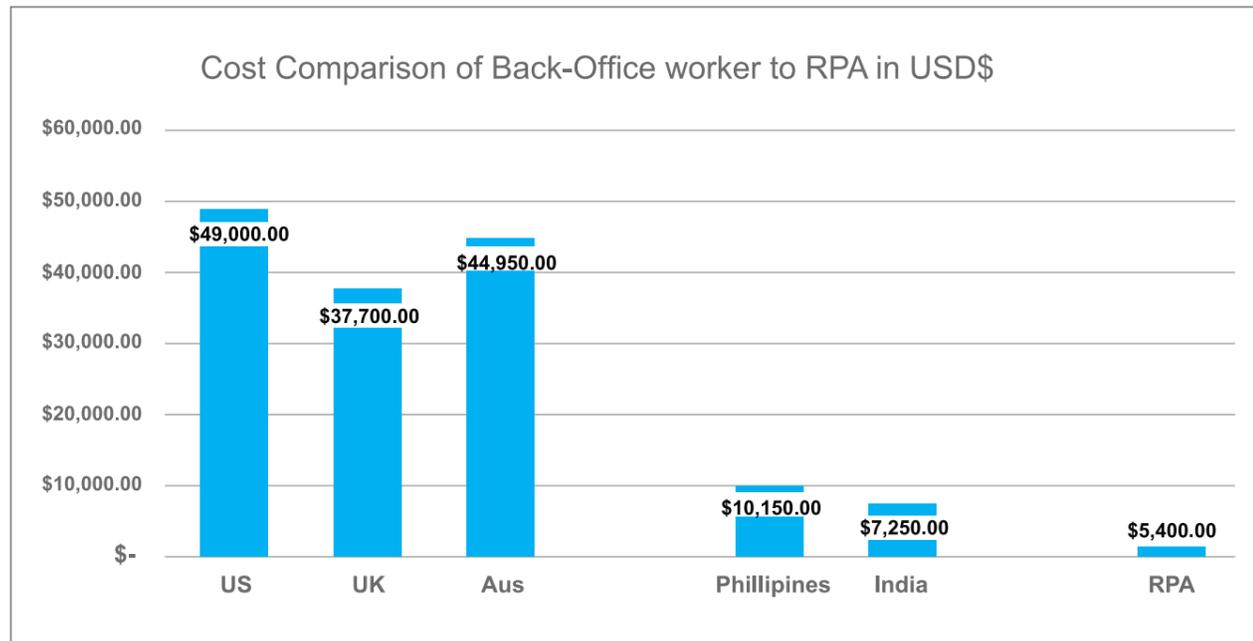
- Higher likelihood of errors
- Risk of data theft
- Loss of control over the process, thus limiting improvements
- Higher costs for supervision
- Rising labour costs that erode the cost benefits
- Business disruption due to climatic and political issues
- Fluctuating currencies that impact financial gain

RPA offers organizations the opportunity to take these processes back in-house at a lower cost than is currently offered by their outsource vendors. Consider a cost comparison of RPA versus a full-time equivalent staff member: The cost of a back-office worker in three similar markets (US, UK, Australia) reveals that an onshore staff member would cost approximately 85 percent more than an RPA software license. At the same time, the RPA solution is approximately 50 percent cheaper than a Philippines-based worker and 34 percent cheaper than an offshore worker in India.

These cost comparisons are based on a captive operation in both the onshore and offshore locations. The costs would be approximately 35 percent higher if a vendor were providing the services to an end client. The cost comparison includes labour on-costs of 35 percent and software on-costs of 20 percent.



# ARTIFICIAL INTELLIGENCE



This high-level cost comparison is more attractive when a more detailed analysis compares the costs benefits of RPA with hiring a human equivalent. Additional components to consider include:

- support staff,
- attrition,
- hiring,
- training,
- vacant real estate and utilities, and
- Agent errors.

These components need to be considered when preparing the case for RPA software



The adoption of operational applications of AI is increasing across many industries. Research companies such as Tactics are predicting that the market for AI systems for the enterprise sector will increase from \$202.5 million in 2015 to \$11.1 billion by 2024. This represents a compound annual growth rate (CAGR) of 56.1 percent.

