

A Virtual Partnership?

How Artificial Intelligence will disrupt Project Management and change the role of Project Managers

Table of Contents

Foreword	05
Moving from Reactive to Proactive	06
Going the extra mile	06
Five ways AI will transform Project Management	08
The future of AI in Project Management - are you ready?	12
Proof of Concept - Combining AI with RPA	16
Points of Contact	18



Foreword

We are living in a time when global megatrends are actively reshaping our world at a rapid pace. These large-scale macroeconomic and geostrategic forces – which we define as changes in ‘demographics’, the ‘shift in global power’, ‘urbanisation’, ‘climate change’ and ‘technological breakthroughs’ – are raising both profound challenges and opportunities for governments and business alike. In particular, ‘technological breakthroughs’, and the impact of advances such as Artificial Intelligence (AI), will have a huge impact on the future of the workforce, including the role of the project manager.

PwC’s recent analysis of OECD data covering 200,000 jobs in 29 countries¹ breaks AI’s job-displacement effect into three waves: algorithmic (until the early 2020s), augmentation (to the late 2020s) and autonomy (to the mid-2030s). The first wave will impact relatively few jobs – perhaps 3%. By the mid-2030s, however, up to 30% of jobs could be automated – mostly those involving clerical and manual tasks. The need for upskilling the workforce is clear: as technology evolves at an ever-increasing pace, so too will employees’ skill sets in order to adapt and keep pace with such changes, so allowing all to thrive in the new era of AI.

AI will change how the discipline of project management and the role of project managers will function in the future. By 2030, 80% of the work of today’s project management discipline will be eliminated as AI takes on traditional project management functions such as data collection, tracking and reporting.² In this context, the role of the project manager will shift from ‘managers’ to ‘leaders’ who are able to integrate AI capabilities into new practices and procedures, allowing for a greater focus on activities requiring soft skills such as ideation, communication, listening, problem solving and emotional intelligence.

AI can be used to analyse disparate and ‘big’ data with greater speed and dexterity to derive actionable, tangible insights. In this way, project managers will be empowered with more and better quality data and insights to improve the speed, quality and accuracy of decision-making throughout the project lifecycle.

In this report, we outline the five main areas where AI will transform the practice of project management and examine the characteristics of future project managers and organisations. We highlight the key considerations to make before implementing AI-enabled project management software and the important next steps that organisations can take today to prepare for a future where AI and humans will work together.



Riyadh Al Najjar
KSA Country Leader
Transformation Management BU Leader
Middle East Region



Faisal Al-Sarraj
Transformation Management BU Partner
Middle East Region

¹ PwC, ‘Will robots really steal our jobs? An international analysis of the potential long term impact of automation’, 2018

² Gartner, ‘How AI will reinvent Program or Portfolio Management’, 2018

Moving from Reactive to Proactive

Going the extra mile

Project management has evolved over time to help organisations identify project, programme and portfolio benefits and achieve their strategic objectives. The origins of project management date back to the Egyptian epoch; the pyramids of Giza, built 4,500 years ago, are considered the first structures built using project management practices. Nevertheless, it was not until 1977 that the first project management software emerged.³

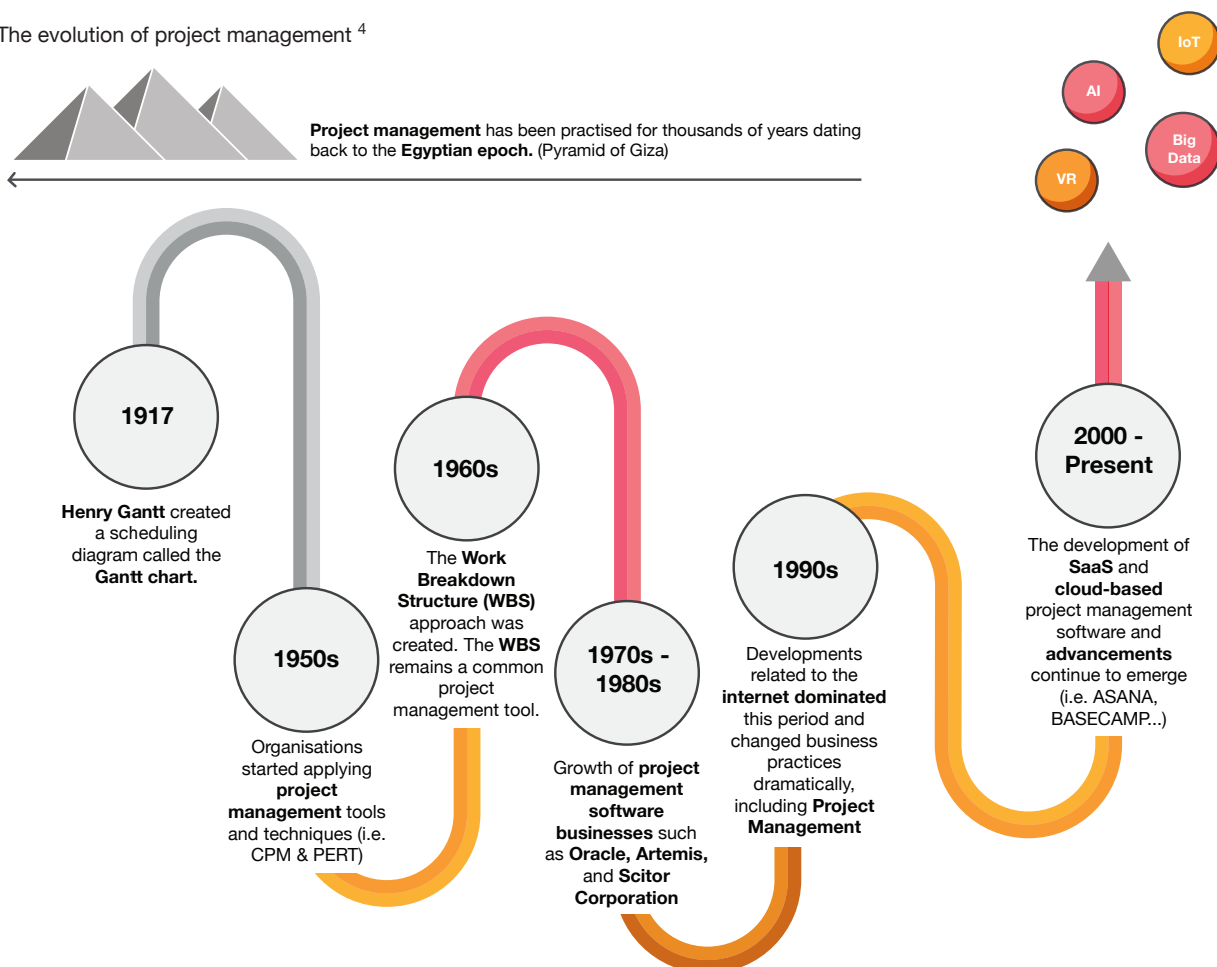
Developments catalysed by the advent of the internet have dramatically changed business practices, including project management. For example, the development of Software as a Service (SaaS) and cloud systems have allowed stakeholders to access and navigate project information, dashboards and reports at any time and from anywhere, with an increasing emphasis on real-time data displays. By using enhanced tools for streamlining standardised project management processes, organisations are able

to improve the collaboration between their different functions, increasing efficiency and effectiveness while reducing cost and effort.

