NAVIGATING THE 4TH INDUSTRIAL REVOLUTION

FOURTH LEAP

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INSIDE

ECONOMIC RECOVERY THROUGH INNOVATION: MALAYSIA'S EMERGING ECOSYSTEM BATTLES BACK

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"While there is no shortage of technology, one must be reminded to not operate in silos, which hurts collaboration and stymie efforts to drive competitiveness."

AS the year draws to a close, we look back in retrospect at some of our accomplishments in the midst of the Pandemic. In the past months, Malaysia has emerged as one of the top countries in the region with the fastest-growing digital economy. This journey, while fraught with obstacles, has been quite a successful one as we toil to cement our position as the "Heart of Digital ASEAN".

In a bid to uplift the nation to become the digital powerhouse and birth champions to lead the digital revolution, many key players have linked arms to drive change; each, aligning goals and purposes towards the Shared Prosperity Vision 2030. With more people-focused and value-based initiatives, the end-goal is slowly but surely emerging in the line of sight.

In terms of business continuity, 2021 will challenge many to remain steadfast and resilient. With the new Budget 2021 and its key focus on resiliency and business continuity – with a heavy emphasis on digitalisation – there is some light at the end of the proverbial tunnel. However, remaining competitive and trying to stay afloat are two separate yet equally daunting tasks.

As employees return to the office, and some, remain working from home, technology stands at the centre of it all and takes on a more major role in our lives. These "contactless" practices demand a technological bridge to solve the absence of physical interaction. While there is no shortage of technology, one must be reminded to not operate in silos, which hurts collaboration and stymie efforts to drive competitiveness.

This issue wraps up 2020, an eventful year that shook the very foundations of business practices, questioned conventional approaches and age-old belief systems, and reprogrammed our minds for change. We hope the publication encapsulates our progress as a community and projects challenges and opportunities that are sure to come in 2021. Do stick around and let us work together to keep the community well-informed!

– Sritharan Vellasamy
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MDEC's DataKITA Initiative as Impetus for Growth in Malaysia's Data-Driven Economy

THE Malaysia Digital Economy Corporation (MDEC) is launching the DataKITA initiative in conjunction with Malaysia Tech Month 2020 (MTM 2020) to catalyse a thriving national data ecosystem in Malaysia. The ongoing initiative will be inaugurated with DataKITA.Pulse virtual event taking place on 21-22 November 2020.

DataKITA is preparing Malaysia for a new world order of data, one driven by disruptive Fourth Industrial Revolution (4IR) technologies that necessitate business openness and digital evolution. Through the initiative, MDEC will collaborate closely with enterprises and stakeholders within the nation's data economy. They will do this to help businesses jumpstart their data transformation journey through a structured approach – leveraging data literacy, data analytics, governance, data sharing and artificial intelligence (AI).

MDEC launches DataKITA initiative in Malaysia Tech Month to turbocharge growth of Malaysia's Data-Driven economy"Malaysia must gear up for a world beyond the new normal. To reach the next evolutionary level of our development, we must take charge of emerging 4IR technologies that will power the digital economy. As Malaysia transforms digitally towards Malaysia 5.0, businesses now must make the most of the "new gold" that is data to better understand markets, increase revenues, gain new segments and raise their efficiency," Dr Rais Hussin (pic), Chairman, MDEC

MDEC's expectations are that, through DataKITA, it will empower digitally-skilled Malaysians, enabling digitally-powered businesses and driving investors in digital sectors to join this data-driven population, as it works with the ecosystem to realise the nation's Shared Prosperity Vision 2030.

The DataKITA initiative will raise the availability, accessibility and usability of data in Malaysia's society and economy via four strategic pillars:

1. Knowledge: Promote Data Literacy
2. Infrastructure: Foster a Data-Driven Environment
3. Talent: Facilitate Development of Data Professionals
4. Action: Accelerate business enterprises to be Data-Driven and AI Ready

By fostering holistic data transformation between the Malaysian people, businesses, and the Government, DataKITA will be the key vehicle to help Malaysia grow a data-driven digital economy to become an advanced market that sets a global example in leading the data proliferation within society and the economy.