On the AI end of the digital workforce spectrum, government departments will be able to elevate the customer experience by reducing the cognitive heavy lifting and effort required at various stages of the customer life cycle. Pattern-matching AI programs can be used to create an effortless, highly customized customer experience, for the simple reason that customer behaviour is largely pattern based. People tend to follow repetitive behaviour when shopping based on visual cues, and organizations of the future will be able to capitalize on this.

Take, for example, the online shopping experience. Consumers tend to follow a pattern in how they search and purchase goods. An AI program can recognize this pattern of behaviour and then manipulate the user's experience, providing a highly contextualized and personal experience by presenting pages and images most likely to appeal to the user. The AI programs can achieve this contextualization only if there is pre-existing data on user behaviour. Programs like Mix panel capture the raw user behaviour from websites that is required for AI programs to provide a personalized experience for online shoppers.

Other pattern-matching AI solutions capable of elevating the user's experience include image recognition and natural language processing. Programs such as Cloud Sight or IBM's Visual Recognition enable companies to build applications that allow a user to take a picture of anything with a smartphone and have an immediate response about what the item is or how it fits with other items. In a shopping context, this reduces the customer's effort in searching for the item, and it can provide the user with similar products at the lowest price point and in close proximity, all in a matter of seconds.

Digitized support functions can often frustrate customers, because a self-service knowledgebase tends to be cumbersome and costly when trying to retrieve information and live support from a human. But with natural language processing (NLP) using AI, a government department can provide an interactive experience for customers without a human employee. AI programs are being used to leverage existing corporate information (such as user manuals) and to manage support calls in order to provide a faster, more accurate response to customers seeking support.

From an operational perspective AI has the capability to provide the government department with better performance in the following key ways:

- **Speed** – AI software can complete a task or a process faster than a human
- **Reduced Process Errors** – AI can be programmed to follow rules to complete a process. Once programmed the AI does not make programmatic errors.
- **Lower Costs** – AI software costs less than most human employees and can accomplish more workload than a human.
- **Scale-up Capability** – AI is not bound by resource constraints, geography, or physical location requirements. Since AI is software it has the capability to enable government department to scale-up their operations quickly.



# VALUE CREATION FOR CITIZENS

Digital workers can offer far-reaching benefits to government beyond the obvious cost savings of reducing human worker counts. On the surface, it may appear that digital workers provide only cost optimization for the operations of a government department. However, this is a narrow view of the benefits associated with digital workers. In fact they can generate new value, because they can potentially enhance the citizen experience.

Many of the back-office functions described as suitable for digital automation have an indirect and a direct impact on citizen's experiences. For example, when highly repetitive tasks are required, humans are prone to errors. These errors could lead to a delay in processing any applications required to conduct business or manage personal affairs. Similarly, citizens calling a contact center to inquire about their application are often subjected to the same security questions several times, as the agent is required to open multiple applications to process an inquiry. This highly repetitive task creates frustration for both the citizen and the human worker processing the inquiry. Human workers performing such repetitive tasks are less focused on delivering a superior citizen interaction.