Current project management tools and software can assist programme and project managers in optimising their efficacy and tracking key metrics against KPIs and project milestones. However, they cannot predict ‘what if’ and future scenarios or proactively alert project managers before a major issue arises.

In addition, current tools provide information in ‘pull’ format and not ‘push’. In the increasingly complex project management environments that we see today, the need for such tools to proactively ‘think’ and ‘do’ on behalf of the project manager and provide on-demand information to support their efficiency and effectiveness is clear.

Fig.1 The evolution of project management ⁴



³ Project Smart, 'The Evolution of Project Management', <https://www.projectsmart.co.uk/evolution-of-project-management.php>

⁴ History of Project Management Software: How It Developed: <https://project-management-software.financesonline.com/history-of-project-management-software-how-it-developed>

**SaaS and cloud-based project management software: https://en.wikipedia.org/wiki/Project_management_software

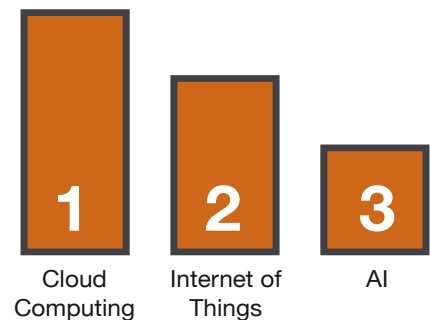
One of the major breakthroughs that will affect the discipline of project management is AI, which is ranked by the Project Management Institute (PMI) in its 'Pulse of the Profession' research as the third top disruptor

in project management based on total impact, closely behind Cloud Computing and the Internet of Things (IoT).⁵



“Artificial Intelligence is the designing and building of intelligent agents that receives percepts from the environment and takes actions that affect that environment.”

AI is ranked by PMI as the third top disruptor in project management



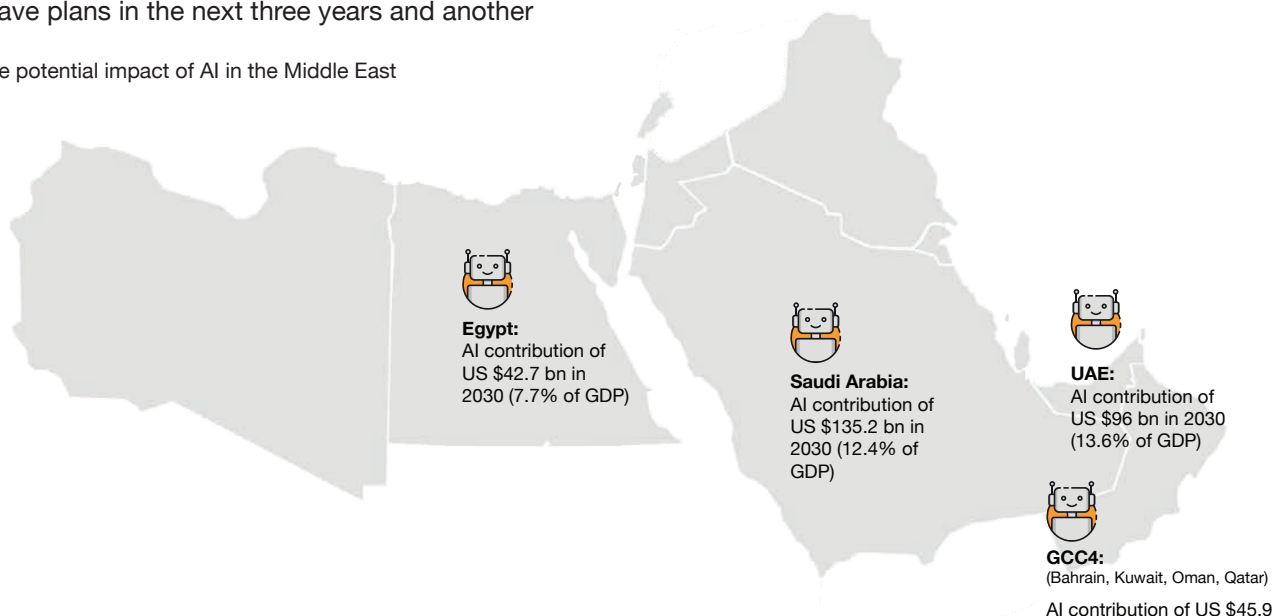
– Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig (Pearson, 2009)

AI has created a multitude of opportunities for different industries and fields, and is reshaping the way organisations take strategic decisions.

In PwC’s most recent ‘22nd Annual Global CEO Survey’, 85% of CEOs agreed that AI would significantly change the way they do business in the next five years.⁶ In the Middle East, this number was even higher at 91%. In fact, 78% of CEOs in the Middle East see AI having a bigger impact than the internet. And yet, from an implementation perspective, only 43% have plans in the next three years and another

23% have introduced AI in their business but only for ‘limited uses’. Globally, the overall sentiment is that AI will be a catalyst for transformation across regions⁷ and the AI market is estimated to increase global GDP 14% by 2030 (adding US\$15.7 trillion to the market). In the Middle East alone, the potential impact of AI is expected to be US\$320 billion by 2030: clearly, this is something which cannot be ignored.⁸

Fig.2 The potential impact of AI in the Middle East

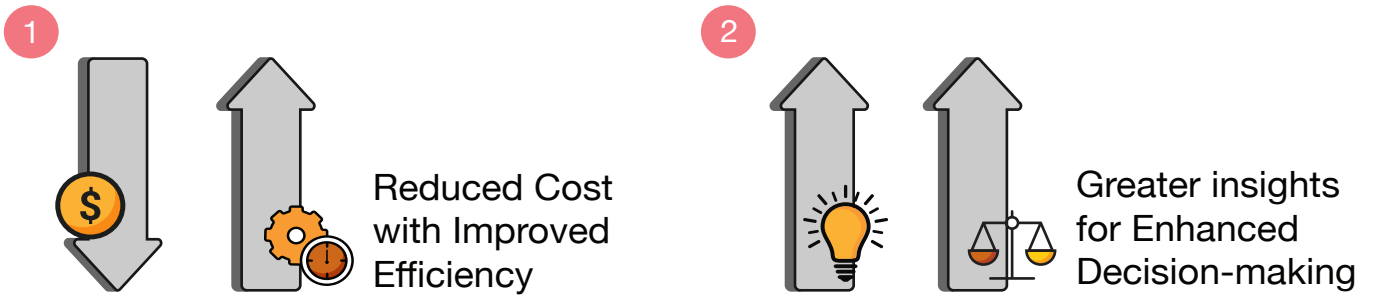


5 PMI, 'Pulse of the Profession. Next Practices, Maximizing the benefits of disruptive technologies on projects', 2018 (Base: 1,730)