It will also help Malaysia's economic actors tap into the US$13 trillion revenue projected to be added by data-fuelled applications in the global economy by 2030, thereby reinforcing the nation's position as the Heart of Digital ASEAN.

"We want organisations to recognise the importance of data transformation and to take the first crucial step to embark on the journey, such as training, using data for decision making, investing in technology or the cloud, and setting up data roles within their organisation.

This is what MDEC's DataKITA initiative is all about and we are calling on Malaysia's businesses and tech talent to embark on this data journey at our upcoming DataKITA.Pulse event," Karl Ng, Director of Data Ecosystem Development at MDEC said.

Malaysia Concludes APEC 2020 on a High Note

MALAYSIA successfully concludes APEC 2020 on a high note, with the adoption of the APEC Putrajaya Vision 2040, and the 2020 Kuala Lumpur Declaration on 20th November 2020, at the first-ever fully virtual Asia Pacific Economic Cooperation (APEC)

Economic Leaders' Meeting (AELM). The AELM was chaired by The Right Honourable Tan Sri Dato' Haji Muhyiddin bin Haji Mohd Yassin, Prime Minister of Malaysia. The Meeting was participated by all 21 APEC Economic Leaders.

The APEC Putrajaya Vision 2040 is set to build on Bogor Goals, which were launched in 1994 and reach maturity this year. Malaysia was the lead penholder for this Vision, which will serve as the primary guiding document for the work in APEC, for the next two decades. This strategic document was a result of Malaysia's close collaboration with all APEC Economies.

The Putrajaya Vision aspires for an open, dynamic, resilient and peaceful Asia Pacific community by 2040, for the prosperity of all our people and future generations. The Vision also identifies three key economic drivers to achieve this aspiration, namely Trade and Investment; Innovation and Digitalisation; as well as Strong, Balanced, Secure, Sustainable and Inclusive Growth.

In addition to the Putrajaya Vision, the Leaders also adopted a consensus Declaration, a document that has remained elusive in the past two years. The Prime Minister noted that Senior Officials worked until the eleventh hour to come to an agreement on this Declaration. "This, for me, is a clear demonstration of what we are capable of accomplishing when we set aside our differences and focus on our shared values", he said in his speech.

In the Kuala Lumpur Declaration, the Leaders highlighted the need to facilitate equitable access to safe, effective and affordable vaccines. They also noted the importance of a free, open, fair, non-discriminatory, transparent and predictable trade and investment environment to drive economic recovery, and reaffirmed support for the on-going work at the WTO, including through necessary reforms aimed at improving its functioning.

Leaders called for an enabling environment that supports the development of the digital economy as well as inclusive economic policies to facilitate post-pandemic regional recovery and growth. They noted the need to advance human resource development and strengthen economic and technical cooperation in order to ensure that affected workers are afforded appropriate support. Leaders expressed hope that new technologies enable the region to handle resources and waste more sustainably, and in a holistic manner. They also made a commitment to support global efforts to tackle climate change, extreme weather and natural disasters.

In his interventions, Tan Sri Muhyiddin Yassin noted the multifaceted responses that have been undertaken in the Asia Pacific, in addressing the COVID-19 pandemic, and navigating the region towards a path of robust and resilient economic recovery. He recognised that APEC has, in its attempt to strike a balance between health priorities and economic needs, introduced stimulus packages, lockdowns and circuit breakers, and more recently, travel bubbles. APEC Economic Leaders also shared their individual policy responses and intervention measures in addressing the challenges brought forth by the pandemic, and underscored the importance of working collaboratively to reopen economic sectors, return people to jobs and reinstating the region to some level of normalcy.

Vodafone and Ericsson are Creating Safe Flight Paths for Drones

VODAFONE and Ericsson are creating "sky corridors" which enable drones to travel safely and quickly.

Today's drones are predominately used for photography, videography, and just recreational purposes. However, drones will increasingly be used for critical applications such as delivering vital medical supplies and organs.

Drones have been largely held back by confusing regulations, unreliable connectivity, and reckless flying that's endangered aircraft and grounded planes.

The sky corridors being tested by Vodafone and Ericsson will help to overcome the hurdles which have hindered drones and enable them to reach their full potential.

