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AUGUST 2018

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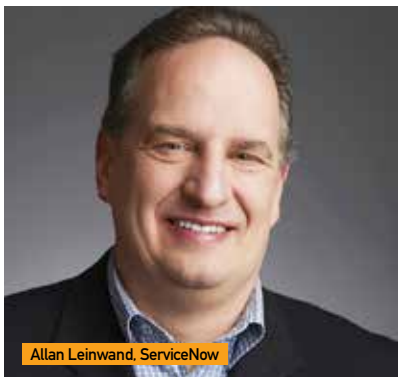
High speed satellite connectivity, airborne IP networks, cloud data streams, electronic flight bags, real time analytics, are bringing in financial savings for the aviation industry and digitally transforming legacy operations.

Fredrik van Essen, Inmarsat Aviation

## SKY HIGH ECONOMICS

*EVALUATING ECONOMIC BENEFITS OF CONNECTED AIRLINE OPERATIONS*

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# CIO 200 AWARDS

## TECHTALK AND META CIO AWARDS

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BUSINESS TRANSFORMATION
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MANAGING DIRECTOR
Tushar Sahoo
tushar@gecmediagroup.com

EDITOR
Arun Shankar
arun@gecmediagroup.com

CEO
Ronak Samantaray
ronak@gecmediagroup.com

GROUP SALES HEAD
Richa S
richa@gecmediagroup.com

EVENTS EXECUTIVE
Shriya Nair
shriya@gecmdiagroup.com

SALES EXECUTIVE
Krishna Thanki
krishna@gecmediagroup.com

ONLINE SALES
Mohamed Mubin
mubin@gecmediagroup.com

BUSINESS DEVELOPMENT EXECUTIVE
Susan Paul
Susan@gecmediagroup.com

SALES AND ADVERTISING
Ronak Samantaray
Ph: + 971 555 120 490

PRODUCTION, CIRCULATION, SUBSCRIPTIONS
info@gecmediagroup.com

GEC MEDIA

UAE
223 DMC 9 Dubai Media City, Dubai
PO Box 500653, Ph: +971 4 368 8523

USA
31 Foxtail Lan, Monmouth Junction
NJ 08852, Ph: + 1 732 794 5918

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223 DMC 9 Dubai Media City, Dubai
PO Box 500653, Ph: +971 4 368 8523





Dear Readers,


*Business Transformation* is a content portal, publication, and event organiser, launched with the objective of partnering with businesses, consultants and technology vendors to enable the process of digital transformation and business restructuring for the digital age.

The primary focus of *Business Transformation* is to showcase how business success can be enabled when organisations are ready to rebuild themselves using new technology platforms. The scope of coverage extends across the GCC, Rest of Middle East, Turkey, and African countries.

Technology platforms such as cloud, mobile, analytics, social media, have been globally responsible for the consumerisation of technology. This suite of technologies has moved access to business applications away from legacy personal computers to almost any device connected on the Internet.

Enabling innovation for those organisation that have embarked on the transformation journey are accelerators like blockchain, artificial intelligence, augmented reality, robotics, drones, 3D printing, and Internet of Things. An overlapping envelope of protection for transforming organisations is delivered by next generation security solutions.

As a repository of content, Business Transformation is focused on showcasing the full stack of milestones along the road of organisational transformation.

These sections include:
Deep dive: A look into what lies ahead, future scaping, new customer experiences, new business revenue, productivity improvement, business intelligence, analytics, workflow and collaboration.
Landscape: Nuts and bolts of how to do it, workshops, methodologies, best practices, road maps, takeaways, transforming business model, transforming organisation, transforming department, transforming job roles, change management.
Markets: Real life use cases and experiences, hands on descriptions, government and citizen, smart cities, energy, oil and gas, homeland security, critical national infrastructure, urban infrastructure, utilities, banking and finance, service providers, communication, telecom, manufacturing, healthcare, transportation, logistics, retail, hospitality, education, green, sustainability.
Flavors: The working environment, look and feel, changing work life, changing ways of working, mission critical solutions, platforms and frameworks, market focused applications, business productivity applications.
Tools: What we use, the enablers, drivers of innovation, artificial Intelligence, 3D printing, blockchain, augmented and virtual reality, Internet of Things, Industrial Internet of Things, big data, analytics, cybersecurity, devices, mobile.

Let the transformations begin !

Arun Shankar

# TIPS ON HOW TO MOVE FORWARD WITH YOUR AI STRATEGY

Given early stage glitches with implementing artificial intelligence strategies, Cyril Perducat at Schneider Electric offers tips on moving forward.

*CYRIL PERDUCAT*
*Executive Vice President of Internet of Things and Digital Offers, Schneider Electric.*

## KEY TAKEAWAYS

- Artificial intelligence applications can help customers understand what it really means to push forward new digital business models in a disruptive yet profitable way.
- Integrating an artificial intelligence strategy can seem like a daunting task as Forrester analysts point out.
- Artificial intelligence makes this business model possible, as trained data models can qualify whether a machine's downtime is really human or any other error.

Last year, Forrester noted that, the honeymoon for enterprises naively celebrating the cure-all promises of artificial intelligence technologies is over. Artificial intelligence and all other new technologies like big data and cloud computing still require hard work.

Given that 70% of enterprises expect to implement artificial intelligence this year, I would like to offer three ways companies can seize the business value that I strongly believe artificial intelligence promises.

Integrating an artificial intelligence strategy can seem like a daunting task as Forrester analysts point out, so we recommend that any company embarking on this journey start with a pragmatic, practical approach to individual artificial intelligence projects.

Ask upfront, which problem can I solve with an artificial intelligence-enabled digital solution? This question always prompts research to lead with the customer challenge in mind.

For all of us, digital transformation at large is about finding ways to create new business value from digitization. We agree that it is often challenging for any legacy company, however, to see beyond its core business model to launch and accelerate a digital journey. Will I cannibalize my business? How do I circulate new value for

Artificial intelligence applications can help customers understand what it really means to push forward new digital business models in a disruptive yet profitable way.

Most OEMs build highly specialized equipment. In many cases, the capital expenditure for tailored machines is high. But what if a machine builder could leverage artificial intelligence, coupled with remote monitoring capabilities, to begin offering uptime as a service to its end-users?

This is a way to lower the CapEx burden for end-users. Only artificial intelligence makes this business model possible, as trained data models can qualify whether a machine's downtime is really a machine issue versus human or other error.

Having strong domain expertise is critical to making artificial intelligence projects successful. Do not underestimate its value. Why? Data overload is a known reality, so it is clear that we do not need more data. What we do need are much better ways to tap the business value of that data. Most companies are not artificial intelligence experts. Channeling domain expertise is what will make artificial intelligence projects relevant to companies and their customers.

This is really what we see as artificial intelligence's golden value: turning data into insights. My point here is to create artificial intelligence project teams that include an artificial intelligence expert, a computer scientist, and, just as crucial, a domain expert. It is the domain expert who can ask the right questions for artificial intelligence to solve and, more important, knows how to best respond to what the artificial intelligence models reveal. ■

# THE CHANGE TO FUTURISTIC BUSINESS

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# BUILDING THE COMPUTE REQUIRED FOR ARTIFICIAL INTELLIGENCE

The usage of artificial intelligence has been limited in the past by access speed to storage, which is changing, explains James Petter at Pure Storage.

*JAMES PETTER*
*EMEA Vice President, Pure Storage.*

## KEY TAKEAWAYS

- For those looking to implement AI projects, the compute bottleneck that used to hold back projects has largely been eliminated.
- To innovate and improve AI algorithms, storage has to deliver performance across all manner of access patterns.
- For legacy storage, meeting these requirements is no mean feat, and data can end up in siloes at each stage of the AI pipeline.
- Bringing data into a centralised storage hub as part of deep learning architecture enables efficient access to information.
- Modern all-flash based data platforms are ideal candidates to act as central data hub.

Artificial Intelligence is starting to change how many businesses operate. The ability to accurately process, and deliver, data faster than any human could, is already transforming how we do everything from studying diseases and understanding road traffic behavior to managing finances and predicting weather patterns.

For those looking to implement AI or machine learning projects, the compute bottleneck that used to hold back projects like these has largely been eliminated. The application of a graphics processing unit, has played a big part in this. As a result, the challenge for many projects is now providing the data fast enough to feed the data analysis pipelines central to AI.

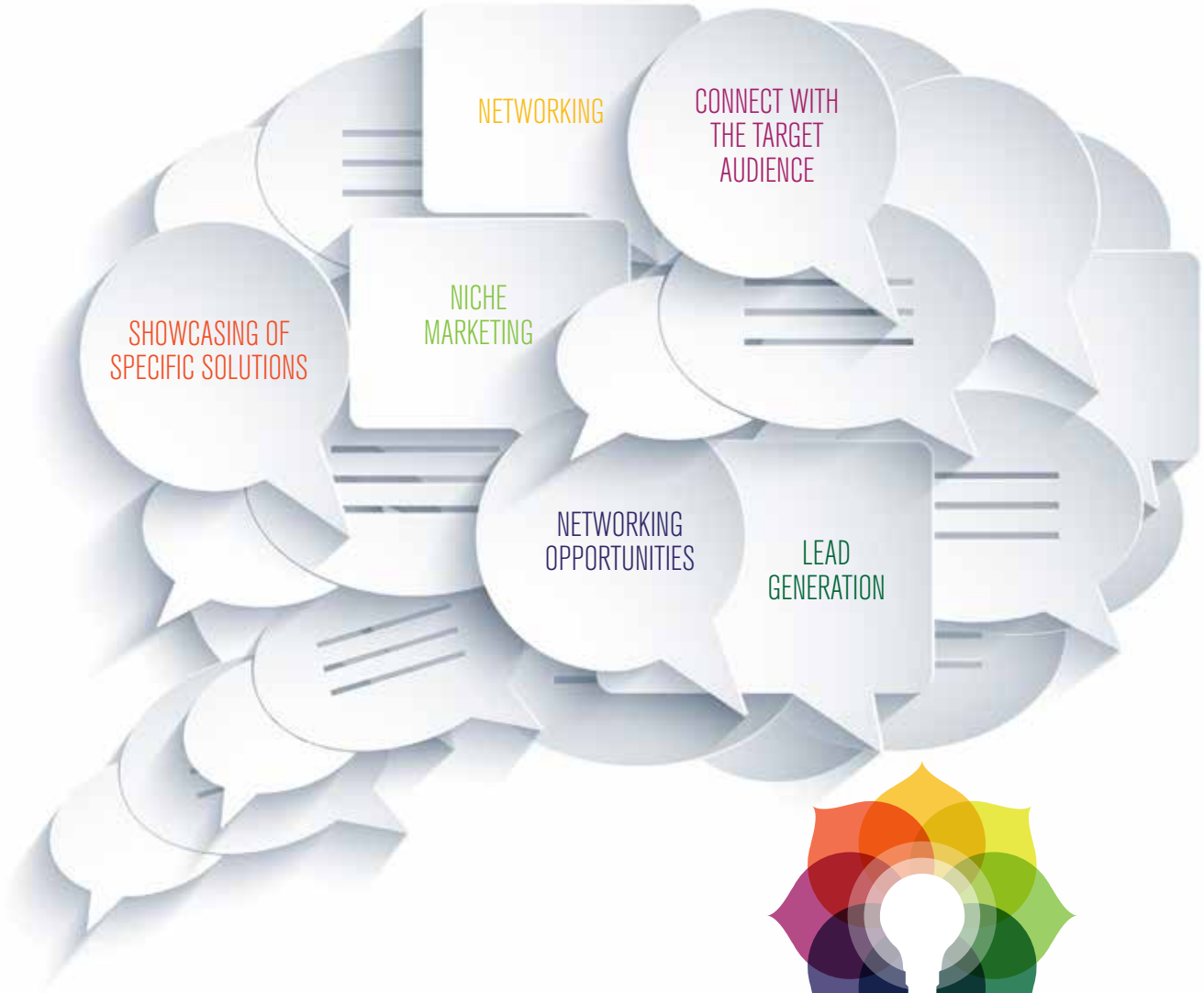
It is critical that organisations also carefully consider the infrastructure needed to support their AI ambitions. To innovate and improve AI algorithms, storage has to deliver performance across all manner of access patterns—small to large files, random to sequential, and low to high concurrency—all with the ability to easily scale linearly and non-disruptively in order to grow capacity and performance.

For legacy storage systems, meeting these requirements is no mean feat. As a result, data can easily end up in infrastructure siloes at each stage of the AI pipeline—comprised of ingest, clean and transform, explore, train—making projects more time intensive, complex and inflexible.

Bringing together data into a single centralised data storage hub as part of a deep learning architecture enables far more efficient access to information, increasing the productivity of data scientists and making scaling and operating simpler and more agile for the data architect. Modern all-flash based data platforms are ideal candidates to act as that central data hub.

Paige.AI is an organisation focused on revolutionising clinical diagnosis and treatment in oncology through the use of AI. Pathology is the cornerstone of most cancer diagnoses. Yet most pathologic diagnoses rely on manual, subjective processes, developed more than a century ago. UC Berkeley's AMPLab created and pioneered real-time analytics engine Apache Spark, the fastest, most cutting-edge analysis tool in the world. The UC Berkeley genomics department then implemented Apache Spark on top of flash storage to serve as an accelerator to make major leaps in genomic sequencing.

For years, slow, complex legacy storage systems have been unable to cope with modern data volume and velocity and have been a roadblock for next-generation insights and progression. Purpose-built flash storage array systems eliminate that roadblock, removing the storage infrastructure as a barrier to customers fully leveraging data analytics and AI projects. ■

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# WHAT THE PRIVATE SECTOR NEEDS TO DO FOR INNNOVATION

GBM's Miguel Khouri points out, the public sector in the region is leading the private sector in innovation and lists key action points that the sector can take.

*MIGUEL KHOURI*
*General Manager of Abu Dhabi and Yemen, GBM.*

The great Irish philosopher George Berkley once asked: If a tree falls in a forest and no one is around to hear it, does it make a sound? A man with a keen interest in the philosophy behind observation, Berkley believed that to be is to be perceived. From his perspective, since nobody heard the tree fall, it never happened.

Fast forward 300 years till today, and this question still leaves us stumped. We are seeing governments set the pace when it comes to embracing the wave of digital technologies, like the cloud as well as analytics and big data, thus encouraging private sector entities to follow suit.

Government leaders are keenly aware of the benefits that can be gained through the implementation of these solutions, and the private entities that have followed their lead have understood that in order to stay ahead of the curve, or even on it to begin with, a digital transformation is a necessity.

This raises the question: If you own a business and have not yet embarked on the journey towards digital transformation, does the business exist?" If we follow Berkley's logic, the answer would be no.

The UAE government has already taken measures to ensure that the ICT sector gets adequate support. For example, Gitex, a globally acclaimed technology event, has been hosted by the UAE government every year for over 30 years. In terms of citizen services, the UAE has implemented a plan to make 90% of all government services available to citizens online.

Our visionary leaders have also made legitimate commitments to the UAE's digital growth, with the establishment of advanced IT policies forming pillars of many of the UAEs strategic long-term plans. In Dubai, Sheikh Mohammed has introduced the Smart Dubai initiative, which aims to bring the private sector and government together in order to deliver a smart city experience for residents and visitors.

Furthermore, Sheikh Mohammed also launched the emirate's flagship Internet of Things Strategy and Data Wealth initiative earlier this year. With it, he aims to promote the emirate's digital wealth, which has been cultivated through the establishment of advanced digital infrastructure, something he considers a strategic national asset.

Much like Dubai, Smart Abu Dhabi also places the citizen and innovation at the heart of its policies. Residents of the emirate can benefit from access to government services at their fingertips, with Abu Dhabi rolling out a series of apps, such as the CityGuard app, aimed at increasing government accessibility.

PRIVATE SECTOR IT SPENDING IS TRANSITIONING AT A SLOWER PACE, WITH THE FOCUS REMAINING ON TRADITIONAL HARDWARE AND INFRASTRUCTURE PROJECTS.

## KEY TAKEAWAYS

- A visionary CIO that can put a plan in place and migrate to the right technology at the right time is essential in order to achieve successful digital transformation.
- If you own a business and have not yet embarked on the journey towards digital transformation, does the business exist?
- Despite progress made by the emirate's leaders, we still experience caution from the private sector when it comes to embracing digital change.

Despite the striking progress made by the emirate's leaders, we still experience caution from the private sector when it comes to embracing this wave of digital change. Private sector IT spending is transitioning at a slower pace, with the focus remaining on traditional hardware and infrastructure projects.

So, what can private entities do to bridge this existing gap? We have a number of recommendations.

### HAVING A VISIONARY CIO AT THE HELM IS INSTRUMENTAL.

As aforementioned, the impact of the digital transformation is far reaching and will impact almost every company within every industry. Companies that understand these new dynamics and can adapt accordingly will thrive, those that cannot will struggle to survive. A visionary CIO that can put a plan in place and migrate to the right technology at the right time is essential in order to achieve successful digital transformation.

### BRINGING IT INTO THE BOARDROOM IS A CRUCIAL STEP.

Elevating the status of IT within the company is crucial should they want to get any digital rollouts off the ground. Gone are the days where IT issues were reserved for the IT department and the CIO – IT is now a pillar of the company's business strategy and should be treated as such.

### APPROACH IT FROM A BUSINESS PERSPECTIVE.

Many companies still view IT investments as a luxury as opposed to a necessary investment. The truth of the matter is measured IT investments secure your relevancy in the market and make your business more competitive. In a country where mobile penetration stands at 228% and everything from government services and groceries can be handled via a mobile app, ignoring the digital transformation is not a viable business strategy.

### SPEAKING TO PROFESSIONALS CAN MAKE A DIFFERENCE.

Technological transformations can be incredibly challenging for companies, which is why aligning yourself with a trusted partner can make the transition a comfortable experience. IT solutions are also not a one size fits all package, the right consultant will ensure the right combination of technologies are put in place with your bottom line in mind.