6 PwC, '22nd Annual Global CEO Survey' (Base: 1,378)

7 PwC, '22nd Annual Global CEO Survey'

8 PwC, 'Sizing the prize: What's the real value of AI for your business and how can you capitalise?'



Organisations can benefit from AI integration with the project management office (PMO) in two key ways:

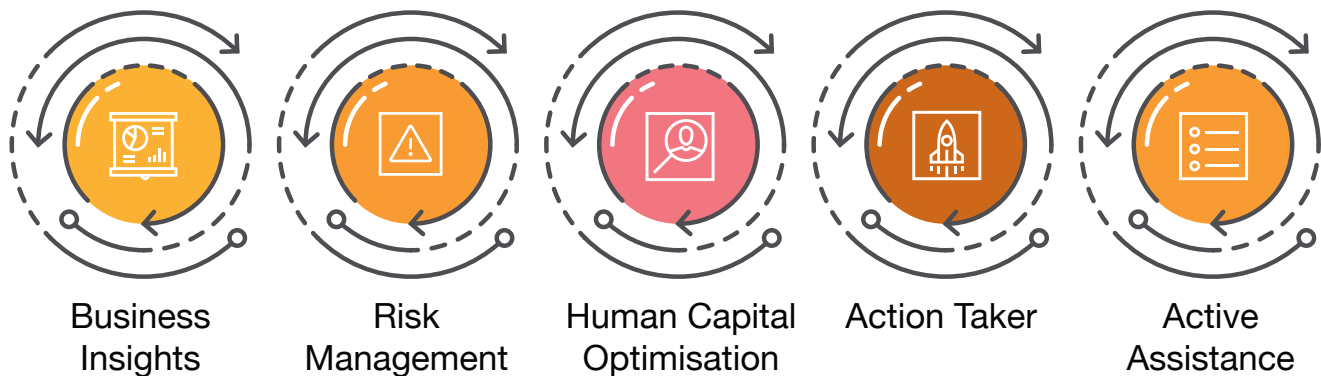
1. Cost reductions with improved efficiency: With AI substituting repetitive administrative tasks, project managers can spend their time more efficiently working on higher value activities, ultimately leading to increased utility and cost reductions.

2. Greater insights for enhanced decision-making: The core capabilities provided by AI (predictive analysis, expert recommendations and risk management support) provide PMOs, CEOs and management teams with greater insights and actionable intelligence to make key strategic decisions.

Five ways AI will transform Project Management

AI-enabled project management tools give greater support and accuracy to the decision-making process and could be crucial in achieving successful project management in the near future across the following five key areas:

Fig.3 Five ways AI will transform project management



Business Insights

1. Better insights with more relevant knowledge

Filtering data to enable management to derive actionable **insights & strategies**.



AI-enabled project management tools can provide more insights about the possible outcomes for a project, which will enhance the quality and agility of critical decision-making.

By identifying relationships and trends in data, the system can remove excessive information and 'white noise', enabling management to focus solely on the most relevant and important information to derive actionable insights and strategies.

2. Optimised schedules

Duration and resource requirements for activities based on **expert knowledge** and lessons learned.



Machine learning algorithms support the optimisation of project schedules to minimise the total cost based on resource constraints. For example, predictive forecasting can be used to identify potential excess or shortage in resources at certain points during the project lifecycle. Machine learning algorithms can also be used to provide estimates of the duration and resource requirements for project activities based on expert knowledge and lessons learned from previous projects.

3. Research new trends and experts

i.e. **Virtual Assistants** can register for associations, publications and find **content & experts**.



AI will potentially be able to inform project managers of new trends and changes in standards to any field, ensuring that the project manager is always up to date with global trends and best practice. Virtual assistants will be able to register for associations, online communities, publications etc. to find relevant content and experts who can enrich project content. Not only that, virtual assistants can also approach those experts and discuss potential involvement in projects.

4. Enhanced data and improved portfolios

Techniques to provide **recommendations** on prioritising projects & portfolios (i.e. Fuzzy Logic).

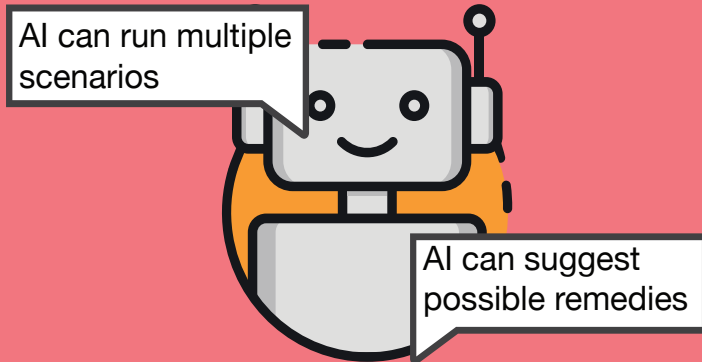


One of the issues facing existing project management tools in general is the quality and availability of data, with some project managers entering minimal or no data into their project management tools. Machine learning algorithms can determine likely values for missing data and the subsequent AI system can provide recommendations for entering accurately the missing data. AI can therefore solve issues in data input and provide the system itself with new complete data sets to learn from. As AI predictions are only as good as the data they are supplied with, enhanced data results in enhanced decision-making. Additionally, incorporating techniques like Fuzzy Logic⁹ can provide recommendations on how to categorise, prioritise and identify dependencies between projects in a portfolio.

⁹ Fuzzy Logic is a form of many-valued logic in which the truth-values of variables may be any real number between 0 and 1 inclusive. It is employed to handle the concept of partial truth, where the truth-value may range between completely true and completely false, and it is thus suitable for dealing with imprecise or inaccurate values.

Risk Management

Fig.4 AI transforms project management by providing risk management



Effective risk management has to be proactive. AI enables predictions that are more accurate than traditional software solutions in determining risk responses, probabilities and their impact. AI can suggest corrective action based on historical data and continuously track progress to warn the project manager when risk arises. This includes risks related to people, vendors, entities etc on the project. Cost assumptions and time constraints can be examined by combining current project data with historic data to run multiple scenarios and generate, assess and rank viable outcomes. AI can also incorporate real-time data, for example using natural language processing to scan emails and documents for signs of potential impending issues and liabilities. It can be used, for example, in reviewing future contracts to predict potential unseen risks based on previous project performance.