By creating specific paths, it can be assured that drones do not interfere with other aircraft and/or endanger others. Furthermore, connectivity along these paths can be guaranteed to prevent any "not-spots" of coverage leading to uncontrollable drones. Regulators are more likely to welcome drones with such guarantees.

The team generated coverage maps of where drones can fly while retaining good connectivity in the air. Anonymised information from mobile users was also used to help drones avoid congested areas.

In one test, Vodafone in Spain used a drone over 5G to fly a defibrillator to the scene of a cardiac arrest patient.

Vodafone says that cellular-connected drones form part of the company's multi-year journey to redefine its technology architecture on a "Telco as a Service" ('TaaS') model, based on platforms that deliver new software, video, and data applications at scale.

Malaysia Better Prepared for 4IR Thanks to COVID-19

WHILE COVID-19 has caused serious economic consequences, there may be some silver lining as well.

In Malaysia, advancement has leapfrogged by as much as five years. A recent study titled "Digital Consumers of Tomorrow, Here Today" by Bain & Company and Facebook, this is due to higher spending power and inclination towards contactless transactions. The exponential growth of the digital economy means that Southeast Asia may see more digital consumers by the end of 2020, with 83% of Malaysia's population aged 15 and above. 48% of which have opted for online shopping in the past year.

Malaysia Digital Economy Corporation's (MDEC) chief executive officer Surina Shukri said, "We're immersed in the era of technology – from going cashless, generating income through digital means and exploring new revenue streams through e-commerce."

The Basics of coding and apps development are being taught in schools and institutions of higher learning which will equip students for 4IR and the future workforce.

MDEC has played a huge role in this aspect, developing and spearheading initiatives such as #myDigitalMaker, #SayaDigital, and #YoungCreators.

She added that many small and medium-sized enterprises (SMEs) and micro-enterprises are quick to digitalise their end-to-end systems for their businesses.

Making the digital leap into the 4IR is crucial to mitigate the impact of COVID-19 on the nation. Key stakeholders and industrial players are eager to embrace change to remain relevant.

South Korea to Help Bangladesh Develop Skilled Labour for 4IR

LEE JANG-KEUN, the Korean High Commissioner to Bangladesh hinted on a collaboration with Bangladesh in facilitating the development of skilled labour, aligned with the 4th Industrial Revolution (4IR).

He suggested this during a courtesy call with the FBCCI President Sheikh Fazle Fahim, at the newly renovated FBCCI Icon 60 Motijheel in the capital, said a press release.

During the visit, the FBCCI President appraised the High Commissioner of South Korea on FBCCI Impact 4.0, entailing FBCCI ADR Center, Tech Center, Skill Lab, FBCCI Institute, FBCCI University, Economic Applied Research Center, Multipurpose Workshop / Seminar / Skills Auditorium, and the federation's capacity enhancements with globally top-rated organizations and roadmap to LDC and SDG 2030.

Aligned with Bangladesh's development trajectory, the present FBCCI board launched FBCCI 2041 which constitutes Impact 4.0 initiative.

However, the highlight of the meeting was soliciting Korean interest for FDIs or Joint ventures in the automotive component making, and its potential contribution in the tech centre, providing access to the startup ecosystem; at the same time imploring the counterpart in providing arbitrator for the Alternate Dispute Resolution Centre.

The FBCCI President and the High Commissioner also discussed the apex trade body's noteworthy economic and social measures during COVID-19; Bilateral Value Chain Initiatives (BVCI); diplomatic relations; trade agreements entailing KCCI, KOIMA, KITA; COVID-19 engagements; investment incentives; TVET skill development through knowledge transfer and labour migrants.

The two countries are expected to engage in stronger cooperation in various facets including FBCCI Impact 4.0.

Jong Won Kim, trade representative, commercial section and Cheolsang KIM, deputy chief of mission counsellor of the Embassy of Republic of Korea (ROK); alongside FBCCI Vice-Presidents, Md Rejaul Kariem Rejnu; Mir Nizam Uddin Ahmed; Nizamuddin Rajesh and FBCCI Directors Sujib Ranjan Dash, Md Munir Hossain; and Salahuddin Alamgir, were also present during the occasion.