With data now set to become our greatest natural resource, many are referring to the digital era as the fourth industrial revolution. The last industrial revolution shaped the landscape and the destiny of nations around the world, with many of those who were left behind then, still struggling to catch up today. ■

# USING NEUROMORPHIC AI TO BUILD FACIAL RECOGNITION

Artificial intelligence using neuromorphic techniques is providing gains in facial recognition explains Dr Manan Suri at Indian Institute of Technology, Delhi.

*DR MANAN SURI*
*Assistant Professor, Department of Electrical Engineering, Indian Institute of Technology-Delhi.*

The use of artificial intelligence is a rapidly growing trend across several industries. Key among them is security. Using pattern recognition and improved applications of neural processing, artificial intelligence is helping them become more efficient. Artificial intelligence can instinctively pick up on commonly occurring patterns and acting accordingly with minimal external guidance. The system can then build a database of information based on the recognition of these patterns and reach meaningful and accurate outcomes based on the data.

One might say that is an investment that pays for itself, in that its true value is only fully realised once it is used enough to process layer upon layer of intersecting and diverging threads of data over a period of time and bringing them together into a cohesive web of meaningful information.

A facial recognition system is a computer application capable of identifying or verifying a person from a digital image or a video frame, using a video source such as a surveillance camera or CCTV. The system matches the input against the entire database simultaneously rather than by process of individual elimination. It can also be trained to retain any incorrect input and disallow any future use of this input through machine learning.

Compared to other biometric identification techniques available today such as fingerprint analysis, which require a precise and complete imprint of the finger each time, or iris detection – positioning the eye directly in front of the scanner, face and speech recognition are easier as they often can be completed passively. And since the databases for this information are ever-increasing, there is a tremendous need for a faster and more power-efficient implementation of face and speech recognition algorithms.

Current software implementations are impaired by the prevalent paradigm of Von Neumann computing, resulting in slower training and recognition times.

When the recognition times of a neuromorphic chip are compared with that of various software libraries, the results clearly show that the recognition times are much faster even for small datasets, while still maintaining accuracy comparable to the software solution. This scalability and consistent recognition time provides a huge advantage for real time computations, making

## NeuroMem chips

Dr Manan Suri, has been building complex functional neuromorphic systems using NeuroMem technology chips. He and his team have developed proprietary low-power AI applications in the field of security such as facial recognition. Dr Suri has been working on making the entire process far more accurate and efficient using NeuroMem, and its ability to localize pattern matching, whether voice or facial.

His team has prototyped different proprietary multimodal authentication systems using bio-inspired architectures powered by NeuroMem hardware and unique processing techniques. The Neuromem chip offers consistent recognition time, irrespective of the size of the knowledge base, which gives massive time gains in learning and recognition, and also minimises the risk of error by having a second frame of reference to be checked against.

## KEY TAKEAWAYS

- A facial recognition system is a computer application capable of identifying a person from a digital image or a video frame.
- Compared to other biometric identification techniques, face and speech recognition are easier as they can be completed passively.
- When recognition times of neuromorphic chips are compared, results show recognition times are much faster even for small datasets.
- Current software implementations are impaired by the prevalent paradigm of Von Neumann computing, resulting in slower training and recognition times.

them virtually independent of the dataset size.

The key challenges with working on artificial intelligence systems are a double-edged sword. If using mainstream technologies, the dependence on high processing requirements is immense, and more often than not, unable to be fulfilled by existing mainstream technology. The alternative is creating a highly customised, specialised system, while incurring the significant costs of Application-Specific Integrated Circuit, customised for dedicated function rather than multipurpose use, that are inflexible, and not easily available.

Staying offline poses a range of different options, each with its own pros and cons. The biggest choice is selecting the type of hardware to use - normal computing, Field Programmable Gate Array, or ASICs. These also need a dedicated connection to a server where the processing of data can take place in a controlled environment.

There are several services that offer cognitive solutions that are hosted on a cloud server – available all the time – but this requires the process to provide data in a specific format through an API built into an application created to speak to the cognitive services hosted on a server somewhere else in the world.

This, however, raises the concerns of security and reliability. These services are usually maintained by third parties, which means that any down times could affect the actual processing of data, although this is not a common occurrence.

The demand for neuromorphic technology has been growing and improving steadily. Ultimately, the solution depends entirely on the nature of the application. ■

# THE INTERSECTION OF LINE OF BUSINESS HEADS AND CIOs

Similar to red, green traffic lights, CIOs and business leaders need to act together to lead digital transformation, explains Allan Leinwand at ServiceNow.

*ALLAN LEINWAND*
*Chief Technology Officer, ServiceNow.*

On my way to the office last week, I was stopped at a stoplight that only allowed three cars through before turning red again. The red and the green seemed to fight for control. In my frustration, I wondered who had created such a thing?

With a quick search I learned that traffic officers controlled the flow of traffic in large cities before the invention of the electric traffic light. This was the case from at least 1722 until 1912, when a policeman in Salt Lake City, Utah invented the red-green electric traffic light. He, in a sense, automated and digitally transformed a process that had been in place for nearly 200 years. But which is more powerful, the red or green light?

There is a strong parallel to the leadership of digital transformation initiatives within the enterprise.

## GREEN AND RED

In our business, there seems to be a debate about who leads digital transformation. In my mind, I envision IT as the green light and line of business as the red light. Both are equal yet both push for control of digital transformation. And, like a traffic light, both should work together to help digitally transform their organisation.

Historically, the person who saw the importance of transforming business was the CIO. As the systems guy, he was tasked with finding technology to help the company get work done effectively and efficiently. He was the green light to make the traffic of digital transformation occur.

Over time, business requirements changed, and the CIO would often deliver on strategic initiatives that helped the business be more efficient, but not enable technology that the line of business leaders knew could help them do their jobs more effectively.

For example, enabling efficient cloud storage for an organisation will help save some companies thousands of dollars, but it will not help line of business leaders as much as a cloud application that provides insight into a certain set of customer data, in order to retain customers longer.

As a result, the line of business leader became the red light, trying to slow down the CIO to see business needs that will benefit the business effectiveness, not just business efficiencies. The red light is crucial to make sure new technology helps the bottom line, not just operational costs.

## DRIVERS

Red and green lights determine which drivers they will let through. In a similar vein, line of business and IT must determine which market drivers they allow into

> CIO WOULD DELIVER ON INITIATIVES THAT HELPED BUSINESS BE EFFICIENT, BUT NOT ENABLE TECHNOLOGY THAT LINE OF BUSINESS KNEW COULD HELP THEM DO THEIR JOBS EFFECTIVELY.

## KEY TAKEAWAYS

- In our business, there seems to be a debate about who leads digital transformation.
- I envision IT as the green light and line of business as the red light, both equal, yet both push for control of digital transformation.
- Line of business and IT must determine which market drivers they allow into their enterprise.
- The driving force behind digital transformation is consumerisation of technology.
- One common thread I have seen with successful digital transformation initiatives is that the CIO becomes a champion for the needs of the business.
- The CIO meets with line of business on a regular basis to determine how to help them make their business processes more effective.
- The best question a CIO can ask is - why do you do it that way?
- Line of business leader will engage with the CIO and help identify processes that can be digitally transformed.

their enterprise. The driving force behind digital transformation is the consumerisation of technology. Workers know what is possible and they experience the power of technology on their mobile phones.

They want business applications and data to be easier to consume. They are also dealing with a deluge of data that is overwhelming in the form of instant messaging, email, reports, websites and more. Employees often know exactly what they need to be more effective at their jobs.

For example, IT has invested heavily in email over the past 25 years. Yet, for some, email is not effective. The formal nature of email makes it too long to read and hard to consume with the deluge of data they receive. So, IT invested in chat for communications. But all that really does is allow workers to type shorter emails that send instantaneously.

As a result, some line of business leaders implemented collaboration software. This allows for the shorter messages, but added the functionality of the inclusion of documents, project management and more. And with the addition of the mobile app, it can be done from anywhere at any time. But this is still only evolutionary.

Digital transformation would automate much of this drudgery and serve up information to make effective decisions rather than simply making communication more efficient.

## INTERSECTIONS

One common thread I have seen with successful digital transformation initiatives is that the CIO becomes a champion for the needs of the business. The CIO regularly meets with each line of business group on a regular basis to determine how to help them make their business processes more effective. I have seen employee surveys and internal research be a part of this process. The best question a CIO can ask in this process is - why do you do it that way?

Once he can determine the need, the linear thinking of IT can be implemented, and the efficient technology put in place can be used to create effective, digitally transformed business processes. On the other side of the intersection, the line of business leader will engage with the CIO and helps to identify processes that can be digitally transformed.

They help fix broken processes and re-think processes in order to innovate how their group does business. They help the CIO to prioritise projects and offers resources for initiatives that can be effectively handled by their groups. The line of business leader will help to drive innovation.

This intersection is where development and operations come together. When they are together, business processes become better, faster and much more successful.

So which side should lead digital transformation initiatives? The answer is both. You cannot have red without green. You must have both to direct the flow of market drivers through the enterprise. CIOs and line of business leaders need to come together at the intersection of development and operations to work successfully together and lead digital transformation within their organisations. ■

# MANAGING EMPLOYEES CHANGES FROM DIGITAL TRANSFORMATION

Digital transformation in organisations can break employees into groups based on cooperation or resistance to change, explains Elise Olding at Gartner.

*ELISE OLDING*
*Vice President at Gartner.*

Imagine the start of a long-distance race where all runners line up and take off for the course at the same moment. Over time, experienced runners will pull ahead and, after two miles or so, the division between the running groups becomes more apparent. This is a natural occurrence, as individuals have various levels of experience, skill sets and motivation to perform. Such differences are often overlooked by leaders.

Employees in a change programme will fall into distinct groups based on their eagerness to adapt to change. As leaders of thriving organisations, CIOs in particular must assist their organisations in adapting to change that happens in a rapid fashion as the environment is flooded due to the rise of digital business.

To overcome the organisational challenges associated with change dynamics, exceptional leaders will understand the varying types of employees, leverage their experiences and communicate appropriately to support all employees through change.

> CIOs CAN USE THE INDIVIDUAL ADOPTION STYLES FRAMEWORK TO FIND AND LEVERAGE EARLY ADOPTERS TO SUPPORT THEIR ORGANISATION'S CHANGE PROGRAMME.

## FOUR INDIVIDUAL ADOPTION STYLES

Similar to a race, employees in a change programme will fall into distinct groups based on their eagerness to adapt to change and their capacity to take the initiative to heart. There are four groups, or individual adoption styles, that exist across organisations.

### RUNNERS

Considered to be early adopters, these employees are eager to try new ideas, ways of working and ways of behaving. This group is okay with failure at first, as long as they feel each attempt directs them to the right track.

### JOGGERS

This group is not against change, but they feel more comfortable watching the runners take the first step. Once they believe the runners have proven the course, they will join in.

### WALKERS

Even more cautious than the joggers, this group needs to fully understand the implications and potential consequences of change before taking any action. They will not be easily persuaded by

## KEY TAKEAWAYS

- Employees in a change programme will fall into distinct groups based on their eagerness to adapt to change.
- CIOs must assist organisations in adapting to change that happens in rapid fashion as the environment is flooded due to the rise of digital business.
- No group is more correct than the others. Each represents the diversity in how employees will internalise change.
- Runners might be too tolerant of risk and walkers too risk-averse.
- CIOs should partner with human resources to develop an engagement strategy.
- Human resources can help CIOs to communicate the alternatives or consequences of not moving forward.

early adopters, but rather will be convinced by the perceived success or failure of those that come before them.

### WILL NOT RUN

Composed of status quo employees, they see no reason to change the way things have always been done. They will likely view change negatively, but with special attention, some of these employees can be convinced.

No group is more correct than the others. Each represents the diversity in how employees will internalise change, therefore providing insight into how best to lead the styles through it.

## DEVOTE RESOURCES TO RIGHT PLACES

Informal CIO surveys collected by Gartner show that the majority of CIOs spend much of their time and effort in the early stages of a change programme — when they are discussing or preparing for change — and less time in the support or execution stages.

Compounding this, employees who are reluctant to change are often the most vocal and demanding. Spending so much energy upfront and with a small resistant group of employees often causes leaders to categorise their organisation as change-resistant.

CIOs can use the individual adoption styles framework to find and leverage early adopters to support their organisation's change programme. For instance, the energy, excitement and creativity of runners can motivate the reluctant and inspire joggers to engage more quickly. As more employees join in, their experiences can be used to persuade the rest of the organisation. Runners are also great catalysts for pushing employees across the finish line.

But CIOs must beware of extremes. Runners might be too tolerant of risk and walkers too risk-averse. Careful monitoring and soliciting feedback from these various individual adoption styles groups will give leaders a full view of their change programme and allow for appropriate course adjustment.

CIOs should partner with human resources to develop an engagement strategy to give the - will not run group, the special attention it needs. Human resources can also help CIOs to clearly communicate the alternatives or consequences of not moving forward so that employees understand their choices.

## HELP YOUR ORGANISATION

The four adoption styles in the individual adoption styles framework provide a method for identifying and most effectively working with employees through change. All four helps to improve CIOs' understanding of the variance among employees and what is needed for each type to feel fully supported.

Success calls for leaders to communicate more than might be expected. When employees feel supported, no matter what individual adoption styles category they fall into, they are able to empathise with one another, feel less anxious about change and have a greater appreciation for each other.

In both informal and formal situations, engage employees in specific initiatives, and be conscientious of the progress and effort of each group. CIOs should then identify and share as many wins as possible — all progress is success. And progress made increases employees' ability to adapt to future changes that the digital world will inevitably bring. ■

# Honeywell Vector Space Sense launched in ME to help show building space utilisation

Honeywell, a global vendor in Connected Buildings, introduced Honeywell Vector Space Sense in the Middle East, a software solution that shows where, when and how building spaces are used at any given point in time. As a result, the building operations team can make better-informed real estate and space usage decisions that provide opportunities to optimise costs and promote better building experiences for occupants.

"From higher levels of employee productivity to healthier environments that help drive cost savings, Connected Buildings have real benefits for owners, operators and occupants," said Vimal Kapur, President and Chief Executive Officer, Honeywell Building Technologies. "Honeywell Vector Space Sense is the latest example of how Honeywell is using cutting-edge technology to enable smarter, data-driven buildings that work for their organisations."

Recent studies indicate most offices around the world are under utilised by as much as half of their actual capacity due to factors such as shifting work schedules, mobile technology usage and changing business needs. However, many facility managers lack the comprehensive insights required to take action to address these usage issues.

This can lead to overpaying for unused space, wasted energy usage, off-temperature spaces and other inefficiencies that negatively impact an organisation's bottom line.

Honeywell Vector Space Sense helps address this issue by gathering and analysing data from multiple sources throughout a building to deliver actionable insights that help personnel better utilise, optimise and prioritise building spaces. The facility team can view these insights through detailed, information-rich dashboards and reports incorporating visualisation methods like maps, usage profiles, overall trends and other metrics to show where, when, and how space is used, along with opportunities to optimise usage and help reduce costs.

For example, organisations can gain the necessary insights to repurpose unused spaces for more productive uses, make better-informed decisions about future space investments or divestments, and better align building equipment schedules with actual usage patterns.

Backed by a cloud-based infrastructure, Honeywell Vector Space Sense follows a three-step process that starts with gathering space utilisation data from multiple sources such as smart lights, Bluetooth beacons, mobile apps, and other sensor-connected devices and equipment. The solution then applies analytics to the collected data, using customised algorithms and space utilisation models to deliver actionable insights—the third and final step.

Cunyet Comez, Digital Services Director for Honeywell Building Solutions, High Growth Regions, said, "With regional governments heavily focused on driving energy efficiency, smarter buildings are now becoming a reality, as facility managers and building operators become increasingly aware of the need to make buildings more efficient, safe and productive."

"Expenses associated with unused building spaces often go unnoticed, simply because it is so difficult to get an accurate, moment-by-moment view into how building spaces are used, or if they are being used at all. Honeywell Vector Space Sense takes the mystery out of space usage through real-time, IoT-enabled insights that give organisations the real picture of where and how people are using spaces, so they can get the most out of their buildings," he added.

Honeywell Vector Space Sense is part of Honeywell's Connected Services portfolio, which includes other technologies such as the Honeywell Vector Occupant App that leverage the connectivity of buildings to improve how they operate and the experiences they offer for those who visit and work within them. ■

## KEY TAKEAWAYS

- Studies indicate most offices around the world are under utilised by as much as half of actual capacity.
- Facility managers lack the comprehensive insights required to take action to address usage issues.
- This can lead to overpaying for unused space, wasted energy, off-temperature spaces and other inefficiencies.
- Facility team can view insights through information-rich dashboards.

# CIO Majlis discusses impact of automation on education and changing job roles

In its latest session event, CIOMajlis welcomed Mohamed Arab from open-learning portal, Udacity, to its podium. The GCC and Levantine Head of Enterprise Partnerships explored the topic of lifelong learning and how it can shape the ideal well-rounded citizen of tomorrow.

Hosted on 25th of July, the monthly conference gathers renowned speakers, notable industry players, and prominent Chief Information Officers from across the UAE. Examining and debating a range of current industry-specific themes, this month's topic explored self-empowerment through lifelong learning.

Commencing with a brief history lesson, Arab walked the audience through the 1700s, a time period that restricted education to the elite. The 1800s saw the education system evolve, witnessing the formation of cohorts and the middle class. This system remained static for 150 years and the introduction of Massive Open Online Courses MOOCs in 2006 further transformed the education scenario.

With the dawn of the fourth industrial revolution, the global and regional job market are expected to be disrupted by pressing factors like job automation, increased connectivity and accessibility to information, and big data and processing power. With an estimated 800 million jobs worldwide at risk of being automated by 2030, diversifying one's skill set is imperative in the rapidly evolving 21st century.