Human Capital Optimisation

There are several areas where AI can support human capital optimisation in project management, for example by incorporating smart educational content to meet the needs of the individual at any particular time, and by building this into life-long learning opportunities. Similarly, risky employee behaviour can be used to identify cohorts requiring additional training.

AI can calculate the best allocation of resources by identifying the right employees for different jobs based on their skills and availability. Previous success factors can easily be taken into account, for example being cautious about placing the same person into three consecutive high priority projects because historical data show the likelihood of increased fatigue. Using data, AI systems warn project managers on resource capacity and utilisation issues and suggest preventive actions, while flagging a resource excess or shortage.

AI-enabled project management systems can advise on when and in which skills a particular employee needs training. They can even provide feedback about the behaviour and competency of the project managers themselves based on the decisions, or lack of decisions, that are made.

Fig.5 AI transforms project management by supporting human capital optimisation



36%

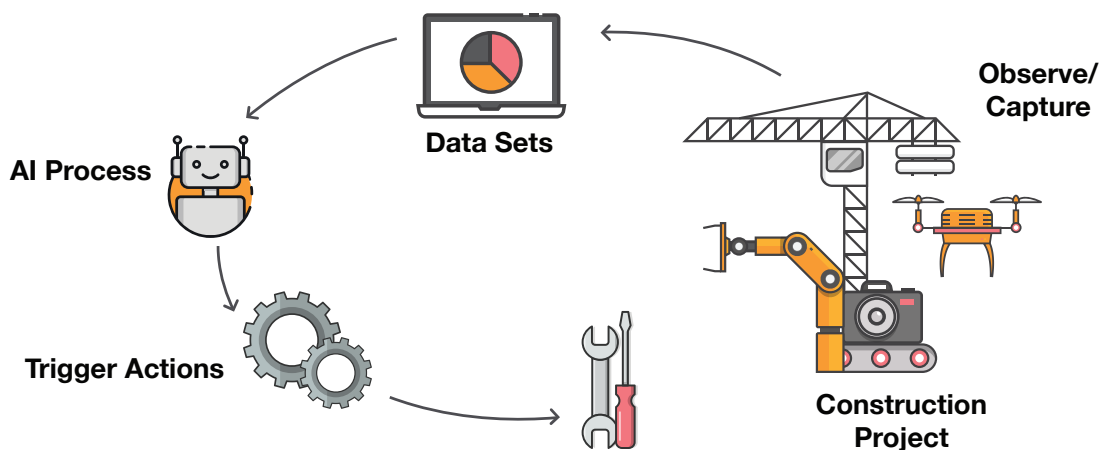
36% of the executives surveyed called the convergence of AI with other technologies a top challenge for 2019¹⁰

Action Taker

AI can transform project management by amplifying benefits from other technological breakthroughs such as analytics, Robotics Process Automation (RPA), the IoT, blockchain and, eventually, quantum computing. In a recent PwC report, 36% of the executives surveyed called the convergence of AI with other technologies a top challenge for 2019¹⁰. DevOps techniques can help manage this convergence by bringing diverse specialists together to keep projects flowing smoothly. AI is often the trigger for several digital elements (such as IoT devices) to act according to specific conditions and acquire information. As people look to solve a problem with AI, they need to determine what data they need. This data may not exist in current systems, and in many industries sensors and sensor inter-connectivity through the IoT are the solution.

AI can then perform specific analysis and provide insights or perform tasks such as updating project progress reports and schedules. For example, in the construction industry, companies are combining drone technology with AI by using drones to monitor and capture information from sites and then using deep learning to correctly identify people, machinery and materials. AI-enabled project management tools can then identify risks/issues that require direct intervention, providing recommendations and progress reporting to the project manager and intervening directly if needed.

Fig.6 Example: AI transforms project management by amplifying benefits from other technological breakthroughs such as the IoT



Active Assistance

One of the most common services carried out by the PMO is status and progress reporting to different stakeholders and top management. Applying AI will assist the project managers by performing administrative and repetitive tasks on their behalf, therefore augmenting their skills.

These tasks could include:

- Data entry, collection and management
- Preparing and updating project schedules with inputs from multiple sources
- Generating status reporting and flagging exceptions to bring them to the project manager's attention

Take Action

- Actively interacting with project managers to inform them of overdue tasks, schedule constraints and requests from project stakeholders, and also providing updates to their current workload and task management
- Listening to meetings to assign tasks to people with target dates, send out actions and follow-ups

AI virtual assistants serving as project assistants can take over some tasks and provide initial insights based on existing data. For instance, virtual assistants could organise meetings, analyse variances and send reminders to the team.

¹⁰ PwC, '2019 AI predictions: Six AI priorities you can't afford to ignore', 2018

The future of AI in Project Management - are you ready?

Organisations and project managers need to be prepared for the new AI era where humans and machines will collaborate to deliver projects, execute strategies and provide insights to key stakeholders. PwC research has found that, while 73% of people don't believe that technology can replace the human mind entirely, the synergies for collaboration between the two are clear.¹¹ Automation, including robotics and AI, is advancing quickly and has the power not only to change the types of jobs we do, but also to alter how many jobs there are and how much we value them. The recent PwC report 'The Workforce of the Future: Middle East Edition' revealed that the 'Brains and bots in collaboration' category had a high risk of reducing the number of human jobs and replacing them with technology, with the Middle East having a higher risk rating than the world as a whole in 86% of the areas questioned.¹² Crucially, less than 28% of Middle Eastern respondents were exploring how robotics and AI could enable the redesign of human work in their organisation, compared with 40% globally.

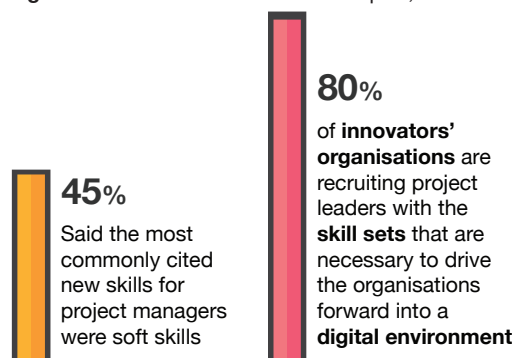
Project managers of the future

Will AI replace project managers?

Project managers need to capitalise on the opportunities generated by technological disruption, and in many ways be the champions of new technologies as they emerge. However, according to PwC's 'The Workforce of the Future' survey, 73% of people think technology can never replace the human mind. Indeed, AI tools rely heavily on data input from project leaders and without their guidance, AI systems will not be able to perform distinctly.

Both AI and project managers depend on each other; the project manager is required to have the right skill set to be able to manage AI and AI is inoperative without the input and added value of a skilled project manager.