Mostafa Kamal, chairman of Meghna Group of Industries, was also present at the occasion as the honorary consul of Korea in Chittagong.

WEF: Inequality Likely to Worsen as Robots Set to Do Half of Work by 2025

A report from the World Economic Forum (WEF) predicts that robots will do half of all work tasks by 2025, with inequality likely to worsen as a result. Concerns about the impact of automation on jobs are not exactly new, but most felt the timeline for significant change would be longer – providing more time for mass reskilling of the workforce.

The pandemic we find ourselves in is creating "a double disruption of jobs" with businesses reducing their employees while simultaneously speeding up the adoption of automation to make up for the lost productivity.

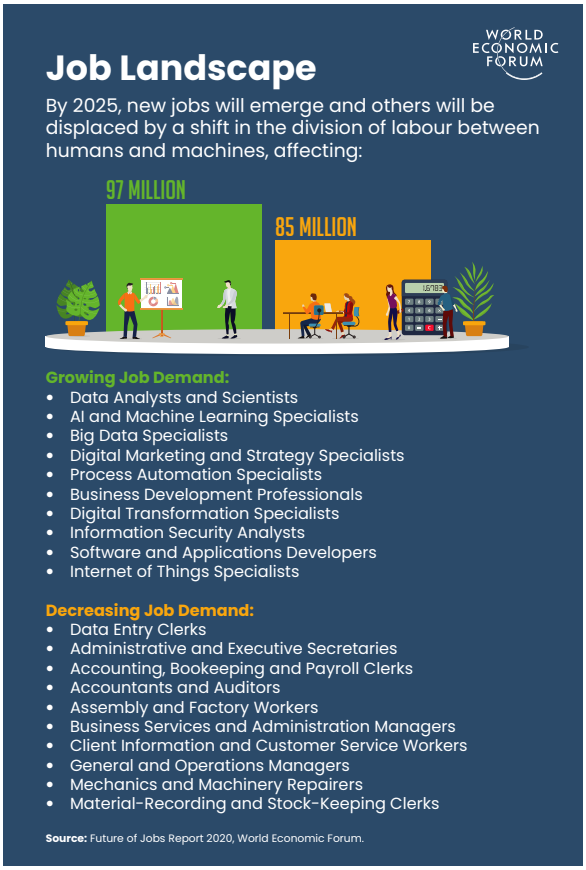
43% of the businesses surveyed report they are set to reduce their workforce due to technology integration. 41% say they will increase their use of contractors. Just 34% plan to expand their workforce due to technology integration.

The silver lining is that more jobs overall should be created than destroyed from automation. However, these new roles will require very different skills than most current jobs.

Societal inequalities are expected to be exacerbated in this transition. Disadvantaged groups and those on lower incomes will struggle comparatively to retrain in the future skills they need to succeed.

Manual jobs in areas like administration and data processing are most at risk of automation, according to the WEF. Roles that require very human skills like communicating and reasoning will rise in demand. There will understandably be a huge demand for workers in areas like the IoT, AI, cloud computing, and engineering; helping to support the growth in automation.

The WEF says millions of people will need to be reskilled to prepare for the coming changes and governments will need to provide stronger safety nets for workers displaced by automation.



The Devil is in the Data: Balancing Privacy and Healthcare

DATA is crucial in effective decision-making, especially when tackling healthcare issues such as the novel coronavirus. Getting individuals to participate in an ecosystem of sharing data, however, is not that simple. To gain public trust, the Korea Centers for Disease Control and Prevention (KCDC) implemented key principles to protect the citizens' data privacy.

"They announced that they collect only the minimum data needed and then deleted it afterwards," said Tai Myoung Chung, a professor in South Korea's Sungkyunkwan University, in a recent discussion on healthcare data. "Secondly, prior approval is needed before investigators can access private data. Thirdly, a security clearance is necessary for officials of both the KCDC and local government. Lastly, they use all kinds of model security solutions by security experts."

South Korea, he added, invested US$240 million (MYR 973 million) in a Data Dam project that collects and integrates information provided by both public and private sectors to manufacture useful data that can be shared via 5G networks. More than 5,000 companies and organisations are part of the project.