Citing a 2016 report published by the World Economic Forum, the UAE possessed the largest population of highly skilled professionals in the MENA region. In order to maintain this momentum on an international platform, Arab proposes restructuring the traditional educational system, both nationally and globally. The Ministry of Education in the UAE is already preparing its youth to embrace new skills.

Schools are gradually introducing contemporary modules into elementary school curricula. New-age subjects like design and technology have been incorporated into syllabi from the third grade onward, in anticipation of future skills-in-demand.

Additionally, the UAE is also bringing the best out of its students with endeavors like the National Internship and Summer Jobs program and the 1 Million Arab Coders Initiative. Through this, it hopes to invoke a sense of proactive curiosity in its youth.

"It is not an intellectual barrier that prevents most people from committing to lifelong learning, it is an emotional one. It takes approximately 20 hours to become good at something," Arab said. "If you can practice the self-discipline to commit to mastering a new skill for 45 minutes a day, for 30 days, you'll surprise yourself."

The CIOMajlis initiative is in line with the National Innovation Strategy launched by HH Sheikh Mohammed Bin Rashid Al Maktoum with the goal of making the UAE the world's most innovative country by 2021. It functions as a thought leadership platform and networking hub for Senior Technology Executives to swap industry knowledge, explore business solutions, and share experiences. ■

## KEY TAKEAWAYS

- Global and regional job market are expected to be disrupted by factors like job automation, connectivity and accessibility to information, and big data and processing power.
- With an estimated 800 million jobs worldwide at risk of being automated by 2030, diversifying one's skill set is imperative in the rapidly evolving 21st century.
- According to a 2016 report published by the World Economic Forum, UAE possessed the largest population of highly skilled professionals in the MENA region.
- The Ministry of Education in the UAE is preparing the youth to embrace new skills.

# LG ties up with University of Toronto for development of AI research initiatives


Global innovator LG Electronics is poised to define the future of artificial intelligence for consumers and businesses in the years ahead with the establishment of a major new AI research presence in North America in collaboration with leaders in academia and start-ups.

This marks the launch of the new LG Electronics AI Research Lab in Canada, an extension of the newly expanded LG Silicon Valley AI Lab in Santa Clara, California. Supporting LG's vision of AI as a key future growth engine, the North American labs further enhance LG's global research capabilities, which include AI labs in South Korea, India and Russia.

In addition, LG is entering into a new research partnership with the University of Toronto, which is recognised worldwide for its AI and machine learning expertise, particularly in the area of deep learning.

"AI will ultimately touch everybody's lives, transforming the way we live, work and play," said LG Electronics President and Chief Technology Officer Dr IP Park. "Early implementations of AI in connected devices today are setting the stage for tomorrow's smart cities, smart homes, smart businesses and smart devices, all with capabilities that no one has even dreamed of yet." He said the North American labs and LG's research partnership with the University of Toronto will play a key role in developing source technologies defining that future.

## KEY TAKEAWAYS

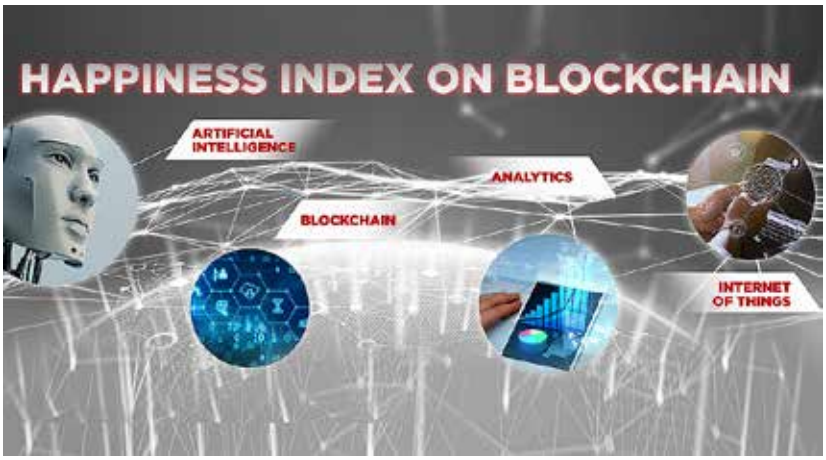
- Under its five-year research partnership with the University of Toronto, LG will build on its Open Platform-Open Partnership-Open Connectivity to expand the AI ecosystem.
- The new lab will capitalise on researchers at the University of Toronto who will have the opportunity to work collaboratively with LG's US and Canadian AI research teams.
- LG intends to collaborate with and invest in North American start-ups.

Under its five-year, multi-million-dollar research partnership with the University of Toronto, LG will build on its Open Platform-Open Partnership-Open Connectivity strategy to expand the AI ecosystem. The new lab will capitalise on the expertise of researchers at the University of Toronto who will now have the opportunity to work collaboratively with LG's growing US and Canadian AI research teams. Complementing this work, LG intends to collaborate with and invest in North American start-ups.

Dr Park said, "AI solutions based on deep learning will revolutionise how we interact with the world around us, in new seamless ways that use contextual data from things like biometrics, emotions, gestures and of course voice." He went on to explain the three main pillars of LG's AI strategy:

"The first is the ability to evolve with time, so the more you use our products, the better they evolve to meet your specific needs. The second is the ability to integrate AI into diverse touchpoints – to have a seamless, consistent user experience across the entire LG product portfolio, from connected appliances and TVs to connected cars and smartphones. The third is openness; our strategy is to provide the best AI experience for LG customers, leveraging the complementary capabilities of leading partners across the ecosystem," Dr Park explained. ■

# Blockchain Happiness Index built by Avanza, Sundown, Avaya recognised




The Avaya Happiness Index on Blockchain, developed in the UAE and showcased at GITEX 2017, was voted a Gold Winner for innovation at the 31st Edison Award in New York City. The distinguished awards, inspired by Thomas Edison's persistence and inventiveness, recognise innovation, creativity and ingenuity in the global economy.

The Avaya Happiness Index on Blockchain, which securely collects and analyses customer data from multiple sources in real time, enables organisations to gain greater insight into their customers behavior and respond quickly to user trends.

The solution was inspired by the Smart Dubai Happiness Agenda, which places citizen happiness at the core of Dubai's smart city transformation. Built on scientific principles, the Happiness Agenda is designed to make Dubai the happiest city in the world, utilising collaborative technology solutions, such as blockchain, to deliver an enduring positive impact on the lives of residents and visitors alike.

The Blockchain infrastructure securely collects and shares anonymous customer interaction data from a network of peers, while the real-time automated analysis of speech and text including chat, IM, email and SMS, interactions instantly identifies behaviors and trends, accelerating an organisation's ability to anticipate requirements and proactively respond to customer demands.

Being recognised with an Edison Award has become one of the highest accolades a company can receive in the name of innovation and business.

"This award, inspired by the various global initiatives being led by the UAE, showcases the thriving technology ecosystem within this nation and is yet another global mark of recognition for Dubai's Happiness Agenda. When visionary leadership focuses on citizen happiness, and leverage the transformational capability of technology and collaboration, they unleash the immense power of human innovation," said Nidal Abou-Ltaif, President of Avaya International.

"By combining Blockchain architecture with automated data analysis, the Avaya Happiness Index on Blockchain solution, developed in partnership with Avanza Innovations and Sundown.ai, delivers secure access to industry-wide, real-time competitive customer insights that organisations can use to stay competitive and drive customer loyalty," said Ahmed Helmy, Director, Advanced Solution Architect, Avaya International.

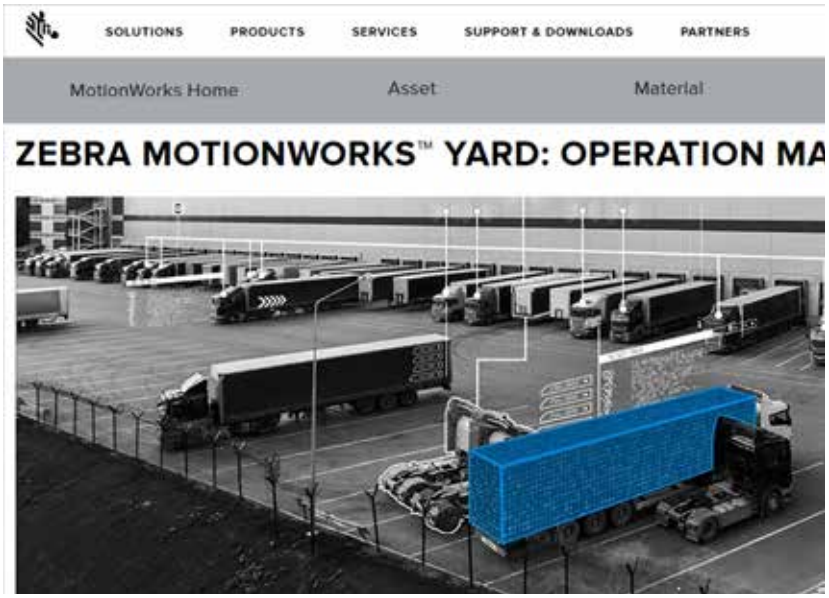
"In times of rapid change, it becomes essential to solve the problems customers are facing today while addressing the challenges of tomorrow. Alongside Avaya, we continue to turn conceptual technologies into business tools that provide a unique value proposition, like the ability to shape memorable customer experiences that adapt to consumer needs," Waqas Mirza, Chief Executive Officer, Avanza Innovations.

"This award recognises Sundown.ai's sophisticated Analytics AI Technology. With deep technological innovation at her core, Chloe, our AI engine, works with organisations to solve real business problems," said Fabio Cardenas, CEO of Sundown.ai. "With that aim, Chloe's Snap-in integration with Avaya's Platform allows unified communications to become a bit smarter, creating the next generation of customer support analytics AI." ■

## KEY TAKEAWAYS

- The Happiness Agenda utilises collaborative technology such as blockchain.
- Blockchain infrastructure securely collects and shares anonymous customer interaction data from a network of peers.
- Real-time analysis of speech and text identifies behaviors and trends.
- The Avaya Happiness Index on Blockchain, securely collects and analyses customer data from multiple sources in real time

# Zebra releases asset tracking and location solutions for manufacturing, logistics




Zebra Technologies, a vendor in rugged mobile computers, barcode scanners and printers, unveiled a comprehensive portfolio of business-class location solutions for manufacturing and transportation and logistics industries. Zebra MotionWorks automatically senses the location of assets and inventory, helping improve employee safety, streamlining production lines, and delivering actionable insights to increase productivity and efficiency. Zebra MotionWorks is based on Zebra's industry-leading RFID technology.

Powered by Savanna, Zebra's data intelligence platform, MotionWorks is a portfolio of flexible and customisable, end-to-end solutions that integrate operational and edge data from multiple sources – including Ultra-Wideband, UHF RFID tags, Bluetooth Low Energy beacons and cameras – to create insights that mobilise action to solve business needs. The portfolio includes innovative options such as the MotionWorks Asset solution, the MotionWorks Material solution and the MotionWorks Yard solution.

## KEY TAKEAWAYS

- Zebra MotionWorks is based on Zebra's RFID technology.
- Zebra MotionWorks senses the location of assets and inventory, helping improve employee safety, streamlining production lines.
- Automated asset tracking makes operations more efficient by ensuring assets are available when and where they are needed.
- Zebra's MotionWorks provides scalability to support thousands of sites and users, and hundreds of thousands of tracked resources, as well as the capability to locate Zebra mobile devices.

The MotionWorks Asset solution allows businesses to track and manage important assets with detailed, on-time information about the location, condition, and state of their enterprise resources. Automated asset tracking saves time and money, making operations more efficient by ensuring assets are available when and where they are needed.

An aviation manufacturer saved nearly $1 million in replacement costs and improved productivity by using this solution to improve the visibility of their parts and significantly reduced the time spend searching for assets.

The MotionWorks Material solution helps manufacturers manage and automate the flow of material for their business. With seamless integration into other plant floor and enterprise resource planning ERP applications, it provides valuable insights into smarter material usage and helps ensure just-in-time delivery, creating operational efficiencies and reducing costs.

A European automotive manufacturer saved $750,000 in inventory carrying costs, improved labor productivity by almost 20% and decreased on-hand inventory from local suppliers from seven days to two days with this solution.

The MotionWorks Yard solution facilitates the continuous flow of material and goods between transportation systems, distribution centers, and manufacturing plants. It also increases gate transaction speed, improving switcher productivity and ensuring the right trailer arrives at the right door at the right time.

This solution has helped a North American retailer reduce the average trailer check-in time by 80% – decreasing labor costs and dwell time while improving yard efficiency and conserving fuel costs. By getting the right trailer to the right dock door at the right time, the retailer has improved supply chain velocity and enabled faster product movement to the retail floor.

Using the Savanna Location Engine, Zebra's MotionWorks solutions provide enterprise-level scalability that can support thousands of sites and users, and hundreds of thousands of tracked resources, as well as the capability to locate Zebra mobile devices. ■

## VEOLIA WATER BUILDING EGYPTIAN SUSTAINABILITY

Veolia, the global leader in optimised resource management through its subsidiary Veolia Water Technologies, has been awarded a contract by Egyptian Electricity Holding Company to construct and set up water and wastewater treatment plants for Assiut Supercritical Power Plant and Cairo West Power Plant.

Supporting Egypt Vision 2030 to drive sustainable urban development and economic growth, the State-owned Egyptian Electricity Holding Company chose Veolia Water Technologies due to its extensive experience in the power generation market both in Egypt and across the wider Middle East region, and for its technical expertise in the process and design of wastewater treatment systems for supercritical power plants.

Veolia Water Technologies is well suited to design, build, and deliver integrated systems to treat water and wastewater. This will enable Assiut Supercritical Power Plant and Cairo West Power Plant to operate at maximum capacity while serving its boiler feed's high demand for extra-pure demineralised water.

## AI TO BOOST UAE GDP BY 2030

Rapid adoption of artificial intelligence solutions will increase the UAE's GDP by $96 billion by 2030. By industry, Accenture says finance $37 billion, healthcare $22 billion, and transport and storage $19 billion will see the biggest growth by 2035.

"Artificial intelligence solutions can enable new innovations that can augment the existing workforce, optimising costs, efficiency, and innovation. Banks can analyse credit and loan repayments, hospitals can predict patient treatment success, and government agencies can enhance mega-events management," said Savitha Bhaskar, COO at Condo Protego, the UAE-based IT infrastructure and information management consultancy and solutions provider.

Organisations also need to have in place the next step, machine learning, where machines or applications learn from massive data sets, and uncover patterns that are largely beyond what people could uncover themselves. Condo Protego is seeing demand for Dell EMC high performance computing solutions.

"AI and machine learning solutions should meet business needs, and not merely have futuristic technology for technology's sake. The massive computing power needed for AI and machine learning also means that organisations need to invest in high-performance information management infrastructure," added Savitha Bhaskar.

## ETISALAT CONNECTS EXPO 2020 TO 5G

The UAE has set another benchmark for the early adoption of advanced new technology, with Expo 2020 Dubai becoming the first major commercial customer in the Middle East, Africa and South Asia region to access 5G services, through its partnership with Etisalat.

The telecom provider connected Expo 2020 Dubai to its 5G network, making the site of the next World Expo the first commercial location in the MEASA region to experience 5G. The milestone reinforces the reputation of both UAE and Dubai as leaders in innovation and infrastructure.

At around 20 times faster than 4G and with ultra-low latency, 5G technology will enable users to stream live 4K resolution video anywhere at any time, with virtually no lag.

Etisalat's network will provide the most advanced digital and telecom services to Expo 2020 Dubai and its millions of visitors, supporting an expected 300,000 users on peak days.

## MULTIFACTOR KEY FOR BANKS, CONDO PROTEGO

Cybersecurity is vital to the business world, ranking as the top priority for more than 36% of CEOs worldwide in their digital transformation, according to IDG's State of the CIO 2018 report. As more regional organisations invest in cybersecurity, Visiongain predicts the GCC's cyber security market will top $8 billion in 2018.

"The UAE's financial sector has always been at the forefront of innovation. Multi-factor authentication should include an object, a fact, and a person, and is the next step for banking and finance organisations to defend against cyber-attacks and secure transactions," said Andrew Calthorpe, CEO, Condo Protego. In the UAE, Condo Protego is seeing demand for the RSA SecurID Authentication solution.

"Banks need to place the trust of their customers and employees front and center. Channel partners play a key role in supporting banks with unified tools and processes to securely store, manage, and access customer data at all times, locations, and devices," added Calthorpe.

## HONEYWELL TO PROVIDE OLEFLEX TECH TO EGYPT

Honeywell announced that Sidi Kerir Petrochemicals has chosen Honeywell UOP's C3 Oleflex technology to produce propylene at its refinery near Alexandria, Egypt. Operating from Cairo, Honeywell works with some of Egypt's key government and private sector entities in the fields of oil and gas, defense, aviation, infrastructure, smart cities, security and fire safety.

Sidi Kerir Petrochemicals is a joint stock company established in 1997 and represents Egypt's initial development of a domestic petrochemicals industry. Egypt is the top consumer of polypropylene in Africa, consuming about 4.4 kg per capita, and growing by more than 5% annually through 2022.

Honeywell will provide the process design package, proprietary and non-proprietary equipment, on-site operator training, technical services for startup and continuing operation. Including this project, Honeywell UOP's Oleflex technology has been selected for 52 out of 64 dehydrogenation projects globally since 2011. When completed, the unit will be the first Oleflex unit operating in Egypt.

# Central Bank of Egypt completes phase one of digitisation scanning 100M documents

Alaris, a Kodak Alaris business, announced that Central Bank of Egypt is on its way to attaining its digital transformation aspirations by digitising 100 million documents using scanners from Alaris, with the aim of scanning another 500 million documents over the next 5 years.

The digitisation of documents has resulted in a number of benefits including huge cost savings in terms of storage space, quick and easy document retrieval and completion of certain processes in a few minutes as opposed to weeks.