Fig.7 PMI: 'Pulse of the Profession' report, 2018



11 PwC, 'The Workforce of the Future: The competing forces shaping 2030', 2018

12 PwC, 'The Workforce of the Future: Middle East edition', 2019

13 Association for Project Management & PwC Research, 'The golden thread- A study of the contribution of project management and projects to the UK's economy and society', 2019

14 Association for Project Management & PwC Research, 'The golden thread- A study of the contribution of project management and projects to the UK's economy and society', 2019

15 PMI, 'The Project Manager of the Future: Developing Digital-Age Project Management Skills to Thrive in Disruptive Times', 2018

16 PM Network, January 2019, Volume 33, Number 1

Traits of future project managers

In the future digital era, where humans and AI work together, project managers will need to build a skill set that focuses on the areas where AI falls short: these are the core 'people skills' or '21st century skills'. The use of AI will also require a diverse and flexible skill set to be able to cope with future challenges.

According to research commissioned by APM and undertaken by PwC (a study of the contribution of project management and projects to the UK's economy and society – 'The Golden Thread'¹³), the most important skills are leadership and management skills, budgeting and financial management, planning and monitoring, along with strategic management, digital skills and risk/opportunity management. All of these were rated as important by more than 80% of businesses.¹⁴

As business-as-usual tasks become automated, soft skills increase in value. It is essential for project leaders to have strong communication, negotiation skills and emotional intelligence to inspire teams and lead them collaboratively. According to the latest PMI 'Pulse of the Profession' report' the most commonly cited new skills for organisations are soft skills at 45%.¹⁵ Four out of five respondents reported that soft skills are more important today than they were five years ago. The need for soft skills was closely followed by computer/web/IT and management/project management, both at 39%.

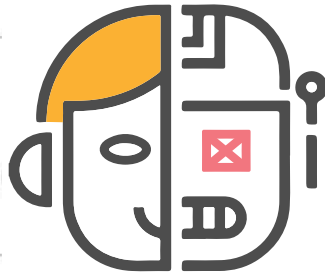
Considering that AI acts as a project management's 'virtual partner'; project leaders must have an innovative mindset and customise their knowledge to drive this digital transformation forward. Having strong 'digital know-how' and data science skills is key, alongside security and privacy knowledge. The legal and regulatory knowledge to manage contracts is also important.

Figure 7 depicts how AI and project managers will collaborate in the digital era.

As awareness of the profession continues to increase, it is expected that a greater proportion of project work will earn more distinct attribution for the profession itself, giving more recognition and appreciation to the role of the project manager.

Fig.8 The Project manager's skill set compared with AI

Project Managers	AI
21st Century Skills	Virtual Partner
Data science	Identifying relationships & trends
Complex problem solving	Intelligent real-time analysis
Ability to make data-driven decisions	optimising schedules
Collaborative leadership	Enhanced data and improved portfolios
Stakeholder management	Providing business insights
Emotional intelligence	Human capital optimization
Communication	Status reporting
Legal & regulatory knowledge	Risk management support
Negotiation	Active assistance
Security & privacy knowledge	Researching new trends and experts



The organisation's role in the new AI era

A culture of adaptability and lifelong learning will be crucial for shifting today's project management roles into the future; both soft skills and digital skills will be required in collaboration with each other more than ever before. Recent PwC research found that only 33% of HR leaders were felt to have an in-depth understanding and insight into the technological landscape.¹⁷ Governments and business need to work together to help people adjust to new technologies through upskilling, retraining and career changes by investing in formal processes to develop project manager competencies and skills. According to PMI's 'Pulse of the Profession' report¹⁸, the top drivers for effectively managing disruptive technologies in organisations are:

Organisations will require a mix of traditional business and management skills, technical and digital skills. They need to create a culture that embraces disruption as an opportunity to achieve success. Furthermore, they need to revisit the processes and methodologies used to ensure greater agility and flexibility. As digital becomes an ever-increasing part of an organisation's DNA, there are many needs to consider (other than increased information accuracy and time-saving) in order to increase the maturity level of portfolio and project management practices and shift gear from reactive to proactive.



By investing in talent, increasing innovation and seeking digital era skills.



Creating a digital environment and viewing disruption as an opportunity.



By using digital tools and approaches and reducing paperwork.

¹⁷ PwC, 'The Workforce of the Future: Middle East edition', 2019

¹⁸ PMI, 'The Project Manager of the Future: Developing Digital-Age Project Management Skills to Thrive in Disruptive Times', 2018

Key Considerations

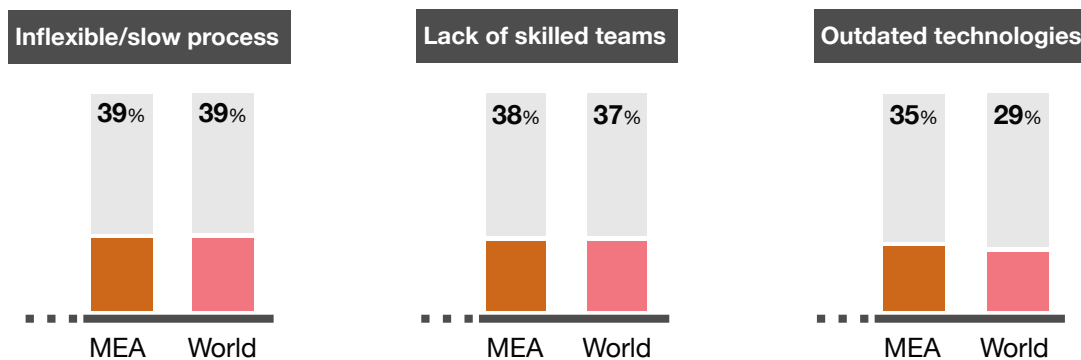
As with any digital transformation, organisations need to be mindful of the main obstacles (financial, infrastructure, cultural etc) and work on plans to overcome them. PwC’s 2018 ‘Global Digital IQ’ survey found that inflexible processes and a lack of properly skilled teams are the top two barriers to digital initiatives, followed by outdated technologies.¹⁹ And when implementing AI, there are additional challenges that are unique to this scale of transformation.

For example, current AI tools rely heavily on data input from project managers. Given the general lack of industrial experience of project managers, AI’s risk identification and prediction ability is subsequently impacted. In addition, the initial lack of experience

and knowledge when managing new projects that may have an unfamiliar scope or unique challenges will impact the quality of data put into the AI system and therefore impact the outcome. Understanding what AI can do is crucial for successful implementation and the realisation of benefits.

Digital transformation relies on an organisation’s ability to integrate technology rapidly and tools that are evolving. The changes brought about by AI disruption are coming, whether organisations are ready for it or not. It is important to start preparing today, as early adopters will gain a competitive advantage in the AI ecosystems of the future.