Chung, whose research is focused on data security and digital therapeutics, said that sharing data is beneficial but that an earnest discussion is necessary before interoperability across country borders can be realistically implemented.

"If we have a standard for data collection interoperability, will it be freely accessible to anonymous stakeholders? Data itself is the money," Chung said. "Are countries willing to exchange data with other countries? We have an open-source community but I don't see any open-data community yet."

Uber Sells Robot-Vehicle Division as Pandemic Takes its Toll

UBER is selling off its autonomous vehicles development arm as the ride-hailing company slims down after its revenues were pummeled by the coronavirus pandemic. Self-driving vehicle technology company Aurora will acquire the employees and technology behind Uber's Advanced Technologies Group in a stock transaction, the companies said Monday. Uber will also invest $400 million into Aurora, and Uber's CEO Dara Khosrowshahi will join Aurora's board of directors.

After the transaction, Aurora will be worth $10 billion and Uber will hold a 26%t stake in the company, Aurora CEO Chris Urmson said in an interview.

"Our first product will be in trucking and freight, but we look forward to taking this great team that we have and accelerating that while continuing working on light vehicles and ride-hailing, and we'll ultimately see our vehicles deploying on the Uber network," Urmson said.

Uber will not have exclusive rights as a ride-hailing company to Aurora's technology, but the two companies will have a "preferred relationship," Urmson said.

San Francisco-based Uber will lose a critical piece of its company after the pandemic cut into its finances by suppressing demand for shared rides. Its path to profitability has often been linked with its plans to deploy autonomous vehicles and reduce the high cost of paying drivers.

The company's efforts around self-driving technology was marred in March 2018 when one of its automated test vehicles hit and killed a woman, the first death involving the technology. The backup Uber driver involved in the crash was charged with negligent homicide for being distracted in the moments before fatally striking the woman in suburban Phoenix.

"There's no doubt they had a pretty rough couple of years a while back," Urmson said. "What's been impressive to me in meeting the team over the last little while is just how much the team has learned, and the tenaciousness, and determination of the team as they come to market in a thoughtful, safe way."

Gaining customers' trust is a huge factor, said Dan Morgan, vice president of Synovus Trust Company. "You have one or two bad accidents and people are like, 'I'm not getting into that thing,'" he said.

Aurora, based in Mountain View, Calif., is led by former Google, Tesla and Uber executives. Aurora also has partnerships with delivery giant Amazon and auto companies Hyundai and Kia, among others, but its partnership with Uber is its first official relationship with a ride-hailing company.

The move will help Uber find a quicker path to profitability, said Steven Fox, founder and CEO of Fox Advisors. "It accomplishes the best of both worlds for them. It takes away a big profit drag and keeps them strategically well-positioned for when they want to move parts of their network to be autonomous," he said.

The deal means San Francisco-based Uber will be entrusting a key piece of its future to a 3-year-old startup co-founded and run by one of the engineers who launched Google's pioneering work in self-driving cars more than a decade ago. Urmson was one of the most visible people involved in the once-secret project that Google initially dubbed "Chauffeur" before it was finally spun off into a separate company called Waymo. Google and Waymo remain closely aligned under the same corporate parent, Alphabet.

While at Google, Urmson also worked on the self-driving car technology with another top engineer, Anthony Levandowski, who defected to Uber in 2016 oversee its early efforts to build robotic vehicles.

As part of that effort, Uber bought Levandowski's startup, Otto, for $680 million. That deal quickly disintegrated into a scandal after Waymo accused Levandowski of stealing its trade secrets and using them to help Uber to make the transition from human drivers to autonomous vehicles.

Uber denied the allegations, but eventually reached a $245 million settlement with Waymo in 2018 after a few days of testimony during a high-profile trial in San Francisco. Before the settlement, Uber's former CEO and co-founder Travis Kalanick revealed he believed Google's self-driving car technology posed an existential threat to Uber during his dramatic appearance on the witness stand.