As an institution that sets the standard for other banks and financial institutions in the country, Central Bank of Egypt decided two years ago to embark on its digital transformation journey. Digitisation of documents was given topmost priority in order to meet regulation, security and compliance demands, reduce costs and to enhance productivity and efficiency.

Kassem Mohamed, Head of Business Technology Development at Central Bank of Egypt says, "In today's mobile-first era, paper-based processes are no longer viable, and as a forward-thinking organisation, we needed to digitally transform our information management strategies to improve operational efficiency and ensure profitable growth."

"We had over 500 million documents, that were stored in three warehouses, that had to be retained as per regulatory requirements. Not only was there a huge storage cost, but these documents were at risk of damage and loss. There was a lot of sensitive and confidential information within those documents and the paper handling process itself was unsecure, which threw up cyber security challenges."


"Finally, it was a very difficult and time-consuming process trying to retrieve a particular document. Digitising these documents and implementing an Enterprise Content Management system was imperative. Electronic storage is a lot faster, easier, cheaper and more reliable. If you have a warehouse fire, your documents are gone. But if you have files on a server that is backed up, you cannot lose them."

Kassem and his team reached out to Microfilm Egypt, an Alaris partner and a leading IT solutions company specialising in document management, archival and business process management solutions. The project would be completed in 2 phases. The first phase would involve backlog scanning of 100 million documents, followed by another 500 million documents in the next phase as well as implementation of an ECM solution.

Based on the high volume of the scanning job as well as the emphasis on productivity and accuracy, 20 scanners were used in the first phase of the project. An archive writer was used simultaneously to convert the digital images to microfilm to be stored for the long term.

The digitised files are stored in an Oracle database. The scanning and capture solution integrates with other business systems and all the data stored is encrypted and digitally signed. The first phase of the project has been completed with 100 million documents scanned and digitised in a period of 2 years.

Having successfully completed the first phase of the project, Microfilm Egypt will now start work on digitising 500 million documents over the next 5 years. Considering the mammoth task, the company has recommended that more units of Alaris scanners be commissioned.

The next stage will also involve the implementation of an Enterprise Content Management solution including designing workflows and applying business analytics and intelligence to the data. This will undoubtedly enhance efficiency of operations and aid quick e-retrieval of documents, thus saving precious time and energy manually sifting through stacks of papers. ■

## KEY TAKEAWAYS

- Based on volume of scanning 20 scanners were used in the first phase of the project.
- Archive writer was used simultaneously to convert digital images to microfilm.
- The digitised files are stored in an Oracle database.
- Scanning and capture solution integrates with other business systems.
- All the data stored is encrypted and digitally signed.
- Digitisation of documents has resulted in cost savings in terms of storage space.

# Priority Pass adds way-finding, augmented reality, boosting airport lounge access

Collinson Group, the global vendor in influencing customer behavior and driving customer devotion, announced a partnership with indoor mapping and way finding specialist, LocusLabs. The relationship will enhance the lounge experience and airport services available to Collinson Group's customers, including those of Priority Pass, the world's largest independent airport lounge and travel experiences program.

The two companies are also collaborating on other groundbreaking technologies including augmented reality as they look to assist customers in navigating the airport space of the future.

LocusLabs' location-as-a-service technology is successfully used by a number of leading airlines and technology companies. It will be incorporated into the Priority Pass app, making it easier for users to locate lounges and understand how busy different facilities are, such as security wait times, in addition to seeking out other benefits inside terminals.

## KEY TAKEAWAYS

- Priority Pass will be the first lounge membership program to integrate LocusLabs' indoor mapping and way finding features within its app, through an update due in the coming weeks.
- LocusLabs' location-as-a-service technology is successfully used by a number of leading airlines and technology companies.
- Those with push notifications enabled on their smart phones can receive recommendations of services when entering an airport to help them navigate to lounges and exclusive discounts.

Additionally, those with push notifications enabled on their smart phones can receive recommendations of services when entering an airport to help them navigate to lounges and exclusive discounts. Priority Pass will be the first lounge membership program to integrate LocusLabs' indoor mapping and way finding features within its app, through an update due in the coming weeks.

Initially, key major airports will be covered including Dubai, Hong Kong, London Heathrow, London Gatwick, Singapore, Manchester, Amsterdam, Los Angeles, Mexico City and Istanbul Ataturk airports, with more locations due to follow in the coming months.

Reflecting the trend for airports investing in unique experiences on the ground, this partnership represents another major step in realising Collinson Group's vision to provide connected travellers with smarter digital and real-world experiences which enrich their travel journey. The company is continuing to evolve and improve its Priority Pass service, supported by a growing number of premium features such as restaurant and spa discounts and seamless mobile access to retail discounts.

The LocusLabs partnership marks the start of a string of further developments for the company in 2018, with a number of exciting capabilities due to be introduced to the Priority Pass app.

Priority Pass is the original and largest independent airport lounge membership program, accepted at over 1,000 lounges worldwide across 500+ cities and in more than 130 countries, regardless of class of travel and airline flown plus access to exclusive Collinson partnerships and dining, retail and spa offers through the Priority Pass app.

Priority Pass is a flagship product of the Collinson Group, a global vendor in influencing customer behaviour to drive revenue and value for its clients and program members. The Group offers a unique blend of industry and sector specialists who together provide market-leading expertise in delivering products and services across four core capabilities: Lifestyle Benefits, Loyalty, Insurance, and Assistance. ■

# Smart Dubai enters phase one of becoming paperless internally and externally

Smart Dubai has reached the first phase of implementing the Dubai Paperless Strategy, which seeks to digitise internal and external transactions at government entities and save time and effort for employees and customers alike.

The initiative was launched in early 2018 by His Highness Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of the Dubai Executive Council, to ensure Dubai's full transition towards smart government, as envisioned by HH Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE, Ruler of Dubai.

Set to conclude at the end of the year, the first phase of implementing the Dubai Paperless Strategy will see Smart Dubai work with six government entities, namely: Dubai Police, Roads and Transport Authority, Dubai Electricity and Water Authority, Dubai Land Department, Dubai's Department of Economic Development, and the Department of Tourism and Commerce Marketing. Phase two will include cooperation with different government entities.

Her Excellency Dr Aisha bint Butti bin Bishr, Director General of the Smart Dubai Office, said: "The Dubai Paperless Strategy constitutes a significant leap forward in Dubai's quest to transition into a world-leading smart city, embodying the vision and directives of our wise leadership to embrace advanced technologies and harness them to conduct integrated and paper-free operations at government entities, where employees are encouraged to develop plans and strategies for community development, as well as to promote happiness."

"We divided the implementation of the Dubai Paperless Strategy into several phases in an effort to optimise its activities and seamlessly achieve the entirety of its objectives," HE Dr Aisha added. "Each phase will see us cooperate with a group of influential government bodies. For the first phase, we are collaborating with six prominent entities that offer essential services for citizens and residents, while the second and third phases will bring us together with dozens more government agencies in 2019, with the final objective being to establish a fully-fledged smart, paperless government by 2021."


Smart Dubai held several meetings with officials from the government agencies participating in the first stage, which resulted in the formation of special task forces from each entity, that will work closely with Smart Dubai to implement the strategy.

The Dubai Paperless Strategy revolves around three main axes: Technology, whereby all technological requirements would be provided to ensure paper-free government transactions and procedures. Second, Legislation, where the necessary legislative changes are made to regulate paperless transactions in all institutions. The third and final pillar, Culture, seeks to take the strategy forward, overcoming cultural barriers of individuals and institutions to promote paperless transactions and procedures.

The strategy is set to expedite the transition of internal and external customer paper transactions across government institutions towards digital. The government will stop issuing or requesting paper documents from dealers, and government employees will stop issuing or processing paper in key or supporting operations.

Several technical changes will be gradually rolled out to implement the Strategy. These include increasing automation in government institutions and tending to both external customer needs and internal administrative and operational needs, which, going forward, would be conducted through digital IDs, signatures and certificates, as well as secure data available via dedicated platforms.

Changes also include legislative adjustments, regulating physical presence at the courts, and the legal requirement to produce paper documents to guarantee the credibility of the transaction. ■

## KEY TAKEAWAYS

- Dubai Paperless Strategy revolves around three main axes: Technology, Legislation, Culture.
- First phase will see Smart Dubai work with Dubai Police, Roads and Transport Authority, Dubai Electricity and Water Authority, Dubai Land Department, Dubai's Department of Economic Development, Department of Tourism and Commerce Marketing.
- Government will stop issuing or requesting paper documents from dealers.
- Government will stop issuing or processing paper in operations.

# Albéa selects Schneider Electric's EcoStruxure for energy cost reduction

Schneider Electric, a vendor in digital transformation of energy management and automation, announced it is working with Albéa on an integrated energy and carbon management programme. This will help the beauty and personal care packaging company improve energy efficiency across its global facilities 15% by 2020 and improve sustainability reporting.

Albéa provides packaging solutions to beauty and personal care companies including L'Oréal, Unilever, Coty, Estée Lauder, LVMH and many others.

The latest phase in the three-year partnership includes strategic procurement to optimise utility contracts and rates to manage the risks and price volatility associated with energy sourcing. This builds on earlier energy efficiency-focused efforts to uncover opportunities and implement measures to help Albéa meet its 15%-reduction goal.

Schneider Electric has also worked with Albéa to improve CDP reporting — the manufacturer has raised its rating from C to B — and evaluate science-based targets for additional, more rigorous climate action.

Albéa previously managed energy reduction and sustainability efforts locally across its 38-site, 15-country industrial footprint. The absence of a cohesive strategy, and a common approach to sharing data and best practices lacked efficiency and created gaps in reporting and analysis.

To overcome this challenge, Albéa adopted Schneider Electric's cloud-based EcoStruxure Resource Advisor to visualise, measure and manage initiatives across its entire portfolio. This allows the company to standardise conservation efforts across sites and measure progress through one single interface.

With the addition of a company-wide energy procurement program, Albéa has adopted an integrated, data-oriented approach to managing the strategies, data and resources needed to reduce consumption and maximise savings, a practice known as Active Energy Management.


The need for coordination across energy efficiency, supply and sustainability departments has never been greater. A recent study found that most organisations are not taking the necessary steps to integrate and advance their energy and sustainability programs. Many are focused on conventional approaches to energy management and climate action, and few have coordinated efforts between procurement, operations and sustainability departments.

"Organisations are starting to integrate how they buy and use energy with sustainability initiatives to see additional benefits such as increased efficiency, financial savings and more sustainable operations," said Steve Wilhite, Senior Vice President of Energy and Sustainability Services, Schneider Electric. "When these efforts converge into a single global program, companies can uncover new opportunities and drive even greater savings. We are proud to partner with Albéa on its Active Energy Management journey." ■

## KEY TAKEAWAYS

- Latest phase includes strategic procurement to optimise utility contracts and rates to manage the risks and price volatility associated with energy sourcing.
- This builds on earlier energy efficiency-focused efforts to uncover opportunities and implement measures to help Albéa meet its 15%-reduction goal.
- Albéa previously managed energy reduction efforts locally across its 38-site, 15-country industrial footprint.
- Absence of a cohesive strategy to sharing data and best practices created gaps in reporting and analysis.

# Digital platform HalalGuide tracking products and services using Apla Blockchain

Apla, a Blockchain protocol specifically designed for building government and enterprise platforms, unveiled its partnership with HalalGuide, a comprehensive ecosystem of 12 platforms that connects Muslims across the globe to valuable and unique resources including access to halal products and services. This global platform has been built on a peer-to-peer network, now using Apla's proprietary blockchain technology.

HalalGuide acts as an online guide to the world of Halal. It was created to facilitate the lives of modern Muslims to assist them in carrying out their daily duties in a simplified manner while adhering to religious beliefs. HalalGuide helps 1.5 million users around the world take advantage of its resources and is adding as many as 200,000 more each month. It already covers more than 120 countries including the UAE and other countries in the region and is growing.

According to the State of the Global Islamic Economy Report 2016-2017, the global halal economy is estimated to be worth around $3.9 trillion. With a projected annual growth rate of 20%, the global halal industry is valued at $560 billion a year, making it one of the fastest growing consumer segments in the world.

HalalGuide allows Muslims to globally access a variety of halal products and services, not only as a product traceability platform but also as a holistic Islamic ecosystem on blockchain.


Available categories on HalalGuide include clothing stores, accessories, medical centres, Islamic charities, travel agents and more, across the globe.

Apla's blockchain technology brings a number of advantages to an online platform like HalalGuide. Data is stored in a distributed and decentralised manner, with complete transaction history and data audit trail. The technology blocks transactions and notifies users if data is falsified or mutated in any way, making it secure and reliable.

Apla Blockchain protocol is primarily developed for building digital ecosystems and integrates all services of HalalGuide into one coherent ecosystem delivering inter-dependent services with a simplified user experience. Moreover, with transparency being a key element in Islam, the technical solution is oriented to cater to the traceability and certification of halal products.

Commenting on the halal industry, Muhammed Arafath, Executive Director of Apla said, "The advent of modern technology at a global level accelerates unprecedented business opportunities as well as numerous challenges for the global halal industry. To address the overwhelming expansion of the Halal Industry, we are pleased to be the blockchain partner of choice to power a comprehensive global platform."

Ayrat Kasimov, Founder of HalalGuide commented, "The global halal economy consisting of 1.8 billion Muslims has expanded to include food, pharmaceuticals, health products, cosmetics, fashion, travel and much more. HalalGuide, therefore, serves as a bridge between businesses and the Muslim community, making it a universal ecosystem for Muslims across the world."

Apla is a full-service blockchain technology company that enables governments and enterprises to work faster, safer and with greater impact. Apla develops blockchain-based Platform as a Service PaaS, which is integrated to optimise organisational processes, bringing about more secure IT architecture and data integrity. Apla has successfully executed projects in UAE, India, Netherlands Antilles and Russia.

Developed by a team of young Muslim entrepreneurs, HalalGuide is an authentic digital directory that aims to strengthen and upgrade the online search for Islamic venues, products and services and to provide a robust source of information about Halal lifestyle. ■

## KEY TAKEAWAYS

- Using Apla blockchain, data is stored in a distributed and decentralised manner, with transaction history and data audit trail.
- The technology blocks transactions and notifies users if data is falsified or mutated in any way, making it secure and reliable.
- Apla Blockchain protocol is primarily developed for building digital ecosystems.
- Apla Blockchain integrates HalalGuide into a coherent ecosystem delivering inter-dependent services with simplified user experience.
- The solution is oriented to traceability and certification of halal products.

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GEC Media Group
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223, Building 9,
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**SALES**
Ronak Samantaray
Mob: + 971 555 120 490
Email: ronak@gecmediagroup.com

Richa S
Mob: + 971 562 151 157
Email: richa@gecmediagroup.com

**EDITORIAL**
Anushree Dixit
Mob: + 971 529 112 472
Email: anushree@gecmediagroup.com

Divsha Bhat
Mob: + 971 561 553 608
Email: divsha@gecmediagroup.com

# Swiss food processing giant Bühler adopts digital category management solution


Jaggaer, an independent spend management company, announced that Bühler AG won the Jaggaer 2018 Vision Excellence Award, for a joint Digital Category Management solution involving machine learning. Bühler is a global technology and engineering company. The two companies worked closely to utilise Jaggaer Direct Category Management software for Bühler's globally marketed products.

Bühler needed to share a consistent category management strategy across several groups, collect KPIs for each category, and required more transparency in supplier development. Bühler also wanted a recommendation engine, that could independently make suggestions when searching for suppliers based on KPIs.

Jaggaer created a new DCM tool based on these requirements, which has allowed Bühler to successfully implement their digital procurement strategy, track their efficiency, and automate their decision-making processes with machine learning algorithms.

The DCM tool is scheduled to become the central module for all processes in digital supplier management and will be rolled out in all of Bühler's international locations. This will enable Bühler to increase transparency and improve the organisation of category management, while also allowing the company to monitor the global implementation of their category strategies. Overall, these benefits will secure Bühler's competitive market advantage, representing a milestone in the company's digital transformation.

"We would like to congratulate Bühler for their innovation, team work and forward thinking in spearheading this lighthouse project. We know that strategic category management is an absolute must to increase efficiency in their procurement activities and required a new technology solution. This project exemplifies our corporate position of collaborating with our customers to foster market innovation," says Robert Bonavito, CEO of Jaggaer.

"We need to source materials for every project individually," explains Hansjörg Ill, Head of Global Procurement at Bühler. "This is why we have a wide range of differentiated categories, and we needed a software that could help us manage them more effectively."

Jaggaer is the world's largest independent spend management company, with over 1,850 customers connected to a network of 3.7 million suppliers in 70 countries, served by offices located in North America, Latin America, throughout Europe, the United Kingdom, Australia, Asia, and the Middle East.

Jaggaer offers complete SaaS-based indirect and direct eProcurement solutions with advanced spend analytics, complex sourcing, supplier management, contract lifecycle management, savings tracking, and intelligent workflow capabilities. Jaggaer solutions are trusted by largest education, manufacturing, health care, retail, consumer package goods, logistics, construction, utilities companies and public service organisations.

Bühler holds leading market positions in technologies and methods for processing grain into flour and feed, as well as for the production of pasta and chocolate, in die casting, wet grinding and surface coating. The company's core technologies are in the areas of mechanical and thermal process engineering. ■

## KEY TAKEAWAYS

- Jaggaer offers SaaS-based eProcurement with spend analytics, complex sourcing, supplier management, contract management, savings tracking, intelligent workflow.
- Bühler needed to share a consistent category management strategy across several groups, collect KPIs for each category, transparency in supplier development.
- Bühler wanted a recommendation engine, that could independently make suggestions when searching for suppliers based on KPIs.
- Jaggaer created a Digital Category Management tool, which allowed Bühler to implement their digital procurement strategy, track efficiency, automate decision-making with machine learning.

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# CONNECTING THE AIRCRAFT, SKIES, AND GROUND

A perfect storm of high speed satellite connectivity, airborne IP networks, cloud data streams, electronic flight bags, real time analytics, is promising to bring financial savings to the aviation industry and transform legacy operations.