Fig.9 Top barriers to successful digital initiatives



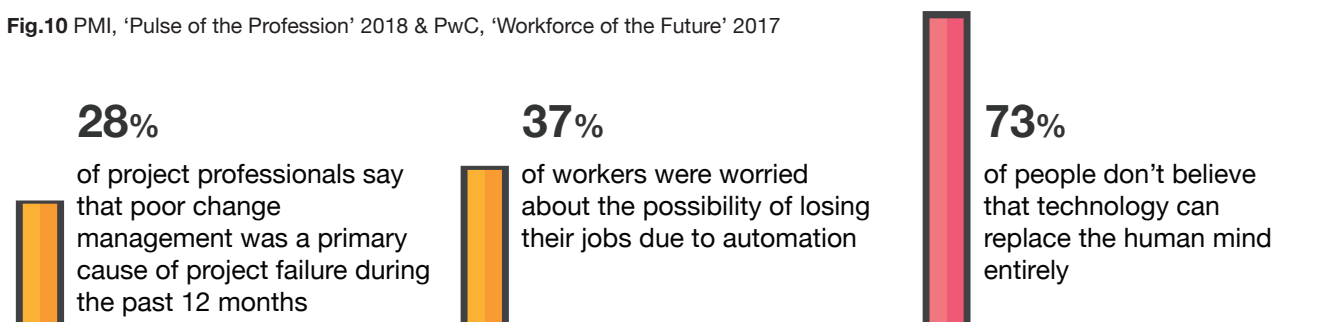
How ready are workforces for change

Organisations should be aware that they will face a massive wave of change and shifts in their workforce by the invasion of these disruptive technologies. They should really be considering now the impact of technological disruption and embedding it into the culture of their workplace and into the mindset of employees.

According to the PwC’s ‘Workforce of the Future’ survey, 37% of workers were worried about the

possibility of losing their jobs due to automation.²⁰ As humans work increasingly with advanced technology, the core skills required need to change in order to allow employees to interact successfully with technology. These new skills will fail to meet expectations without proper change management practices. Once solid foundations are in place, organisations will be well positioned to embrace disruption. According to the PMI ‘Pulse of the Profession’ report, 28% of project professionals say that poor change management was a primary cause of project failure.²¹

Fig.10 PMI, ‘Pulse of the Profession’ 2018 & PwC, ‘Workforce of the Future’ 2017



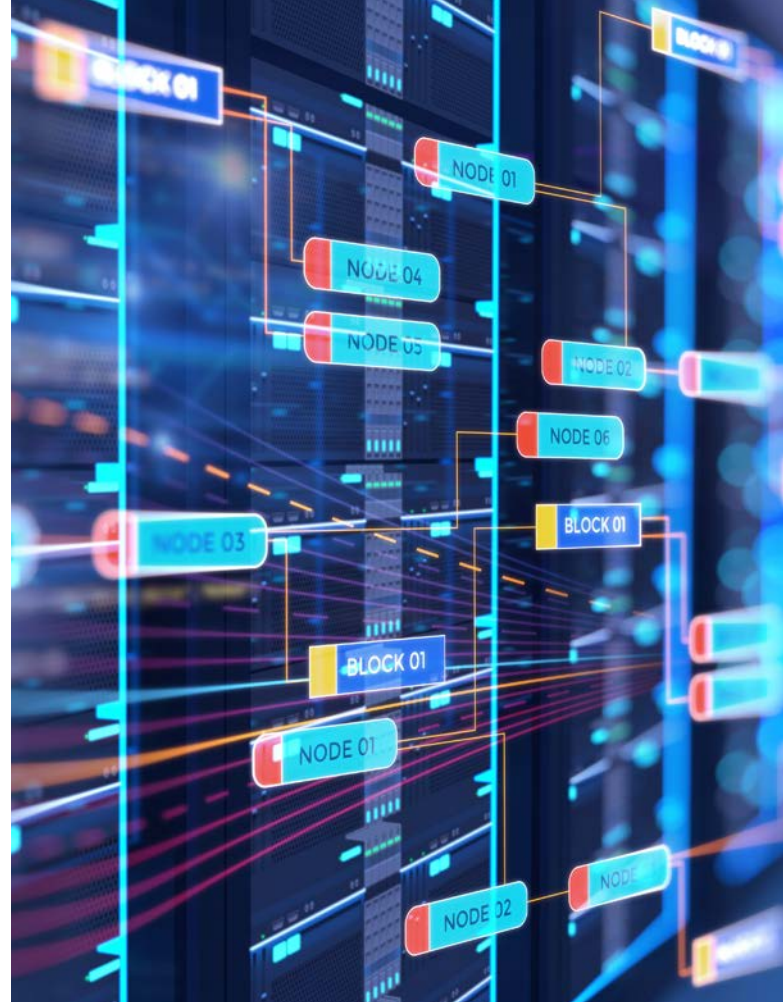
19 2018 Global Digital IQ Survey Regional Focus: Middle East and Africa, March 2019

20 PwC, ‘The Workforce of the Future: The competing forces shaping 2030’, 2018

21 PMI, ‘The Project Manager of the Future: Developing Digital-Age Project Management Skills to Thrive in Disruptive Times’, 2018

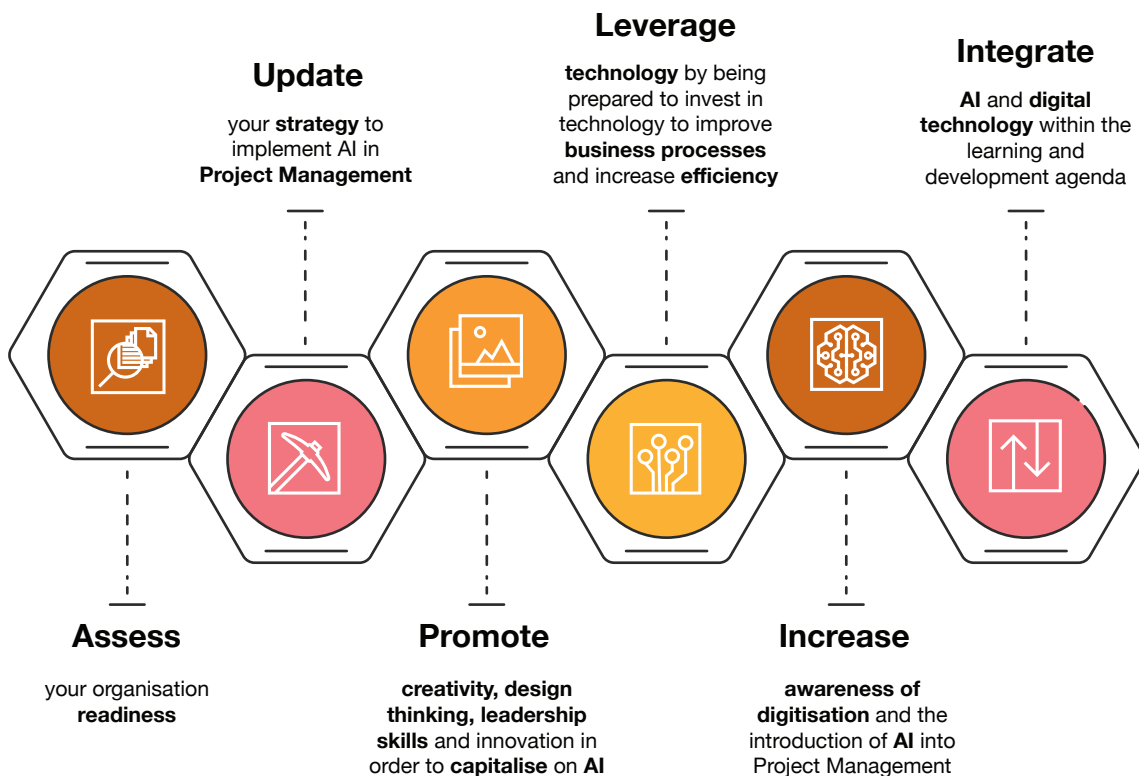
Adapt and adopt – key actions to take now:

- Assess your organisation’s readiness to apply AI in project management from the perspectives of its culture, people, project management processes and data/automation
- Update your strategy to embrace AI in project management, make sure it is aligned with your AI organisation investment strategy
- Promote creativity, design thinking, leadership skills and innovation in order to capitalise on AI²²
- Leverage technology by being prepared to invest to improve business processes and increase efficiency²³
- Increase awareness of digitisation and introduce AI into project management²⁴
- Upskill the workforce alongside the AI investment strategy so helping the organisation to integrate AI and digital technology into the learning and development agenda



How can organisations minimise resistance today and what can they do to thrive in the digital era tomorrow?

Fig.11 How organisations can minimise resistance to thrive in the digital era



22 PwC, 'The Workforce of the Future: Middle East edition', 2019
 23 PwC, 'The Workforce of the Future: Middle East edition', 2019
 24 PwC, 'The Workforce of the Future: Middle East edition', 2019

Proof of Concept – Combining AI with RPA

Sample of data points collected in one of PwC Transformation Management BU's engagements

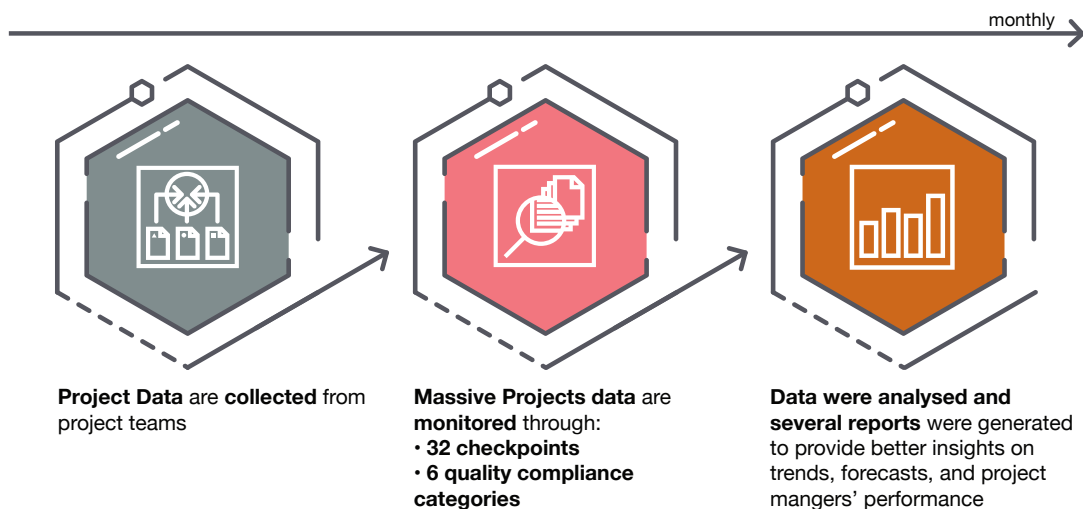
While supporting PwC clients to deliver programmes and projects efficiently to meet their strategic objectives, the PwC Transformation Management BU team collects, monitors and manages massive amounts of project-related data. For example, the PwC Transformation Management BU team developed a project management Quality Compliance Methodology, consisting of 32 checkpoints covering six quality compliance areas, for one of its clients. These checkpoints were used to monitor and manage around

60+ projects on average on a monthly basis that resulted in 1,920 readings every month, accumulating over 30,000 quality compliance readings between April 2017 and December 2018. The data was analysed and several reports generated to provide better insights on trends, forecasts and project managers' performance.

Additional data are stored in the project management system, such as the database of risks and issues (around 2,800), change requests, schedules with baselining history and project managers' and resources utilisation information. This data, in addition to the 1,600+ monthly quality compliance readings and the accumulated 30,000+ readings, could provide a significant input into an AI system.

Fig.12 Monthly cycle of project quality compliance checks in one of PwC's clients