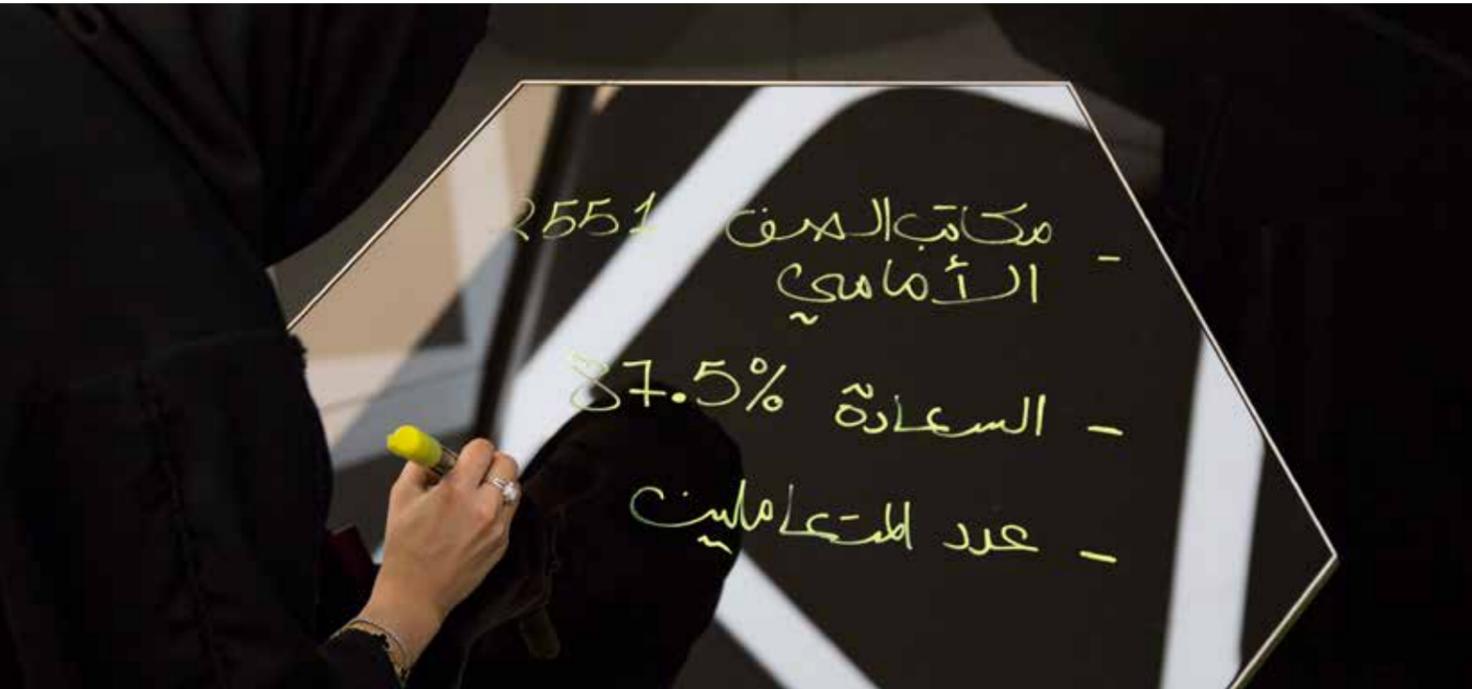
A digital workforce can elevate the citizen experience by making business processes

- More efficient,
- Largely error free,
- Faster, and more effortless.

Automation of these processes releases frontline, citizen-facing human employees to focus their efforts on emotional aspects of customer interactions. With RPA performing the more clear-cut functions, human employees can ensure citizens:

- Receives proper attention,
- Treated courteously,
- Receives personalized responses,
- Has his or her need more fully identified and matched to products and services, and is able to resolve more complaints on the first interaction.

The reason for most substandard citizen experiences is the poor execution of business processes. A digital workforce is capable of remedying this by faultlessly executing the essential processes that impact citizens' experiences



# NEW GOVERNMENT VALUE PROPOSITIONS

Most of the current business cases outlining the benefits of automation and AI are from the private sector. These cases, although not government, offer the insights of the potential that can be achieved from the implementation of automation software in government departments. Case studies are emerging on a regular basis demonstrating the value of AI applications after they have been implemented.

ANZ, one of the top four banks in Australia, announced its use of RPA in 2015, which helped validate RPA use in blue-chip organizations. The case study for the ANZ implementation summarized the benefits as follow:

- 235 processes automated using RPA
- Cost savings of greater than 40 percent
- 20 percent fewer full-time employees used

By automating processes such as transaction investigations, funds tracing, audit certificates, funds disbursements, and address changes ANZ has been able to elevate its customer experience by reducing the delays and errors that occur when humans perform these tasks. Having reduced the cost of processing these low-value functions using RPA, the bank now has the flexibility to pass these savings to customers and become more competitive.

Other companies such as GM, Dell, and Uber have also automated some of their business processes to achieve similar cost savings. As summary of the key value propositions available from the implementation of automation and AI software for government departments is outlined in the table