Our world is increasingly driven by data. The Internet of things has not, until very recently, included the aircraft. While IoT developed on the ground, the aircraft lagged behind, remaining one of the last places on earth without high speed connectivity. Now, aviation is catching up – and very quickly. Digital transformation is taking to the skies, and at the heart of this change is the connected aircraft. Facilitated by satellite communications and integrated with the IoT, the connected aircraft is initiating a data revolution in the skies.

With the advent of secure broadband IP communication, the amount of new applications that are enabled allow airlines to make a step change in digital transformation. In many ways, this is not unlike the step change from traditional mobile phones to smart phones. The aircraft is no longer an isolated unit. It is a live sensor that can interact and share information in real time with a wider digital ecosystem. This enhanced connectivity from the aircraft is bringing increased visibility to the whole industry, from flight crews and ground crews to an emerging network of supporting service providers.

"The connected aircraft is a long term investment and should be seen

With broadband IP communication, the amount of new applications that are enabled allow airlines to make a step change in digital transformation.

in the light of wider airline digital transformation drives. The cost of adoption of connectivity is usually remunerated over a 10-15 year period. Efficiencies will create operational savings of $15 billion annually by 2035, a figure which is hard to ignore. We believe that to meet mounting challenges faced by the industry, including an expected doubling of air traffic by 2035 within already congested airspace, airlines need to consider the role that connectivity has to play in future proofing and streamlining operations," explains Fredrik van Essen, Senior Vice President, Inmarsat Aviation.

The ability to exchange data from an aircraft limits the level of operational efficiencies and safety enhancements that can be achieved. Aircraft communications has been a limited form of connectivity. Even more so, the ability to integrate this connectivity into the wider airline operations. As the connected aircraft is supported by third party systems and solutions, it will continue to evolve with emerging technologies. It is future proof by design, so the possibilities for how the technology will develop are not limited.

The connected aircraft provides multiple operational opportunities for airlines to make efficiencies. These efficiencies are forecasted to create operational savings of $15 billion annually by 2035. These efficiencies extend from pre-departure to post arrival across the air transport ecosystem, and can help the industry to accommodate the forecast doubling of IATA passenger traffic by 2035.

The research finds that the connected aircraft could save up to $1.3 billion each year in fuel costs alone – this equates to 3.39 billion litres of fuel and 8.3 million tonnes of CO2. It estimates that enhanced communication could save $11 billion annually through reduced delays, cancelations and diversions, and that if connected aircraft technology also halved maintenance costs, it could deliver annual cost savings of $5.6 billion.

These are global savings figures which, due to the nature and complexity of the data available, cannot be broken

*FREDRIK VAN ESSEN*
*Senior Vice President, Inmarsat Aviation*

down into regional savings figures. The regional split would depend on the varying speed and scale of uptake across different markets.

Just as smartphones changed the way we communicate on the ground, the connected aircraft is disrupting the aviation industry by giving access to applications which are open and hardware agnostic. These applications give real-time data and insights that drive onboard decision-making and optimise airline operations, reducing costs and enhancing safety.

Inmarsat's CAP Programme aims to facilitate these new connected applications and is currently open to application providers and developers, with an SDK and two-step certification process that tests and optimises connected applications to make the most of the SB-S platform.

"The connected aircraft lowers barriers to entry and provides opportunities for new players to enter the market with innovative new applications to make flying safer, more profitable and more enjoyable. We are already seeing, for example, a host of startups, partnerships between airlines and retailers and OEMs and data mining companies develop. As the adoption of connected aircraft becomes more widespread in the next few years, and technology advances further, it will be interesting to see how the ICT industry responds to this burgeoning opportunity," continues van Essen. ■

## Emirates partners with Thales, Inmarsat for next gen broadband connectivity

In November 2017, Emirates and Thales signed an agreement to equip the Boeing 777X fleet with the next generation broadband inflight connectivity using Inmarsat GX global network. The partnership will give Emirates customers connectivity on its Boeing 777X aircraft due for delivery starting in 2020.

Over the years, Emirates has invested over $200 million to equip its aircraft with connectivity. Demand for Wi-Fi on board has been steadily increasing and today over 800,000 passengers per month connect while inflight. Emirates offers all its customers 20MB of complimentary Wi-Fi data on board while Emirates Skywards members in First Class and Business Class enjoy unlimited complimentary Wi-Fi and discounted plans in Economy Class.

Emirates, Thales and Inmarsat have invested in the new generation Wi-Fi solution and will work together to meet increasing demand for Wi-Fi on board.

# HOW THE CONNECTED AIRCRAFT WILL TRANSFORM THE AVIATION INDUSTRY

Digital transformation, so characteristic of terrestrial markets over the past decade, is taking to the skies. At the heart of this revolution is the connected aircraft. The connected aircraft, facilitated by satellite communications and integrated with the Internet of Things is enabling a range of efficiencies across fuel consumption and emissions, maintenance, flight optimisation, fleet utilisation, airspace capacity and safety.

The launch earlier this year of Inmarsat's SB-S service brings high-speed, multi-channel connectivity to the flight crew for the first time. In layman's terms, this means that the aircraft opens up and becomes an integral part of an airline's IT network, enabling new capabilities, from visual real-time weather to inflight aircraft health and performance monitoring. Most importantly, it represents a step towards the digitisation of air traffic management.

These operational benefits could yield savings for the global airline industry of between $5.5 billion–$7.5 billion annually based on existing connected aircraft numbers, rising to between $11.1 billion–$14.9 billion by 2035. This is a 0.75–1.00% reduction in the IATA consolidated $764 billion annual global airline cost of operation.

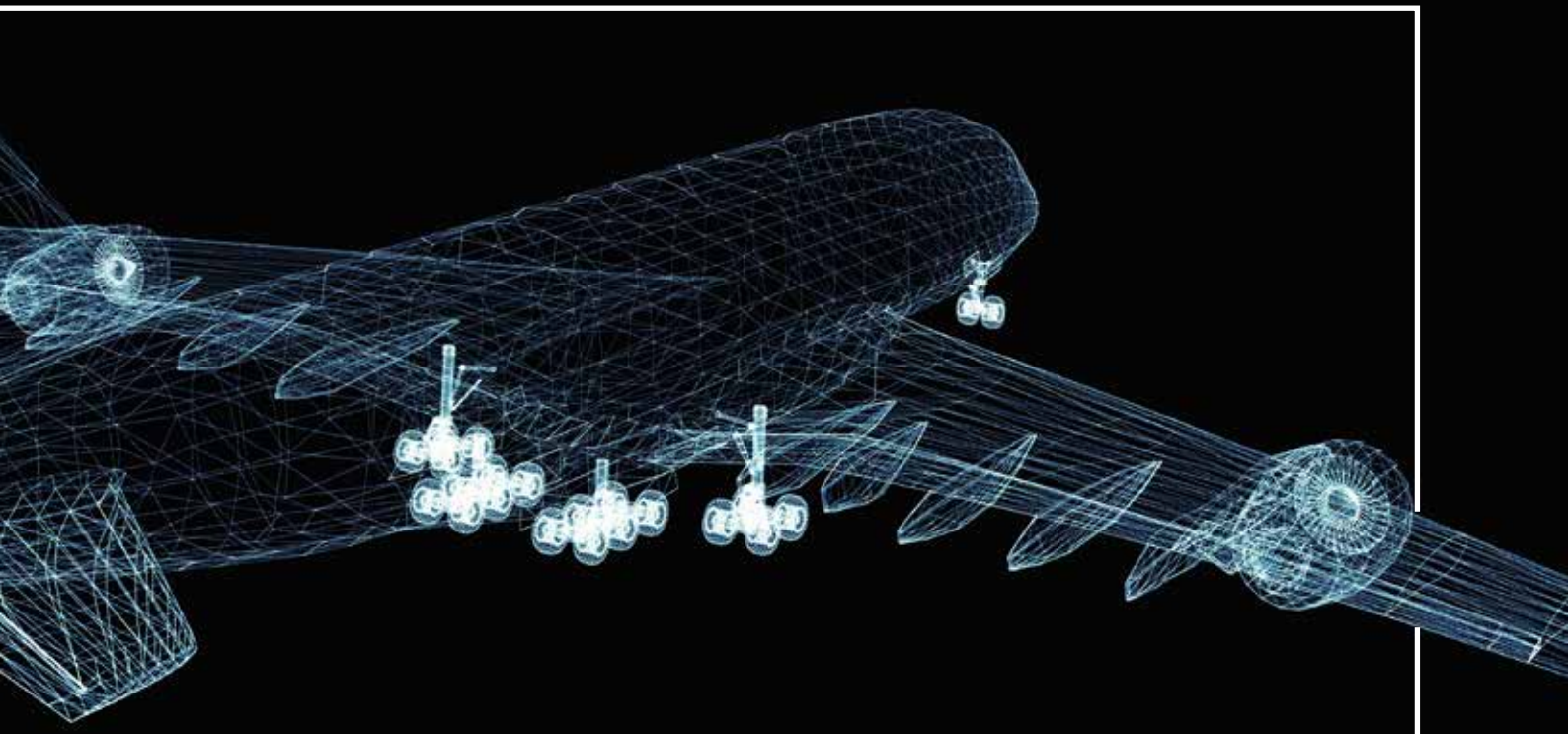
It is estimated that over the past 15 years, satellite communications have resulted in savings for the global airline industry of over $3 billion. These new services have the potential to rapidly dwarf this figure.

The forecast doubling of air traffic by 2035 will require a more efficient use of assets to reduce fuel and CO2 emissions, and increase capacity while assuring safety. Without a reassessment of technology and infrastructure, it is uncertain how the industry, and the finite airspace it relies on, will accommodate the predicted growth.

Interviews indicate consolidated annual benefit of operational connectivity could be a saving of around 2.5%–5.0% of current fuel consumption, with associated fall in emissions. Satcom-enabled air traffic management initiatives offer the potential to reduce separation minima, counteract congestion and manage more aircraft more safely and efficiently.

The IP-connected aircraft promises more than just commercial advantage; it is increasingly an operational necessity. To enable these efficiencies, a new generation of secure, high-bandwidth satellite communication services is emerging, connecting an array of specialist applications with IoT, cloud, artificial intelligence and big data.

Until recently, the business case for connectivity has been largely based on incremental revenue alone. But a growing



number of airlines are now taking into account a broader context that includes both operational savings and ancillary gains.

They are both part of the wider, end-to-end digital transformation occurring across the industry, starting from initial contact with the passenger and extending well beyond the aircraft's arrival at the destination gate.

There is diverse range of benefits of connected operations. These include economies in fuel consumption, a reduction in delays and improved on-time departures, innovations in maintenance processes, fleet utilisation efficiencies, safety enhancements and others.

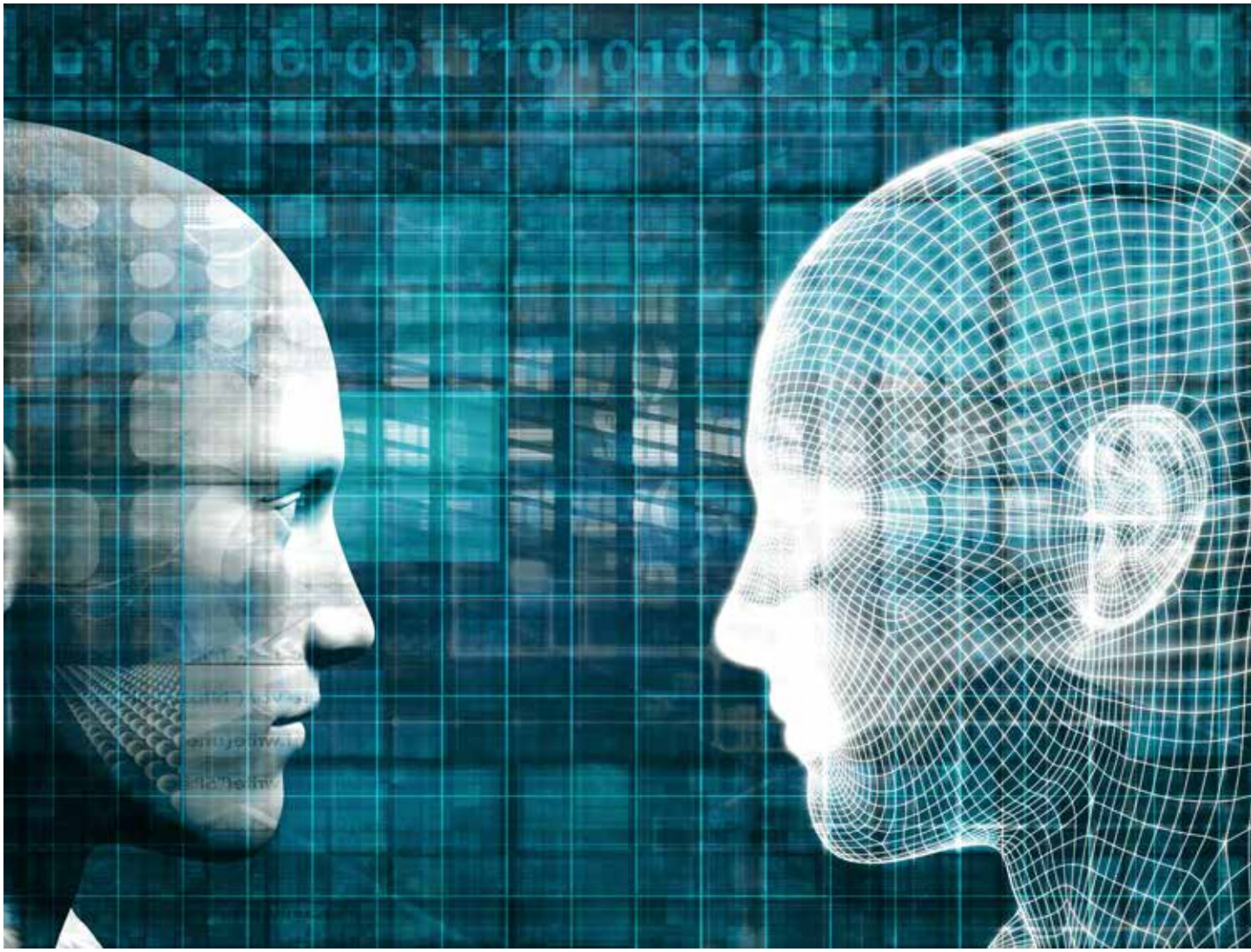
The forecast increase in aircraft traffic will create both challenges and opportunities. The IP-enabled aircraft is an integral step towards addressing the issues while facilitating efficiencies and benefits. Without it, the industry may be constrained by the limitations of finite airspace and a growing environmental agenda.

The connected aircraft impacts four categories: connected operations, maintenance operations, airline operations, air traffic control.

*Source: Sky High Economics: Evaluating the Economic Benefits of Connected Airline Operations. Conducted by the London School of Economics and Political Science, the Sky High Economics study is the first of its kind to model the economic impact of inflight connectivity on the aviation industry.*

## KEY TAKEAWAYS

- The aircraft opens up and becomes an integral part of an airline's IT network, enabling new capabilities.
- This represents a step towards the digitisation of air traffic management.
- The doubling of air traffic forecasted by 2035 will require a more efficient use of assets to reduce fuel and CO2 emissions, and increase capacity while assuring safety.
- Without reassessment of technology, it is uncertain how the industry, and the finite airspace it relies on, will accommodate predicted growth.
- Consolidated annual benefit of operational connectivity could be a saving of around 2.5%–5.0% of current fuel consumption, with associated fall in emissions.



# RESHAPING THE REGION WITH ARTIFICIAL INTELLIGENCE

PWC assesses the impact of artificial intelligence on various sectors in the GCC primarily UAE and Saudi Arabia, and forecasts that finance, public services, education, healthcare, manufacturing, retail will be early adopters.

Beyond 2030, the impact of artificial intelligence on both the economy and society will almost certainly increase, so it is important for the Middle East to be strategically placed in order to provide a springboard for the future. Artificial intelligence is going to be a big game changer in the global economy, and much of the value potential is up for grabs.

Artificial intelligence could contribute up to $15.7 trillion to the global economy in 2030, more than the current output of China and India combined. Of this, $6.6 trillion is likely to come from increased productivity and $9.1 trillion is likely to come from benefits to consumers.

In the wake of the fourth industrial revolution, governments and businesses across the Middle East are beginning to realise the shift towards artificial intelligence and advanced technologies.

| INDUSTRY | ABSOLUTE CONTRIBUTION IN 2030 (US$ BILLIONS) | CONTRIBUTION IN AI TO MIDDLE EAST GDP BY INDUSTRY |
|---|---|---|
| CONSTRUCTION AND MANUFACTURING | $99 | 12.4% |
| ENERGY, UTILITIES, MINING | $78 | 6.3% |
| PUBLIC SECTOR, INCLUDING HEALTH AND EDUCATION | $59 | 18.6% |
| FINANCIAL, PROFESSIONAL, ADMINISTRATIVE SERVICES | $38 | 13.6% |
| RETAIL, WHOLESALE TRADE, CONSUMER GOODS, ACCOMMODATION AND FOOD SERVICES | $23 | 19% |
| TRANSPORT AND LOGISTICS | $12 | 15.2% |
| TECHNOLOGY, MEDIA, TELECOMMUNICATIONS | $10 | 14% |

Gains from artificial intelligence.

They are faced with a choice between being a part of the technological disruption, or being left behind. When we look at the economic impact for the region, being left behind is not an option. We estimate that the Middle East is expected to accrue 2% of the total global benefits of artificial intelligence in 2030. This is equivalent to $320 billion.

In absolute terms, the largest gains are expected in Saudi Arabia where artificial intelligence is expected to contribute over $135.2 billion in 2030 to the economy, equivalent to 12.4% of GDP. In relative terms the UAE is expected to see the largest impact of close to 14% of 2030 GDP. The annual growth in the contribution of artificial intelligence is expected to range between 20-34% per year across the region, with the fastest growth in the UAE followed by Saudi Arabia.