That fear drove Kalanick Uber's to open its own self-driving car division stocked with robotic experts from Carnegie-Mellon University as well as former Google engineers acquired as part of the deal with Levandowski. Uber eventually fired Levandowski in 2017 and Levandowski wound up being sentenced to 18 months in prison earlier this year after pleading guilty to stealing some of Google's trade secrets before he left the company in 2016.

Kaspersky Sees Emergence of New Cyberattack Strategies in 2021

INTERNET security firm Kaspersky expects new cyberattack strategies to emerge, which will mainly target network appliances and 5G. The company said its forecast for 2021 was developed based on the changes that its global research and analysis team observed in 2020.

For 2021, Kaspersky anticipates more countries to use legal indictments as part of their cyber strategy. Kaspersky's previous predictions of "naming and shaming" of APT (advanced persistent threat) attacks carried out by hostile parties has come true, and more organisations will follow suit.

It also expects more Silicon Valley firms to take action against zero-day brokers. Following the scandalous cases where zero-day vulnerabilities in popular apps were exploited for espionage on a variety of different targets, more Silicon Valley corporations are likely to take a stance against zero-day brokers in an effort to protect their customers and reputation.

More disruptive attacks can also be expected, as our lives have become even more dependent on technology with a much wider attack surface than ever before.

Cybercriminals will likewise have a greater incentive to look for vulnerabilities they can exploit, Kaspersky said, referring to 5G.

Such attackers are expected to continue exploiting the coronavirus pandemic crisis. "While it did not prompt changes in tactics, techniques and procedures of the threat actors, the virus has become a persistent topic of interest. As the pandemic will continue into 2021, threat actors will not stop exploiting this topic to gain a foothold in target systems," the company said.

5G and the 5 New Things It Will Bring to the World of Logistics

WITH the promise of unstoppable data download and upload speeds, broader coverage and more stable connections, 5G, the fifth-generation cellular technology, is set to transform mobile connectivity as we know it.

5G is already expected to revolutionise supply chains around the world as it becomes more available to different markets over the next few years.

More companies are shifting toward a data-driven mindset in their decision making — to predict future performance and optimise operational efficiencies — which will require the collection and analysis of a large swath of data, some in real-time.

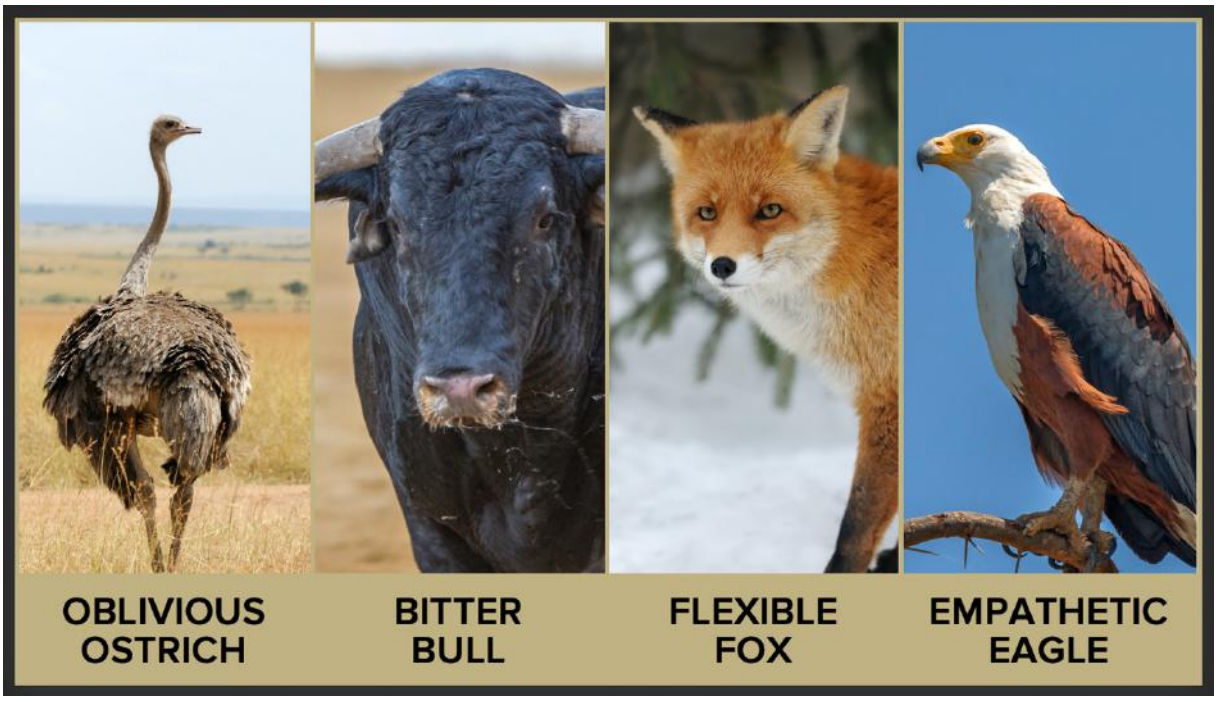
Exponentially faster data speeds and reduced latency will give rise to a more responsive network to support this transformation, while also paving the way for more Internet-enabled smart devices to be integrated along the logistics supply chain.