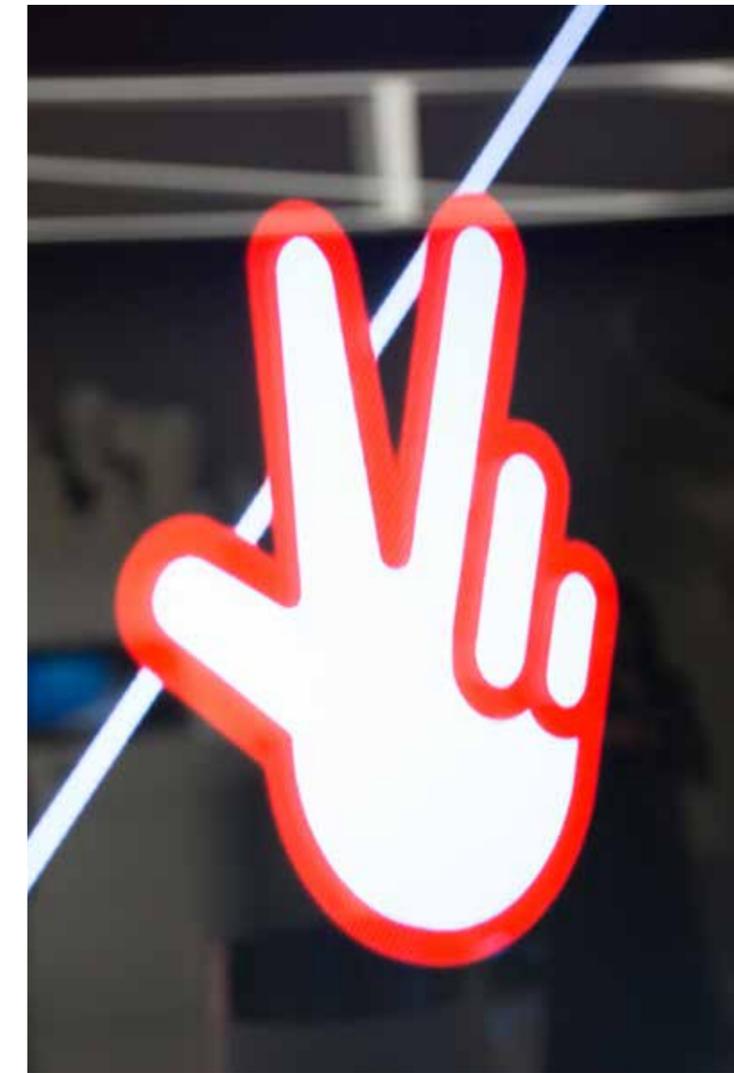


Table 1: New value propositions for government departments

Functional Area	New Value Proposition
<b>Administration and Finance</b>	
<b>Account Opening, Change of Address, Application Processing</b>	Faster processing with reduced errors using Robotic Process Automation. This leads to a better citizen experience and reduced costs.
<b>Know Your Customer (KYC) &amp; Anti-Money Laundering</b>	Automation of the KYC process leading to reduced costs, better legal compliance, a reduction in commercial risk, and saving banks potentially hundreds of millions in fines for non-compliance. Governments can also elevate their country's status for financial security. Customer experience is also elevated.
<b>Fraud Detection</b>	Fraudulent applications can cost millions to government departments. AI's pattern-matching capabilities have been applied to identify fraud and save significant money.
<b>Sales &amp; Customer Service</b>	
<b>New Quotes, Sales &amp; Customer Service</b>	Chabot's are used to provide a fully automated process for generating quotes saving costs for both the government department and citizen.
<b>Sales lead qualification</b>	Finding and engaging with prospects to determine if they qualify for your criteria is one of the most inexact sciences. AI is used to optimize the conversion of prospects into qualified leads. This is designed to increase sales conversions.
<b>Multichannel customer engagement</b>	Engaging with customers across multiple channels in a meaningful way that leads to greater profitability is a challenging task. AI has been used to identify customer segments and apply meaningful engagement to maximize customer lifetime and increase revenues.
<b>Medical</b>	
<b>Medical diagnosis</b>	Misdiagnosis of patients costs the medical industry hundreds of millions of dollars and can greatly impact the lives of people. AI is being used to vastly improve the diagnosis of patients using advanced machine learning and pattern-matching algorithms.

# STRATEGIC CONSIDERATIONS FOR AUTOMATION AND AI IMPLEMENTATION

Many organizations have begun their journey into AI by undertaking exploratory research and developing strategies for the deployment of AI in their organizations. The danger of incorporating AI into any government department lies in not properly evaluating the various strategic elements that need to be properly considered before implementation.

A recent report by technology market research firm Vanson Bourne and data analytics provider Tera-data identified that 91% of the executives surveyed from organizations planning to implement AI expected to face major challenges in the deployment of AI and achieving the expected Return on Investment (ROI).