The magnitude of the impact expected in these two economies is unsurprising given their relative investment in artificial intelligence technology compared to the rest of the Middle Eastern region - both countries place within the top 50 countries in the world on the Global Innovation Index 2017 in terms of their ability to innovate and the outputs of their innovation.

The development of non-oil sectors through investment in artificial intelligence technologies could strategically position the region for the years to come. The world is moving towards artificial intelligence and in these early stages of development, there is an opportunity for the region to become a key player in the global agenda.

## STATE OF PLAY

Parts of the region have already embraced artificial intelligence and the new digital age. Analysis conducted by the IDC estimates that spending on cognitive and artificial intelligence systems in the Middle East and Africa region will grow from $37.5 million in 2017 to over $100 million by 2021, representing a growth rate of 32%. The UAE, Saudi Arabia and Qatar, in particular, have demonstrated strong commitment towards the development and implementation of artificial intelligence technologies.

Businesses in these parts of the region have been investing heavily in new

Analysis conducted by the IDC estimates that spending on cognitive and artificial intelligence systems in the Middle East and Africa region will grow from $37.5 million in 2017 to over $100 million by 2021, growth rate of 32%.

technology, supported by governments as early consumers of the technology. Outside the Gulf economies, however, adoption has been slower. The differences in adoption levels are driven by differences in, for example, infrastructure and access to skilled labour, key enabling factors for artificial intelligence development.

It is important also to note that whilst the volatility in oil prices is taking its toll on the economic prospects of the region, it is creating the need for governments to seek alternative sources for revenue and growth. The development of non-oil sectors through investment in artificial intelligence technologies could strategically position the region for the years to come.

## UAE

In UAE, artificial intelligence is at the forefront of the government's strategic plans. In October 2017, the government launched its strategy for artificial intelligence, demonstrating its commitment towards the technological enhancement of the nation. Alongside this strategy, HH Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, appointed HE Omar Bin Sultan Al Olama as the first Minister of State for Artificial Intelligence. Within the UAE, Dubai is leading the way for artificial intelligence.

Artificial intelligence could contribute up to $15.7 trillion to the global economy in 2030. Of this, $6.6 trillion is likely to come from increased productivity and $9.1 trillion is likely to come from benefits to consumers.

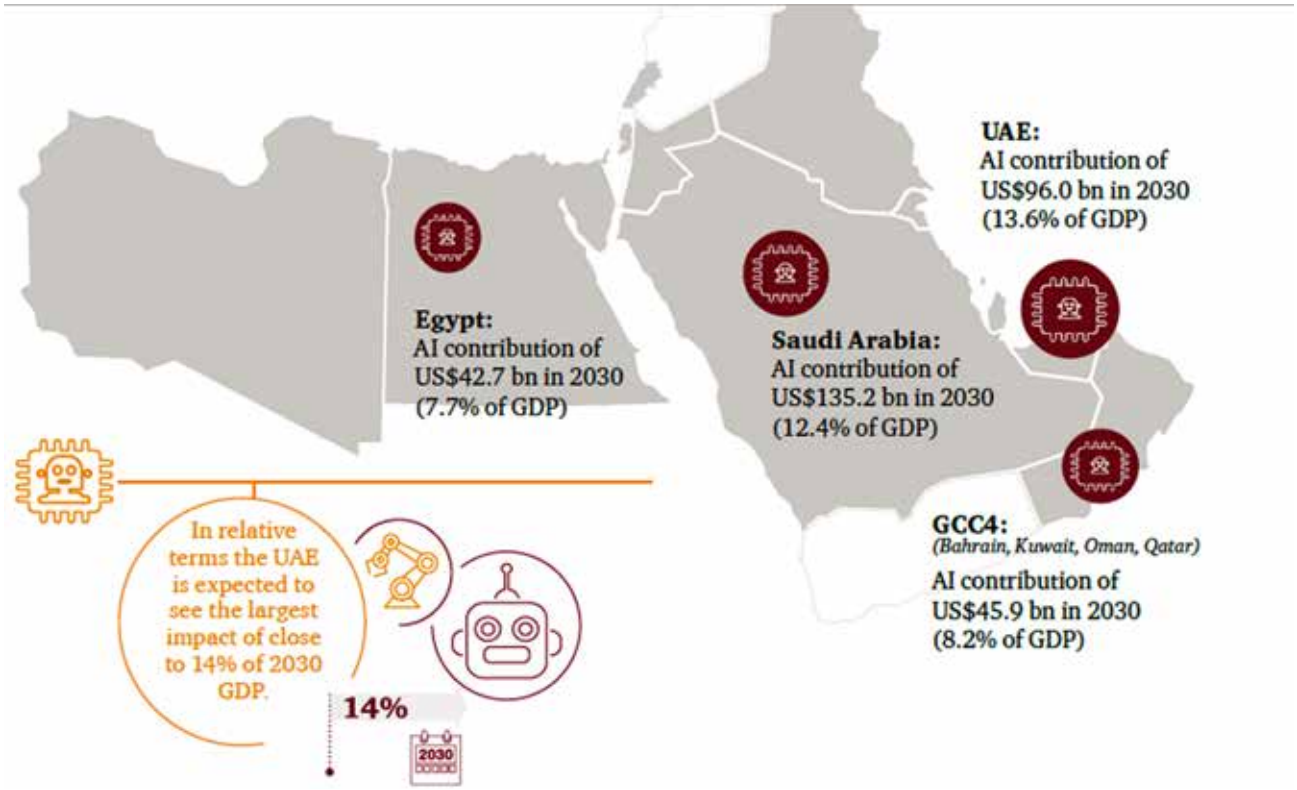
The Emirate's strategies include, amongst others:

- A Smart Dubai strategy which aims to transform the city through innovation and digital transformation, launching an artificial intelligence smart lab in 2017. This is focused on training public and private sector employees in implementing artificial intelligence in their fields.
- Dubai 3D Printing Strategy, targeted at the construction, medical and consumer sectors . This has a goal of having 25% of buildings in Dubai constructed using 3D printing technology by 2030.
- Dubai Autonomous Transportation Strategy, which aims to cut transportation costs by 44%, carbon emissions by 12% and accidents by 12% by transforming 25% of all transportation in the city to autonomous modes by 2030.

The UAE's dedicated strategy towards artificial intelligence and its initiatives to support the development of technologies places it in a strong position to develop itself as one of the leaders for artificial intelligence in the region, and quite possibly the world. The government has demonstrated its commitment towards artificial intelligence development in the country.

However, as well as investment in artificial intelligence, which it is clearly able to generate, the government will also need to create an environment which will allow the outcomes of these investments to become embedded in society. This will include, for example, preparing society and labour markets for the disruption through investing in education and skills development to allow people to adapt to the change. Similarly, legal institutions will also need to evolve to reflect the risks associated with artificial intelligence technology.

Governments have a fundamental role in setting up an environment in which all stakeholders can effectively engage in the development and adoption of artificial intelligence. Hence, the strategic focus on




Contribution to GDP.

artificial intelligence at the highest levels of government in the UAE, if properly harnessed, provides a strong foundation for artificial intelligence-led growth.

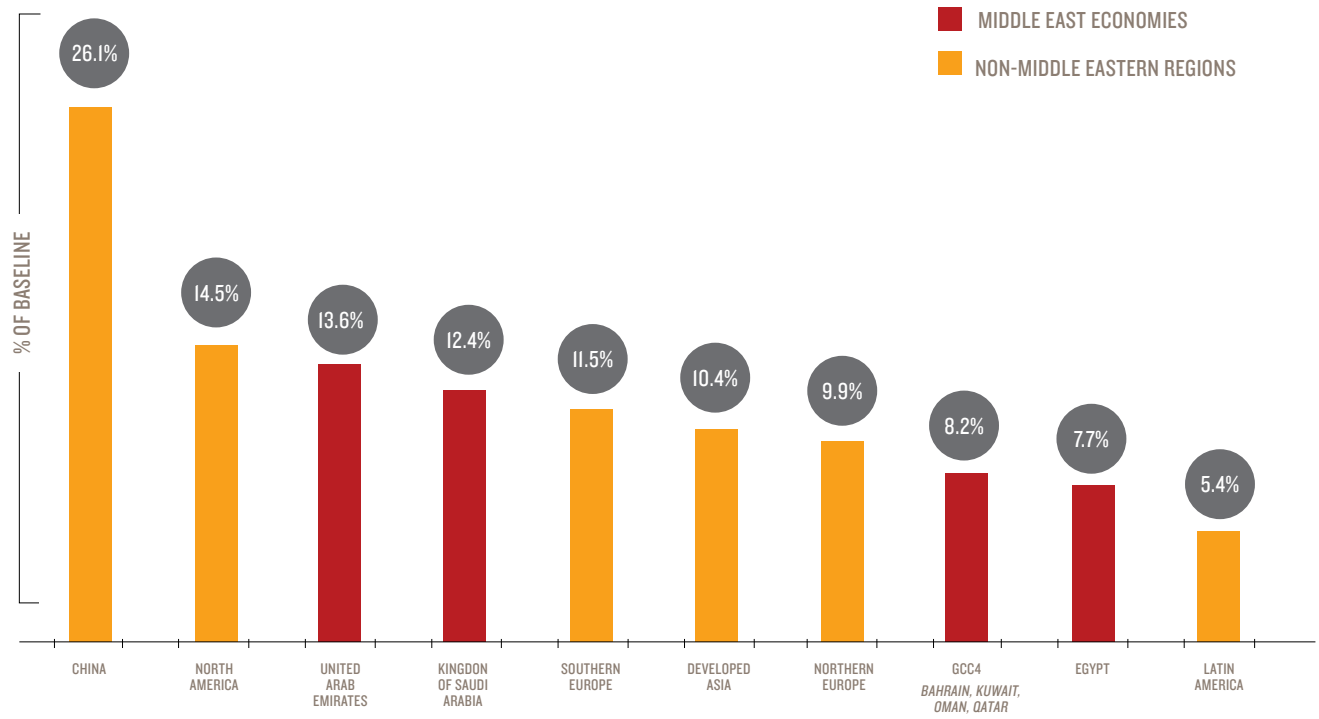
## SAUDI ARABIA

Saudi Arabia holds a clear vision for the future which points towards the development of artificial intelligence-based technologies. Saudi's Vision 2030 and National Transformation Programme 2020 identify digital transformation as a key goal to activate economic sectors, to support industries and private sector entities, to advocate for the development of public- private business models and to ultimately reduce the country's dependence on oil revenues through a diversification of the economy.

Strategic objectives as part of this vision include for example:

- To improve the efficiency and effectiveness of the healthcare sector through the use of information technology and digital transformation. To achieve this, it has set itself a target to increase the percentage of Saudi citizens who have a unified digital health record from 0 to 70% by 2020.
- To provide citizens with knowledge and skills to meet the future needs of the labour market. To achieve this, it has set itself a target to increase the percentage of Internet users in Saudi Arabia from 63.7% to 85% by 2020.

While there is some investment in artificial intelligence in Saudi Arabia, supported by a commitment by the government to digitally transform the country, investment is currently driven through domestic sources, and in particular the country's Sovereign Wealth Fund. In order to maintain momentum in the pace of technological advancement in the country, there is a need for it to attract more foreign investment which is currently constrained by the challenges in the




Contribution by industry.

business environment; in 2017, the country ranked 92 out of 190 countries in the World Bank's Ease of Doing Business index.

Addressing concerns raised by the business community will allow it to attract external investment, which will bring with it skills and expertise to upskill the local population. This will also allow it to reduce youth unemployment placing a burden on the economy, which has increased from 24.1% to 32.6% between 1991 and 2017, by generating high-skilled employment opportunities.

## MARKET SEGMENTS

The potential for artificial intelligence adoption varies by industry. Research conducted by IDC finds that the biggest opportunity for artificial intelligence in the Middle East and Africa region is in the financial sector. This is where it is estimated, 25% of all artificial intelligence investment in the region predicted for 2021, or $28.3 million, will be spent on developing artificial intelligence solutions. This is followed by the public services, including education and healthcare, and the manufacturing sector.

The potential gains at the industry level is likely to depend on two broad factors:

### ABILITY TO AUTOMATE PROCESSES

Labour-intensive sectors, such as retail and health, with greater scope for automation, are likely to see the largest initial gains from artificial intelligence. These industries are expected to see significant labour productivity benefits from artificial intelligence adoption.

### USE CASES FOR ENHANCEMENT

Sectors with compelling use cases in artificial intelligence applications are more likely to innovate in early stages of artificial intelligence development. PwC's Data Analytics team have developed an Artificial Intelligence Impact Index through conducting a

In the wake of the fourth industrial revolution, governments and businesses across the Middle East are beginning to realise the shift towards artificial intelligence and advanced technologies

qualitative assessment to estimate the scale of product enhancements we will expect to see by 2030.

The analysis assessed almost 300 use cases to identify the scope for product enhancements through personalisation, product quality, and time savings for consumers as well as scope for increased variety in products. The index indicates the highest potential for product enhancements in the health, automotive and financial services sectors.

Despite the greater potential for direct gains in specific sectors, the gains are unlikely to remain concentrated in these sectors which develop and adopt artificial intelligence technologies. As these sectors experience growth through the direct effects of artificial intelligence, their demand for inputs from other sectors of the economy will also grow.

Similarly, the increased wages associated with higher labour productivity in these sectors will also increase consumer demand in all sectors of the economy. These indirect and induced impacts of artificial intelligence are likely to be felt by firms and consumers throughout the economy and will add to the total economic impact of artificial intelligence.

As our analysis underlines, artificial intelligence has the potential to fundamentally disrupt markets in the Middle East through the creation of innovative new services and entirely new business models. We have already seen the impact of the first wave of digitisation. With the eruption of artificial intelligence, some of the market leaders in ten, even five years' time may be companies never heard of. Tomorrow's market leaders are likely to be exploring the possibilities and setting their strategies today. ■

*Adapted from potential impact of artificial intelligence in the Middle East, by Shivangi Jain, Economics Consulting, PWC.*

## FACETS OF ARTIFICIAL INTELLIGENCE

Artificial intelligence is a collective term for computer systems that can sense their environment, think, learn, and take action in response to what they are sensing and their objectives. Forms of artificial intelligence in use today include digital assistants, chatbots and machine learning amongst others.

### 1 Assisted Intelligence

Helping people to perform tasks faster and better. artificial intelligence systems that assist humans in making decisions or taking actions. Hard-wired systems that do not learn from their interactions.

### 2 Automated intelligence

Automation of manual, cognitive and routine, non-routine tasks. Automation of manual and cognitive tasks that are either routine or non-routine. This does not involve new ways of doing things – it automates existing tasks.

### 3 Augmented Intelligence

Helping people to make better decisions. artificial intelligence systems that augment human decision making and continuously learn from their interactions with humans and the environment.

### 4 Autonomous Intelligence

Automating decision making processes without human intervention. Artificial intelligence systems that can adapt to different situations and can act autonomously without human assistance.

# HOW SECURE ARE YOUR ORGANISATION'S IIoT END-POINTS

2018 SANS IIoT Security Survey reveals there is confusion across management and operations over who is responsible for security of IoT and IIoT end points.

The world is evolving toward a future that is built upon smart systems composed of disparate types of things including cyber, physical systems, embedded systems, industrial control systems, connected medical devices, connected cars and smart everything, and this trend cannot be stopped. However, to realise this future, industries must properly integrate the connected, software-enabled, real-world interactive types of devices and systems that we call the Industrial Internet of Things IIoT, into a cohesive system.

Unfortunately, along with the promise of greater technical capabilities and business opportunities comes increased complexity, and in turn, a higher vulnerability to cyber security threats that may upset the entire applecart.

The digital transformation of industry, infrastructure and cities has clearly begun. Whether it's called Industrial Internet of Things, Industry 4.0 or digitalisation, companies are developing new business improvement strategies based on analytics, artificial intelligence and machine learning.

These efforts are widespread and far-reaching. They will affect every critical activity including operations, maintenance and engineering. Information technology, operational technology and engineering technology will all be affected by the explosion in sensors, new networking solutions and architectural changes.

The term Internet of Things IoT, broadly refers to the connection of devices—other than the typical computational platforms to the Internet. IoT encompasses the universe of connected physical devices, vehicles, home appliances and consumer electronics—essentially any object with embedded electronics, software, sensors, actuators and communications capabilities—that enable it to connect and exchange data.

Within this universe, Industrial IoT focuses specifically on industrial applications that are often associated with critical infrastructure, including electricity, manufacturing, oil and gas, agriculture, mining, water, transportation and healthcare.

Smart organisations understand the urgency of building a cybersecurity plan that supports

What organisations must not fail to do is to understand and evaluate the security implications of IIoT, as the effects of poor IIoT security could be far reaching

NED BALTAGI

*Managing Director, Middle East and Africa at SANS*

these programmes. New strategies need to be in place before business leaders demand widespread deployment. Expecting them to wait for security is naïve; the cost and performance benefits are simply too large to ignore, and competition is forcing rapid adoption. These IIoT efforts will invariably lead to violations of implicit cyber security assumptions, including well-defined perimeters and architectures, which need to be addressed.

Predictive maintenance and operational improvements are the primary focus of most of their IIoT efforts. Both involve broad-based connection of existing and new plant sensors with cloud-based solutions and service providers. Cloud connectivity is a concern, but most companies believe they can deal with this through network segmentation and isolation of control networks. The security of new endpoints is clearly more troublesome. Few organisations believe they can rely on the sensors' original equipment manufacturers in this emerging market to provide secure devices.