This will all render logistics processes faster, safer and more reliable. Here's a look at what 5G means for logistics in five ways.

1. Logistics, digitalised - With faster speeds, lower lag times, larger areas of coverage and a comparatively smaller power appetite, smart devices can communicate faster with one another at speeds that are even closer to real-time.
2. Minimising supply chain risks – Portable Internet-connected trackers that monitor in real time the location and condition of the goods throughout the entire supply chain.
3. Autonomous trucks on public roads – 5G is a key enabler for autonomous trucks on public roads. The less time it takes for an autonomous truck to make a decision, the safer the roads, and the more reliable the deliveries.
4. Faster and safer port operations – To create an intelligent transportation system, sensors, cameras and devices are connected to a network to form an integrated communications system.
5. Augmented reality (AR) applications – 5G-powered assembly and repair processes in the warehouse can also speed up due to the shorter time needed to transmit information to AR-enabled devices.

When 5G realises its full potential, gone will be the days of losing cargo, misplacing parcels and incurring losses due to human error, mismanagement and inefficiencies.

4 TYPES OF ANIMALS LEADERS BECOME DURING TIMES OF CRISIS



FOURTH LEAP
By Dato' James Foo

"It is your reaction to adversity, not the adversity itself, that determines how your life's story will develop."

Dieter F. Uchtdorf

WHEN pressure builds up, human behaviour will change.

That is something you probably have noticed over the last couple of months. 2020 for most, has been a roller-coaster ride with no end, but unlike most amusement parks, we do not get to see how the journey will be. We cannot anticipate the twists and turns, ups and downs. We can only shift our body weight as we are thrown at each turn, and balance it out as we exit, while waiting anxiously for the next jolt.

And in this state of rising and constant pressure, we also realised that just like us, the behaviours of those around us have shifted as well. While technology and digitalisation are the key areas of focus, how these changes are being adopted in different organisations will largely depend on the leaders themselves.

Interestingly, when it comes to behaviours, we often gain most insights when we detach ourselves from the situation, and borrow inspiration from Mother Nature.

Do understand that the article is, by no means, to compare the readers to animals.

THE OBLIVIOUS OSTRICH

Even after the Coronavirus has hit a global pandemic scale, causing economic conditions to come to a standstill in certain parts of the world, there are still some leaders who made a conscious decision to just stay in denial and say "this too, shall pass".

Despite seeing more and more customers and consumers going online and adopting new digital habits, the Oblivious Ostrich leaders tend to just brush it off as a "hype that won't last". Citing there will always be a market segment who are less tech-savvy that needs to be served, they choose to not make any drastic pivot plans.

Often misinterpreted as optimism, such behaviours of denial (and ignorance!) can spell disaster even during the good times. Companies like Kodak and Nokia are just some examples we can all learn from.

What to do when you are working with an Oblivious Ostrich?

Have a plan B that is ready to be implemented the moment he or she changes her mind. Because it is hard to convince them on a personal level; leverage instead on reports and white papers from sources they trust.

THE BITTER BULL

While it is good that these leaders are acknowledging the situation, they are reacting instead of responding. Emotions are high, and rash decisions are prone to be made. In a mixed mental state of desperation, anxiety, and panic, they would often start lashing out at others as well, blaming external forces they have no control over.