The first starting point to reduce the risk of failure is to consider who will lead the AI strategy. The Chief Technology/Information Officer is typically the person who will be given the responsibility of deploying the strategy. However, unlike other technologies the impact of AI on the organization and its customers is significant. AI has the potential to disrupt the entire business model of the department and displace people. The strategy for the deployment of AI will need to include all the business units to be impacted and the key areas affected by disruption. The areas to consider are complex and multi-faceted. The Vanson/Teradata report identified that many organizations have begun to create a new C-Suite role to address the challenges of AI deployment across the organization. The new role is being termed Chief A.I Officer (CAIO).

The second major consideration is to determine what the government department would like to achieve from the deployment of AI. This question cannot be answered unless there is a resource in place to advise the organization about the potential areas of impact. This person needs to have the necessary knowledge of AI from a technology and

business perspective (first strategic consideration). The report identified three key areas of investment being made by the organizations surveyed: 62% to improve the customer experience, 59% for innovation and product development and 55% for operational excellence. These broad categories require further analyses to determine specific areas of pain that AI can help remedy. There needs to be a business need and this should be articulated in numbers. For example, a highly manual process could be costing the department \$5M a year, but with the implementation of AI automation software the cost could be reduced by 70%. These simple business cases are an important step towards development of the strategy

The final major strategic consideration will be to identify the key enablers required to make the deployment of AI in the organization a success. The key barriers identified in the Vanson/Teradata report from those surveyed included: 40% claimed IT infrastructure was an issue, 34% said getting the right AI talent, 30% identified lack of budget and 28% identified complications in changes to policies and regulatory issues. The enablers required to make your strategy work can only be properly identified once the process is completed for determining how the organization will utilize AI to address certain business challenges

Any successful AI strategy will need to carefully consider the impact on people in the department. Often this is an overlooked part of the equation but one that we feel can severely influence the results achieved from AI for the organization. Internal stakeholders who fear AI because it can replace them are likely to resist the change and potentially undermine its deployment. AI will inevitably replace some workers and this is why it is a critical aspect when designing an AI strategy. Thought needs to be given to the people likely to be replaced and how they will be treated.

The following questions should help you answer how and if you should implement digital workers in your organization:

- Will digital workers augment human efforts during some processes or replace them entirely?
- How will digital workers elevate your current customer experiences?
- What is the likely impact on company culture?
- Should the stakeholder for digital workers be the IT department or a business-focused department?
- Which areas of the business could benefit from a digital workforce?
- Which processes are currently standardized and ready for automation?
- Which processes need reengineering prior to implementing a digital workforce?
- Is there a road map for a phased approach for the introduction of different varieties of digital workers?
- How will communication about the digital workforce be managed internally?
- Will you utilize a change management process to implement the digital workforce?
- What is the governance model for managing the digital workforce vendor?
- If existing processes are outsourced, will a digital workforce enable these processes to be brought back in-house?
- How (and by whom) will the digital workforce be supervised?
- What role will humans play in helping execute a process largely managed by digital workers?
- Will you retrain humans being replaced or fire them?
- Are there any union considerations if you intend to make people redundant?
- Will you reduce headcount through natural attrition instead of redundancy?
- How will you communicate your initiative to the public and shareholders?

Replacing workers without a plan is disruptive for all workers. Consideration needs to be given to retraining and redeployment of displaced workers to ensure cooperation and acceptance of AI as a benefit rather than a detrimental solution for workers.

## CONCLUSION

This report frames automation and AI software as both an opportunity and a threat to government. The software is part of a suite of technology driven solutions that are disrupting many industry sectors. This wave of change occurring in industry has become known as the Fourth Industrial Revolution. Unlike previous industrial revolutions the threat is that this software will replace numerous jobs and disrupt people rather than create new jobs and economic prosperity. The potential for higher unemployment leading to lower standards of living is a possibility.

However, the risk of an adverse impact from automation and AI is largely linked to the inability for government and enterprise to adapt to the changing conditions driven by digital disruption. Resistance to change by not adopting or embracing automation and AI software is the largest risk for both government and enterprise. There is nothing that can be done to slowdown digital progress. Automation and AI will continue to increase and evolve.

The best option for government is to plan and invest into industries that can create the jobs of the future rather than stand still and wait for the inevitable whitewash from the wave that is coming.

The value creation from automation and AI software can benefit both citizen and government. Faster, lower cost, and higher quality processing of government services is ultimately good for the country. Happier citizens builds loyalty to the country where they reside and increases their confidence for investment. All these potential benefits offered by AI translate into an elevation of competitiveness for the country.

[www.worldgovernmentsummit.org](http://www.worldgovernmentsummit.org)