Lack of control over development processes and complex supply chains aggravates end user concerns. Managing endpoint security updates and patches is another daunting challenge. Plant staffs are already overwhelmed with security

**KEY FINDINGS**

32%

*OF IIOT DEVICES CONNECT DIRECTLY TO THE INTERNET, BYPASSING SECURITY LAYERS*

The discrepancy in defining IIoT endpoints is the basis for some of the confusion surrounding responsibility for IIoT security

DOUG WYLIE

*Director of Industrials and Infrastructure Business Portfolio, SANS Institute.*

hygiene tasks for existing assets. There is no bandwidth for coordinating security patches from a multitude of different OEMs. Likewise, few plants have the kind of secure remote access needed to enable direct management by the OEMs. Not surprisingly, these endpoint security concerns are driving increased support for standards groups.

This growth will continue. Most organisations in this survey envision a 10 to 25% growth in their connected devices for the foreseeable future, a growth rate that will cause the systems to which IIoT devices connect to double in size roughly every three to seven years. In its 2017 Roundup of Internet of Things Forecasts, Forbes reports that the installed base of IoT devices is forecast to triple in the next seven years, with manufacturing accounting for 84% of this growth in the past year.

IPv6 can enable the needed expansion of the Internet's address space to accommodate this growth, but business drivers also demand corresponding advancements into increased visibility, efficiency, security and control over these connected assets.

## SECURING END-POINTS

The security of the IIoT endpoints is the leading concern for respondents to the 2018 SANS IIoT Security Survey, with network security controls and countermeasures currently being the main enablers of IIoT security. Most of the growth for connected devices is expected to be for those used for monitoring, status, alarms and alerting, as well as predictive maintenance, but over 50% of respondents are still using their devices for directly controlling operations and processes.

As IIoT moves industrial operations increasingly toward distributed, online processes, increased visibility at the endpoint needs to supplement today's reliance on the collection and analysis of network traffic and security events for incident response and remediation.

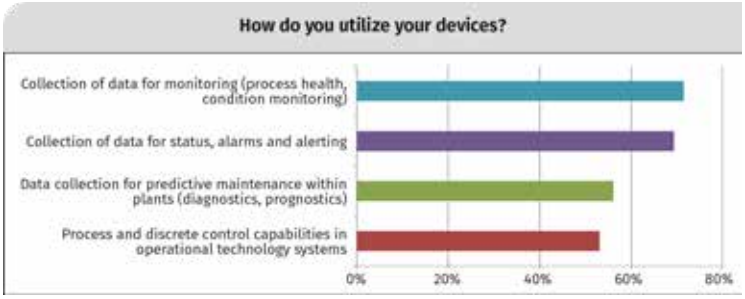
Securing an organisation's IIoT infrastructure requires understanding the threats and risks to be faced. According to the survey data, over the next two years, the leading threats pertain to IIoT life-cycle management issues and human error, while the top reported risk is related to security considerations in product and system installation, configuration, service, support and maintenance.

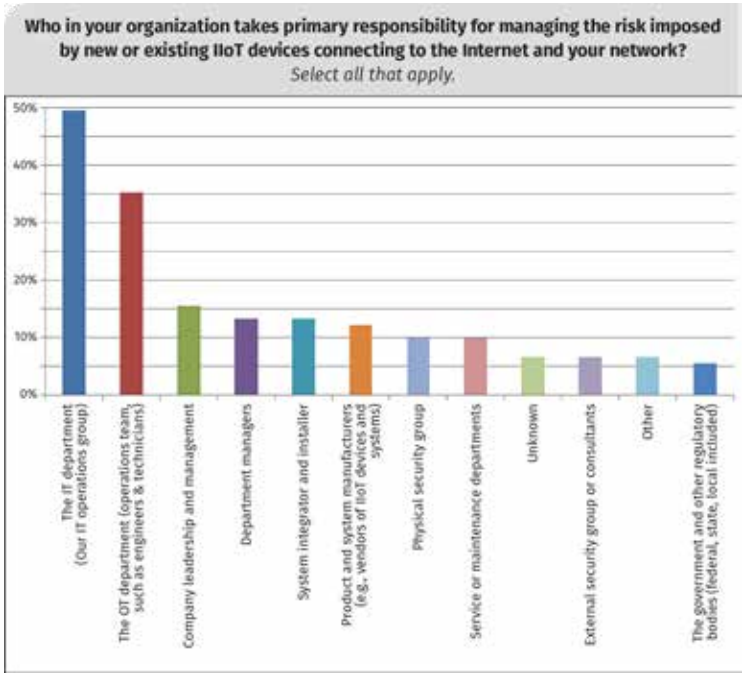
One way to interpret this is that attackers will capitalise on vulnerabilities inherent in the products, or weaknesses introduced by those responsible for building, operating and maintaining the systems where these devices are in use, not unlike what we see in other network systems. In most industrial settings, when organisations

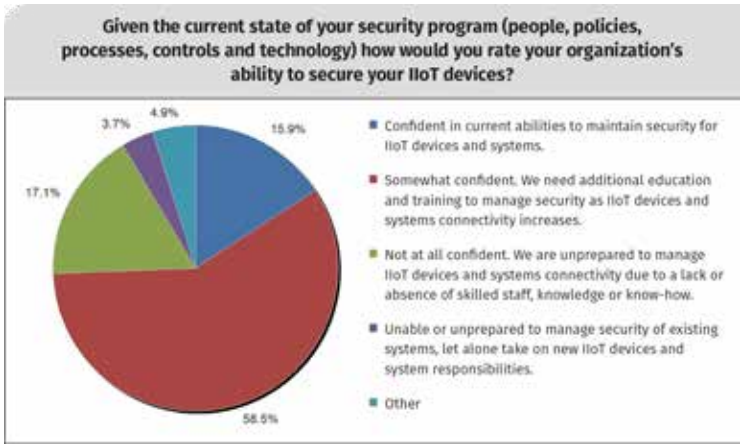
**KEY FINDINGS**

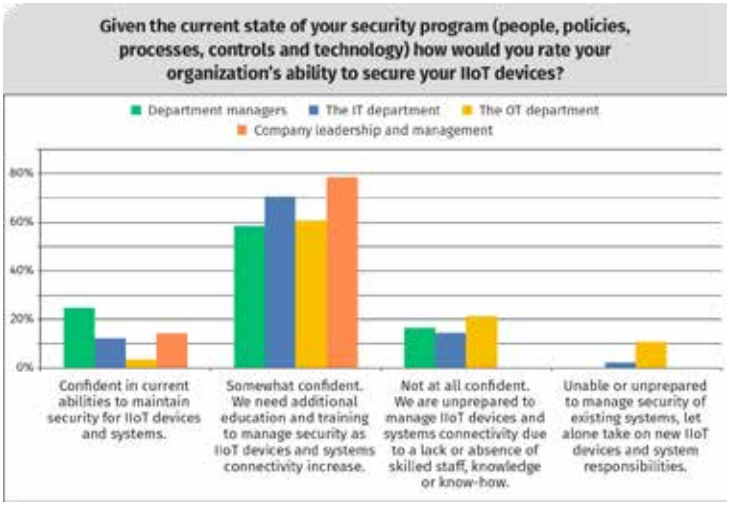
56%

*CITED DIFFICULTY IN PATCHING AS ONE OF GREATEST SECURITY CHALLENGES*






need to make a choice between ongoing operations and security, it is rare for security to take priority.

Confidence in how well organisations are able to secure their IIoT environments, however, depends on who has been assigned to manage IIoT risk. The closer someone is to the IIoT systems, the greater the recognition of a challenging reality. The individuals probably the most knowledgeable about IIoT implementation, the OT team, appear the least confident in their organisation's ability to secure these devices, while company leadership and management, including department managers, appear the most assured.

Convergence in IIoT is not just about technology, it is about who manages the risk and defines the budget. For many, such organisational disparities make security budgeting, staffing and training decisions all the more difficult to execute. The split that often separates IT and OT perspectives on setting proper priorities among availability, integrity, confidentiality and safety objectives is sometimes dwarfed by an unintentional chasm between company leadership and operations.

As IT, OT operational convergence starts to overcome differences, even today, it is not unusual for other differences in language, risk tolerance and perceptions of the threat landscape to show themselves when comparing the proverbial top floor and shop floor of many of today's companies.

## HOW MANY END-POINTS

IIoT is accelerating, since both the near-term and long-term benefits for its adoption are clear. IIoT solutions can help reduce costs and increase productivity, reflected by tangible ROI. For example, predictive maintenance is now a reality facilitated through the use of intelligence and often highly specialised sensors that collect better data faster on machines and apply math, data analytics and machine learning to determine exactly when a machine will need maintenance.

Today, the traditional industrial control system must embrace the idea that the control system perimeter can extend beyond the traditional security

boundaries to often include some means of connectivity to the Internet. IIoT reference architectures must reflect these expanded operational borders, while also accounting for a secure and trustworthy integrated data network and ensuring that endpoints are both trusted and protected.

Surprisingly, the majority 40% of respondents have fewer than 100 connected devices. Having fewer than 100 connected devices should not necessarily be construed as having a small set of endpoints. The definition of an IIoT endpoint and its relationship to an IIoT device remain hotly debated topics.

A device manufacturer may consider the single, embedded sensor or actuator as the IIoT endpoint, while a system integrator may define that endpoint as a collection of such devices serving a particular function within a larger subsystem. The asset owner may consider an endpoint as a more complex system that is masked behind a gateway or edge device, such as a wind turbine or cooling tower.

Given this range in the definition of an IIoT endpoint and the somewhat confusing relationship to a device, the actual number of IIoT devices may be understated here, pointing out the need for asset management—knowing what you have and how it is configured—and its importance in maintaining a secure infrastructure. It is hard to protect what you do not know about!

Endpoints are everywhere in an IIoT landscape, whether making a direct or indirect connection. An endpoint should be characterised specific to the IIoT system of which it is a part, especially if the endpoint requires configuration or programming based on its intended use in the system. This is essential to develop appropriate protective mechanisms against known and, in some cases, unknown attack vectors.

The connection method and cabling may provide a clue as to whether this is the case. Physically wiring these connections can be expensive due to installation costs and network upgrades. Portions of systems may be difficult to reach, in an environmentally unfriendly location, or be part of moving or rotating equipment—making wired connections impractical or impossible.

KEY FINDINGS

40%

*REPORTED APPLYING PATCHES TO PROTECT IIoT DEVICES*

The report highlights a real disparity across organisations in the level of confidence as to how secure IIoT really is

BARBARA FILKINS

*SANS Analyst Programme Research Director and survey report author.*

Here, wireless can be a cost-effective, if not the only, viable connection method, especially if the devices are not considered mission critical. Comparing device utilisation with the connection method does show that the use of Wi-Fi and cellular connections is higher for monitoring and status than for predictive maintenance and process control, suggesting that this may be a trend being followed by the respondents and a direct result of the practical and technical limitations of wired connections.

## ACTION PLAN AROUND END-POINTS

Critical systems must operate tirelessly as well as economically. IIoT-engineered solutions are being embraced because they promise to help stakeholders better meet operational objectives and facilitate improvements to system safety, reliability, resilience and privacy—all key factors in what the Industrial Internet Consortium calls the trustworthiness of systems. These elements make IIoT solutions compelling, leading to greater and faster adoption rates across industries.

## Beefing up IIoT security

While the IIoT community grapples with the operational constraints imposed by the inconsistent state of its technology as implemented by the growing assortment of device vendors, what can organisations do to improve their IIoT security?

The results of this survey suggest that organisations should:

- Evaluate and vet product and services vendors, suppliers, consultants, contractors and service personnel for basic security skills and ensure that security responsibility is well understood and maintained.
- Challenge any and all IIoT providers to demonstrate clear indicators of security quality and maturity in the solutions they provide, including evidence and artifacts of continuous improvement to the security posture of a product and system.
- Establish clear and open lines of communication within the supply chain to ensure proactive, two-way information exchange relating to matters that can affect risks to IIoT systems.
- Strengthen their life-cycle management procedures, especially for asset inventory and management, configuration management, and change management to address the complexities of IIoT.
- Review their internal and external approach to both network engineering and network security. IIoT depends on the network to enforce security at the endpoint and across the system.
- Organisations need to determine the maturity of their security as measured by the use of good design practices, such as segmentation and separation and by operational procedures, such as monitoring and access control.
- Harmonise the viewpoints of IT and OT teams and any third-party remote product and service providers, especially as related to IIoT security requirements, threats and risks. IIoT will eventually narrow the cultural gaps that normally exist between IT and OT.
- Both IT and OT need to understand the risks imposed by new or existing IIoT devices connecting to the Internet and the corporate network. And, both need to know how to track and manage these risks as a team.
- Converge internal stakeholder views concerning IIoT business drivers, language and perspectives of what constitutes cyber risk and establish a uniform set of funded priorities across corporate leadership, management, and IT and OT teams.

Today, an investment in IIoT offers improved productivity, increased performance and efficiency for greater intelligence and enhanced visibility into operations—but at what risk? The need to maintain a clear focus on business risks cannot be overstated as IIoT initiatives race ahead faster than asset owners and operators can react.

Organisations need a road map that can guide stakeholders—users, integrators and vendors, asset owners and operators—in blending together formal definitions, data standards, common protocols, connectivity requirements and best practices to achieve the interoperability needed to have IIoT systems work together securely. The confusion over what constitutes an endpoint is just one example of why a framework specific to IIoT is needed.

IIoT has blurred traditional IT and OT infrastructure boundaries and their historically crisp edges and perimeters. These models and standards are limited in their ability to provide adequate guidance for segmenting and safeguarding contemporary systems because none account for the borderless automation and control system architectures that IIoT has brought to industry.

Today's OT connections and interdependencies not only connect to the Internet, but for true IIoT solutions, they rely on it as a conduit to reach enabling Internet-based services. Multivendor interoperability issues also hamper adequate visibility into the security posture of IIoT devices and systems.

Many devices do not conform to consistent standards, such as communication protocols, enabled or disabled services, or methods for configuration, all of which make engineering, security, and management across these endpoints and the overall system difficult. OT-specific applications provide diagnostic and prognostic information that could flag abnormal activities for action, while IT- oriented network-level tools do not typically use such information. ■

*Excerpted from, The 2018 SANS Industrial IoT Security Survey.*

# Businesses preferring open source to build their IoT applications, Red Hat survey

From refrigerators to doorbells, any device with power can be made intelligent and every day, millions of new connected devices are entering the market. According to IDC, worldwide Internet of Things IoT spending is projected to surpass $1 trillion in 2020, with a forecast compound annual growth of over 14% over the next several years.

With the development of IoT solutions rapidly accelerating, enterprises are actively investing in technology and tools that can develop, deploy and manage these IoT products and services.

To better understand what technology is being used when it comes to the development of IoT solutions, Red Hat commissioned RTInsights to survey 253 IT decision makers at large and very large enterprises. To participate in the survey, the enterprises must either currently be developing IoT solutions or are planning to develop them in the next 12-18 months.

In particular, the survey looked at how IoT application development differed from conventional application development, the most important capabilities when developing IoT solutions, and the relationship between open source tools and the development of IoT solutions.

One of the first questions asked was, what are the most important differences between IoT and conventional application development.

The top answers included:

- The importance of developing solutions that are inherently reliable and scalable 51%
- The importance of standards to address data and app compatibility and longevity 48%
- The large number of intelligent edge devices and sensors 45%
- The importance of addressing data and application security 41%

By determining how the two processes differ, we can better determine what is needed to be successful in developing IoT solutions. It is no surprise that solutions that are reliable and scalable topped the list given the penchant of IoT solutions to both produce and consume high volumes of data.

Over the past decade, open source software has become a de facto choice for application development and deployment in the enterprise. According to the survey results, open source tools are the preferred method for developing IoT solutions as well.

Among enterprises who are currently developing IoT solutions, 39% of respondents favor open source tools over proprietary options. However, when the question was asked of organisations that classify themselves as IoT leaders, that number was higher, with 43% of respondents relying on open source for their IoT solution development. And those enterprises that primarily use open source tools for IoT solution development classify themselves as IoT leaders 50% more often than enterprises that primarily use proprietary tools.

When we consider the key requirements for developing IoT solutions, the support around open source solutions does not come as a surprise. Enterprises developing IoT solutions must be ready to address scale, reliability, complexity, and volume requirements, all characteristics that open source embodies.

Open source software is pervasive in the enterprise and this survey highlights an opportunity for open source technology to further support organisations as they begin to integrate IoT solutions into their IT architecture. ■

## KEY TAKEAWAYS

- According to the survey results, open source tools are the preferred method for developing IoT solutions.
- Among enterprises who are currently developing IoT solutions, 39% of respondents favor open source tools over proprietary options.
- When the question was asked of organisations that classify themselves as IoT leaders, that number was higher, with 43% of respondents relying on open source for their IoT solution development.
- When we consider the key requirements for developing IoT solutions, the support around open source solutions does not come as a surprise.

# THE CHANGE TO FUTURISTIC BUSINESS

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# BUSINESSES TRANSFORMATION DRIVING CYBERSECURITY REVAMP

Large changes in how business processes function in digital organisations is also impacting the cybersecurity function explains, Patrick Grillo at Fortinet.

*PATRICK GRILLO*
*Senior Director, Solutions Marketing, Fortinet*

You do not have to be a wild-eyed futurist to recognise that digital technologies are fundamentally transforming economic and business processes in every corner of the global economy. To define digital transformation in economic terms, it means integration of digital technology into all areas of a business, resulting in fundamental changes to how businesses operate and how they deliver value to customers

While businesses have employed computing technology since the early 1950s, the role of technology has changed from supporting business processes to becoming an essential element of a business' customer value proposition.

While the digital-transformation wave appears to be sweeping away everything that stands before it, cybersecurity worries have emerged as a significant obstacle to the transformation process. At this phase of the global digital transformation, four areas stand out as particularly acute cybersecurity pain points:

## CLOUD AND VIRTUALISED COMPUTING

Virtualised and cloud computing are inherently dynamic phenomena, with firms adding, dropping, and moving various cloud services, data, and architectures at will. It never seems clear who is responsible for securing cloud-based services, and many public cloud computing operations take place in countries with less than robust legal and ethical standards regarding data protection, consequences for malicious hacking, or enforceable vendor responsibilities. Despite the fluidity of cloud computing, many processes and resources remain siloed from each other.