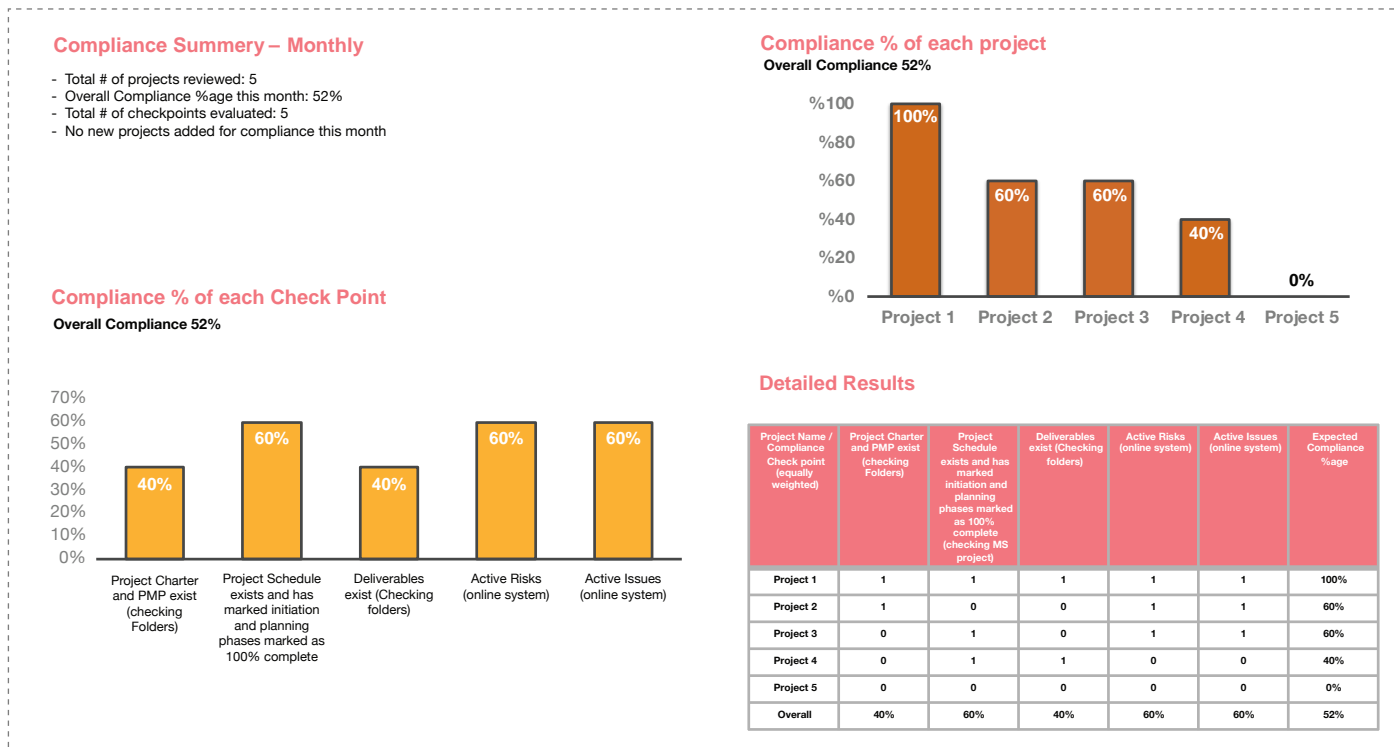
Example of one of PwC Transformation Management BU's engagements consisting of reviewing on average 60+ projects



As a proof of concept, the Transformation Management BU team combined RPA²⁵ with AI to automate the ‘project management quality compliance methodology’ described earlier. A subset of five quality compliance checkpoints (out of 32) was selected covering four of the compliance categories. The compliance check process was initiated automatically by the system, where the robot selected 10 projects

based on their performance, previous compliance scores and anticipated improvement. The results of the compliance checks were stored in a database that was accessible to the AI virtual assistant. The robot also created and shared via email a comprehensive report related to the compliance check.

Fig.13 Sample report generated by virtual assistant

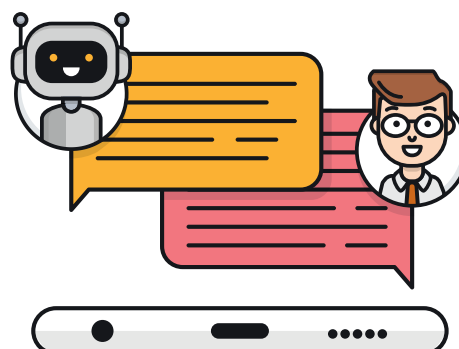


The AI virtual assistant provides a natural language interface to the report, allowing users to query the data in a ‘human-like’ way. The virtual assistant is able to answer questions about the projects that went through the compliance checks, as well as their respective compliance results. Providing access for senior executives to the AI virtual assistant via their mobile devices proved extremely useful, as the interface significantly improves usability, enabling access to the information smartly and efficiently. The executives were also able to provide input to the virtual assistant on future compliance reviews.

The robot analysed the results of the compliance check and came up with recommendations to improve quality, such as actions to be taken by the project manager or the PMO director. These recommendations were shared with the respective team members via email as well as through the virtual assistant. Based on the received responses and changes in the projects’ progress, the robot redefined the scope for the next compliance check.

The estimated time, based on the team’s experience, for a human to perform a compliance check of similar size is around three days. These checks are naturally prone to human error and timely communication and reporting is always a challenge. The robot performed the same task, accurately and effectively, in up to six minutes. The virtual assistant made the life of the project manager much easier - facilitating the access of important information to any executive at a previously unprecedented level of speed and accuracy. This is just a relatively straight-forward example of how we can utilise AI and robotics in project management. The sky is the limit!

Fig.14 PwC Chatbot



25 Robotic Process Automation (RPA) is a form of business process automation technology based on the notion of software robots or artificial intelligence (AI) workers

Points of Contact



Riyadh Al Najjar
KSA Country Leader
Transformation Management BU Leader
Riyadh.alnajjar@pwc.com



Faisal Al-Sarraj
Transformation Management BU partner
Middle East Region
Faisal.alsarraj@pwc.com



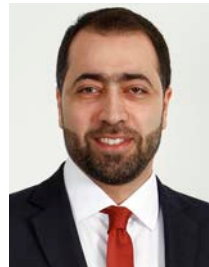
Mohammad Alkhaldi
Transformation Management BU partner
Middle East Region
mohammad.alkhaldi@pwc.com



Fauaz Labadi
Transformation Management BU Director
Middle East Region
Fauaz.labadi@pwc.com



Areej Abukar
Transformation Management BU Senior
Manager
Middle East Region
Areej.abukar@pwc.com



Ahmad Alshaikh
Transformation Management BU Manager
Middle East Region
ahmad.alsheikh@pwc.com



Ayham Fayyumi
G&PS Consulting Senior Manager
Middle East Region
ayham.fayyumi@pwc.com



Hamza Zaidan
Transformation Management BU Manager
Middle East Region
hamza.zeidan@pwc.com



Lana Al Shaer
Transformation Management BU Senior
Consultant
Middle East Region
lana.alshaer@pwc.com



Dr. Scott Nowson
Artificial Intelligence Lead
Middle East Region
scott.nowson@pwc.com

```
mirror_mod = modifier_ob.  
set mirror object to mirror.  
mirror_mod.mirror_object
```

```
operation == "MIRROR_X":  
mirror_mod.use_x = True  
mirror_mod.use_y = False  
mirror_mod.use_z = False  
operation == "MIRROR_Y":  
mirror_mod.use_x = False  
mirror_mod.use_y = True  
mirror_mod.use_z = False  
operation == "MIRROR_Z":  
mirror_mod.use_x = False  
mirror_mod.use_y = False  
mirror_mod.use_z = True
```

```
selection at the end -add  
mirror_ob.select= 1  
modifier_ob.select=1  
context.scene.objects.active  
("Selected" + str(modifier_ob.  
mirror_ob.select = 0  
= bpy.context.selected_object  
data.objects[one.name].select  
print("please select exactly
```

--- OPERATOR CLASSES ---

```
types.Operator):  
on X mirror to the selected  
object.mirror_mirror_x"  
mirror X"
```

```
context):  
context.active_object is not
```