## INTERNET OF THINGS

The legions of Internet of Things devices being deployed in today's networks are expected to almost double between 2018 and 2020, rising from 11.2 billion to 20 billion. IoT risks fall into two areas. First, they tend to possess rock-bottom levels of memory and processing power, making them difficult to secure and protect. Second, companies often deploy them with the sinking feeling that the IoT devices monitoring or collectively controlling their mission-critical industrial infrastructure are vulnerable to attack.

## THREAT LANDSCAPE

The problem is that new threats do not just come and go. Legacy threats often remain in circulation for many years, constantly being recycled by malefactors who tweak them to avoid detection by defenses that may have previously stopped them. Organisations that

## KEY TAKEAWAYS

- Since security risks have emerged as the biggest obstacle to digital transformation, it follows that cybersecurity must also undergo a similar transformation.
- Security transformation demands integration of security into all areas of digital technology.
- There are now fundamental changes to how security is architected, deployed, operated.
- Majority of organisations are not large enough to fund threat intelligence on their own and tap into community threat intelligence resources.
- Security solutions must easily exchange information with each other and not add complexity to an infrastructure that expands its attack surface.

concentrate their security programs on what happens within their perimeter often remain unaware of what is going on in the global threat environment until it shows up on or inside their doorstep.

## REGULATORY PRESSURE

The European Union's General Data Protection Regulation is having a significant impact on businesses based in the EU as well as others around the globe. GDPR really is not about technology, but about the rights and responsibilities of firms and customers engaging each other via digitally enabled business processes. The coming of GDPR also looks like the first of many new regulatory initiatives aimed at curbing real or imagined risks and abuses perpetrated via digitally transformed business practices.

Since security risks have emerged as the biggest obstacle to digital transformation, it follows that cybersecurity must also undergo a similar transformation. To this end, security transformation demands the integration of security into all areas of digital technology. This results in fundamental changes to how security is architected, deployed, and operated.

This vision of security transformation consists of various elements:

### AGILE CYBERSECURITY

This attribute is about agility and timeliness for cybersecurity programs. Proactively, this means that a security system should be able to automatically prioritise the identification and protection of an organisation's crown jewels even in a dynamic and elastic digital infrastructure. This requires driving consistent visibility and control deep into every area and ecosystem of the digital network, from access control to micro-segmentation of even temporary virtual devices.

### THREAT INTELLIGENCE

Think of this as over-the-horizon radar about new and recycled threats potentially heading in your direction, combined with practical information on how to detect and defeat them. Since the vast majority of organisations are not large enough to fund comprehensive threat intelligence operations on their own, almost every cybersecurity team taps into one or more proprietary or community-based threat intelligence resources. Yet, this can bring its own challenges. Monitoring multiple threat intelligence sources requires strong abilities to distinguish between relevant and trivial developments in the threat environment.

### OPEN SOLUTIONS

Under ideal circumstances, multi-vendor security solutions must exchange information with each other, be programmed and directed through a common language, be visible and controllable through a single pane of glass, and not add complexity to an infrastructure that expands its attack surface.

The question boils down to several variations including:

- How to enable an organisation's digital transformation through efficient and effective security transformation
- How to deliver security transformation against a budget
- How to keep the solution effective as both transformational information technologies and a cybersecurity threat environment continue their blistering pace of change

It also must address key security transformation criteria, including right protection in the right place throughout the network, an integrated threat intelligence ecosystem, and controlled openness for greater protection and flexibility. ■

# THE ELUSIVE BUSINESS CASE FOR ARTIFICIAL INTELLIGENCE

Business cases for artificial intelligence need to be built carefully from existing business requirements using trial and success explains Moutusi Sau at Gartner.

*MOUTUSI SAU*
*Principal Research Analyst at Gartner.*

There is huge enterprise-level interest in artificial intelligence projects and their potential to fundamentally change the dynamics of business value. However, most artificial intelligence technologies are nascent at best. According to a recent Gartner survey, 37% of organisations are still looking to define their artificial intelligence strategies, while 35% are struggling to identify suitable use cases.

The mindset shift required for artificial intelligence can lead to cultural anxiety because it calls for a deep change in behaviors and ways of thinking. This is clearly problematic when, in order to secure the necessary investment for artificial intelligence projects, CIOs must put forward a solid business case.

Part of the issue is that there is no such thing as an artificial intelligence business case. Instead, the business case will be for a particular business scenario, problem or use case that employs artificial intelligence methods and techniques as part of the overall solution.

Focus on answering these four questions when you want to define an artificial intelligence project:

1 Why are you doing this project?

2 For whom are you trying to deliver this solution?

3 What solution and technology framework will you employ?

4 How will you deliver this project?

Business cases for artificial intelligence projects are complex to develop as the costs and benefits are harder to predict than for most other IT projects. Challenges particular to artificial intelligence projects include additional layers of complexity, opaqueness and unpredictability that just are not found in other standard technology.

To build a successful business case for artificial intelligence projects, CIOs need to articulate and address the specific factors around how artificial intelligence projects differ from other IT solutions.

## COSTLY WITHOUT PROVIDING IMMEDIATE GAIN

Building a business case includes analysing the expected benefits and costs associated with a project. However, in the case of artificial intelligence, the answer is unlikely to be straightforward.

Artificial intelligence projects can appear costly without any immediate gains — particularly for loosely bound scenarios and in organisations that are not used to setting aside budgets to develop and deploy solutions for new business scenarios.

The return values from the project are closely intertwined with the aspirational value that the organisation is seeking. Past examples of significant and successful investments in artificial intelligence show that organisations ahead of the curve in digital transformation have an advantage with artificial intelligence. Organisations must have a serious strategy around investment in artificial intelligence projects, along with strong management support.

Amazon's acquisition of Kiva Systems, for example, shows how the use of robots in its warehouse automation provided competitive advantage. It is no accident that companies now reaping the benefits of artificial intelligence invested long before their competitors.

An adaptive approach is required here. Do not be afraid to be upfront about expected costs and set expectations that they might change significantly as the solution scope is explored and refined. By the same token, there also needs to be readiness to close down experimental artificial intelligence projects where no clear benefit is emerging from the early stages.

BUSINESS CASES FOR ARTIFICIAL INTELLIGENCE PROJECTS ARE COMPLEX TO DEVELOP AS THE COSTS AND BENEFITS ARE HARDER TO PREDICT THAN FOR MOST OTHER IT PROJECTS.

## SUBSTANTIAL CULTURAL CHANGE

For most enterprises, the mindset shift required for artificial intelligence can lead to cultural anxiety because it calls for a deep change in behaviors and ways of thinking. CIOs should acknowledge the cultural changes, be proactive in managing related challenges and build trust over time. Cultural change and successful transitions to new roles and practices are dependent on open dialogue and mutual respect among IT members and between management and staff.

## DIFFERENT TECHNOLOGY AND SKILLS

The biggest pain point that emerged from Gartner's 2018 CIO survey was the lack of specialised skills in artificial intelligence, with 47% of CIOs reporting that they needed new skills for artificial intelligence projects. As such, talent acquisition is likely to be one of the biggest barriers to artificial intelligence adoption going forward.

While long-term strategies should include how to leverage academic communities and open-source technologies to ease the lack of resources, the immediate priority is working out what needs to happen now.

Leveraging and training existing resources — particularly on data science tools — will be a key strategy. Lessons learned from initial pilots will also help CIOs decide to whether they will ultimately build, buy or outsource future projects. ■

## KEY TAKEAWAYS

- There is no such thing as an artificial intelligence business case.
- The mindset shift required for artificial intelligence can lead to cultural anxiety.
- Challenges particular to artificial intelligence projects include layers of complexity, opaqueness and unpredictability.
- 37% of organisations are still looking to define their artificial intelligence strategies, while 35% are struggling to identify suitable use cases.
- The business case will be for a particular business scenario that employs artificial intelligence methods and techniques as part of the overall solution.

# GENERATING INTELLIGENCE FROM THE EDGE OF NETWORK

Deluge of data collected by sensors at the edge of networks will allow business to receive on the ground analytics, explains Gartner's Santhosh Rao.

*SANTHOSH RAO*
*Research Director, Gartner.*

## KEY TAKEAWAYS

- Gartner defines edge computing as solutions that facilitate data processing near the source of data generation.
- Organisations embarked on a digital journey have realised a more decentralised approach is required to address business requirements.
- As the volume of data increases, so too does inefficiency of streaming information to a cloud for processing.
- Edge computing serves as the decentralised extension of the cloud.
- Currently, 10% of enterprise data is processed outside a data center or cloud. By 2022, Gartner predicts this figure will reach 50%.

Many digital business projects create data that can be processed more efficiently when the computing power is close to the person generating it. Edge computing solutions address this need for localised computing power. IT infrastructure and operations leaders tasked with managing these solutions should understand the associated business value and risks.

Gartner defines edge computing as solutions that facilitate data processing at or near the source of data generation. Organisations that have embarked on a digital business journey have realised that a more decentralised approach is required to address digital business infrastructure requirements.

As the volume and velocity of data increases, so too does the inefficiency of streaming all this information to a cloud or data center for processing. Edge computing serves as the decentralised extension of the campus networks, cellular networks, data center networks or the cloud.

Currently, around 10% of enterprise-generated data is created and processed outside a traditional centralised data center or cloud. By 2022, Gartner predicts this figure will reach 50%.

Edge computing solutions can take many forms. They can be mobile in a vehicle or smartphone, for example. Alternatively, they can be static — such as when part of a building management solution, manufacturing plant or offshore oil rig. Or they can be a mixture of the two, such as in hospitals or other medical settings.

A wearable health monitor is an example of a basic edge solution. It can locally analyse data like heart rate or sleep patterns and provide recommendations without a frequent need to connect to the cloud. More complex edge computing solutions usually involve gateways.

More complex still are edge servers, such as those that are part of next-generation 5G mobile communication network architectures. Servers deployed in 5G cellular base stations will host applications and cache content for local subscribers, without having to send traffic through a congested backbone network.

In especially complex applications, edge servers can form clusters or micro data centers where more computing power is needed locally. Examples can be found in offshore oil rigs and retail outlets.

As with all rapidly evolving technologies, evaluating, deploying and operating edge computing solutions has its risks. Risks come in many forms, but a key one relates to security. Using edge computing particularly for IoT, exponentially increases the surface area for attacks.

Another concern is that the cost of deploying and managing an edge computing environment can easily exceed the project's financial benefits. Moreover, projects can become victims of their own success — scalability can become a serious issue as IoT endpoints proliferate.

Edge computing has enormous potential to enable digital initiatives supported by IoT, but leaders need to tread carefully. ■

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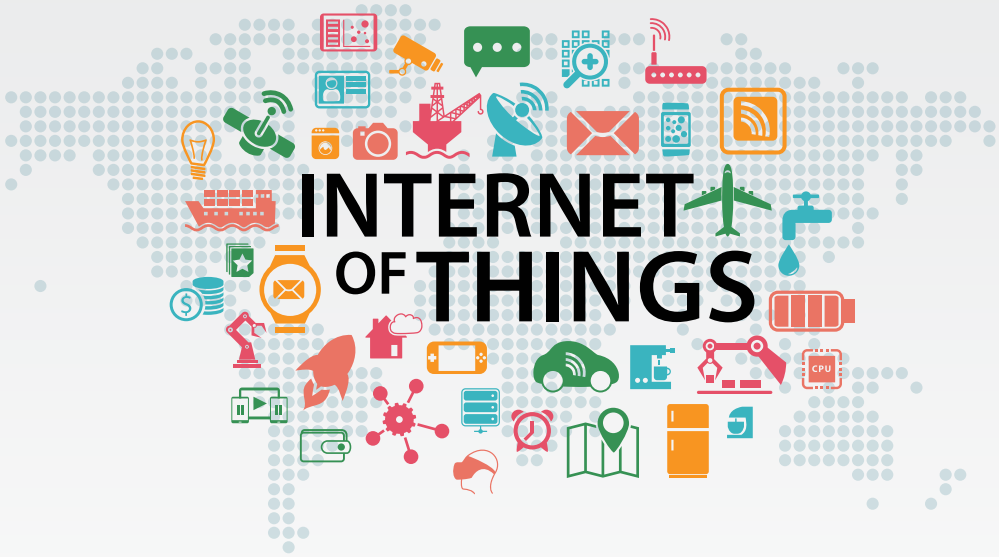
# IDC Worldwide Semiannual IoT Spending Guide




Middle East & Africa (MEA) IoT Market to Reach

**$12.6 Billion by 2021**

IDC forecasts spending on IoT in MEA to grow at a CAGR of 19.3% over the 2016–2021 period.

## Top five industries to account for 57.4% of MEA IoT spending in 2021

- **15.8%** Manufacturing
- **15.8%** Cross Industries*
- **9.9%** Transportation
- **9.6%** Consumer**
- **9.4%** Utilities

* **Cross Industries includes:** Connected Vehicles, Smart Buildings, and Staff Identification

** **Consumer includes:** Personal Wellness and Smart Homes

SOURCE: IDC MEA

## Top five use cases as a proportion of total MEA IoT spending in 2021

**8.4%** Smart Grid

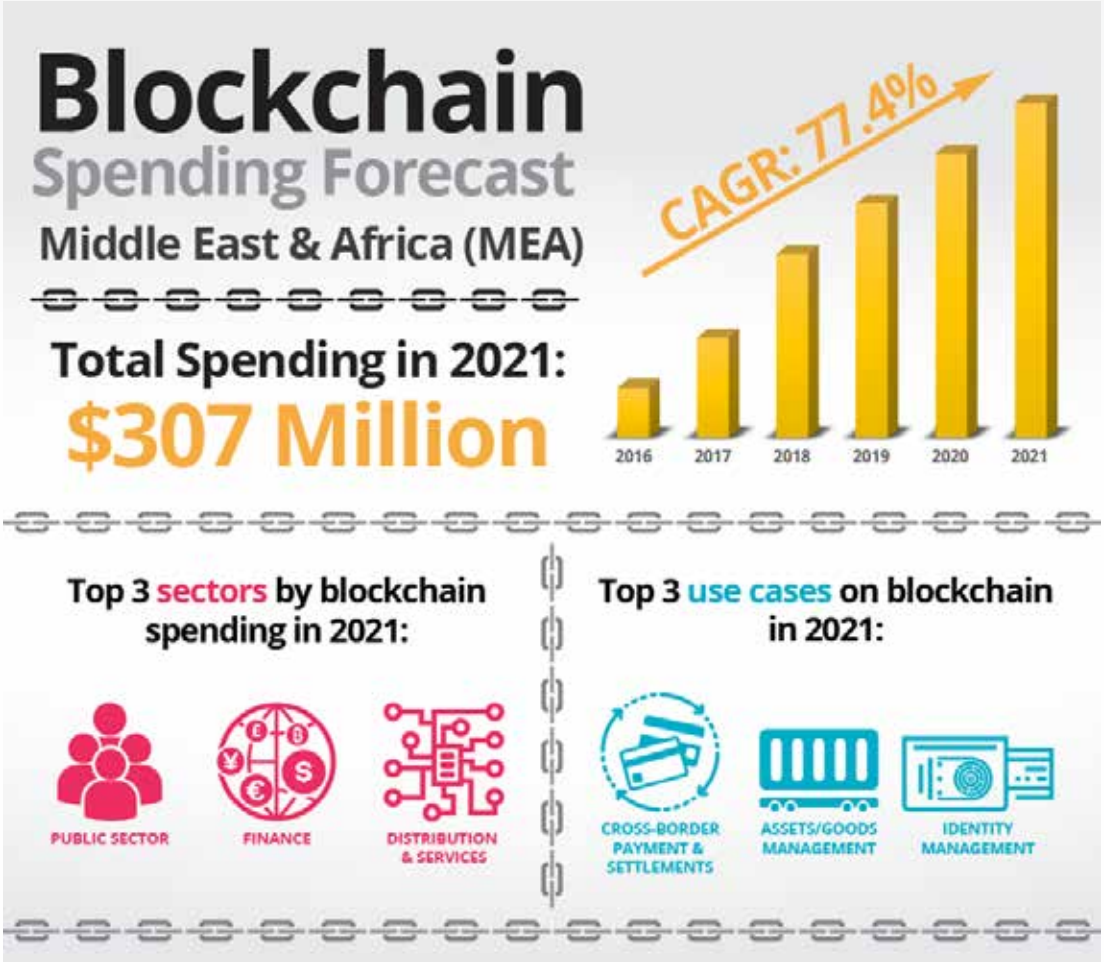
**8.1%** Manufacturing Operations

**6.7%** Smart Buildings

**5.9%** Freight Monitoring

**5.7%** Smart Home

The *'IDC Worldwide Semiannual IoT Spending Guide'* tracks up to 55 use cases across 20 industries and 51 countries




SOURCE: IDC MEA

# GEC OPEN

## DUBAI CORPORATE GOLF WORLD CUP

AMATEUR SERIES

AUSTRALIA
AZERBAIJAN
BAHRAIN
BOTSWANA
CANADA
CHINA
EGYPT
FRANCE
GHANA
INDIA
INDONESIA
ITALY
KAZAKHSTAN
KENYA
MALAYSIA
MAURITIUS
NEW ZEALAND
NEPAL
NIGERIA
OMAN
RUSSIA
SAUDI ARABIA
SCOTLAND
SINGAPORE
SRI LANKA
SPAIN
SOUTH AFRICA
SWITZERLAND
THAILAND
TURKEY
UAE
UNITED KINGDOM
US
ZIMBABWE

**34**
PARTICIPATING COUNTRIES

**50**
QUALIFYING ROUNDS

**3,700**
C-LEVEL EXECUTIVES

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CONTACT:
ronak@gecmediagroup.com, vineet@gecmediagroup.com, bharat@gecmediagroup.com