As they make a string of bad decisions and while the costly mistakes pile up, they will be pushed further into the corner, and in the heat of the moment, may just snap and start destroying everything they have built. Teams become collateral damage, while bridges are burned and connections severed.

What to do if you are working with a Bitter Bull?

Try to empathise that their resourcefulness is tied to the environment in which they operate in, and if harsh words were thrown around, do not take them to heart. Give them space to clear their mind, even if you will need to force them to face reality. Assure them the business will still be around after their short time-off, and trust that in the process of recalibrating their emotions, they will gain clarity and act with wisdom.

THE FLEXIBLE FOX

Agility is the middle name, and in times of crisis, these leaders spring into action. While it is good that they are on the move; the danger is, without knowing, they may be moving in a less favourable direction.

These are the masters of pivots, and the direction of the ship can change several times during its course. While thoughts and ideas are fast to form, execution and results will take time, even for the most agile of organisations.

Combine the impatience and the lack of foresight, the Flexible Foxes may not allow the idea and execution to gestate and expect results to happen in an instant. This may also cause the team to drop the ball due the heightened pace, while others are left in the dust.

What to do if you are working with a Flexible Fox?

While nobody likes to be the kite that's being held back by the string, it is important to let the Flexible Foxes know what are the key performance indicators or business metrics that will be positively impacted with their ideas. The timeline and expectations must also be communicated as well, and constant communication will ensure that all team members are on the same page.

> **"Only the wisest are able to see at a high level, and still come down to the ground level to communicate with the team."**

In their flurry of ideas that are waiting to be executed, I would recommend a technique that I learned from fast-paced start-ups:

1. Pin all the ideas up on the wall and pitch them to everyone in the room.
2. Every team member (the leaders included) is given 2-3 coloured stickers to vote on which idea is the best.
3. The idea with the most votes gets executed first, of course with the KPIs well communicated upfront.

THE EMPATHETIC EAGLE

"You'll never see a wise person run." That is a lesson I learned while I was on the community of mentors in the start-up scene.

While the Flexible Foxes are the action takers, the Empathetic Eagles are the true visionaries. Despite the incoming storm and darkened path, they rise above the clouds and see far and wide.

It is common to assume all leaders have the gift of vision and therefore, see further than anyone else. However, only the wisest are able to see at a high level, and still come down to the ground level to communicate with the team. Seeing the path is one thing; guiding the team on the path when even the next steps may not be clear? Now, that takes skill and wisdom!

How can you become an Empathetic Eagle?

To stay calm even though everything you have built seems to be breaking down. You will first need to disassociate yourself from the situation. In the state of confusion and anxiousness, you will realise that you have lots of ideas to explore. Bear in mind that in this state of economy, you cannot afford to take one step forward and four steps back.

Be open to borrowing ideas from other industries and simplify your message so that your team and business partners are clear on what needs to be done. As you are breaking apart the old systems to do things, take the opportunity to incorporate technology and digitalisation.

THE BEST OF BOTH WORLDS

While many may think that the Empathetic Eagle is something all leaders should strive for in this current crisis, the truth is, the best leaders are a combination of the Empathetic Eagle and the Flexible Fox. The key is knowing which role to play in the shifting of the tides, and emerge as the market leader in this brave, new world.

This is a contribution by Dato' James Foo, Founder of 80+ Startups in 13 industries and 4 IPOs.

ECONOMIC RECOVERY THROUGH INNOVATION: MALAYSIA'S EMERGING ECOSYSTEM BATTLES BACK

Effective leadership, interagency collaboration and thinking-outside-the-box are a strong foundation on which to build a country's response to health and economic risk. Dr Alan Downe of Fourth Leap interviews two dynamic leaders on overcoming challenges, being resilient, and innovating during these trying times.

"The era of COVID-19 can be an unavoidable lesson in how to pivot and fight back through innovation, and how to power onward with human ingenuity."

Datuk Ir Dr. Siti Hamisah binti Tapsir, Secretary-General of the Ministry of Science, Technology & Innovation (MOSTI)

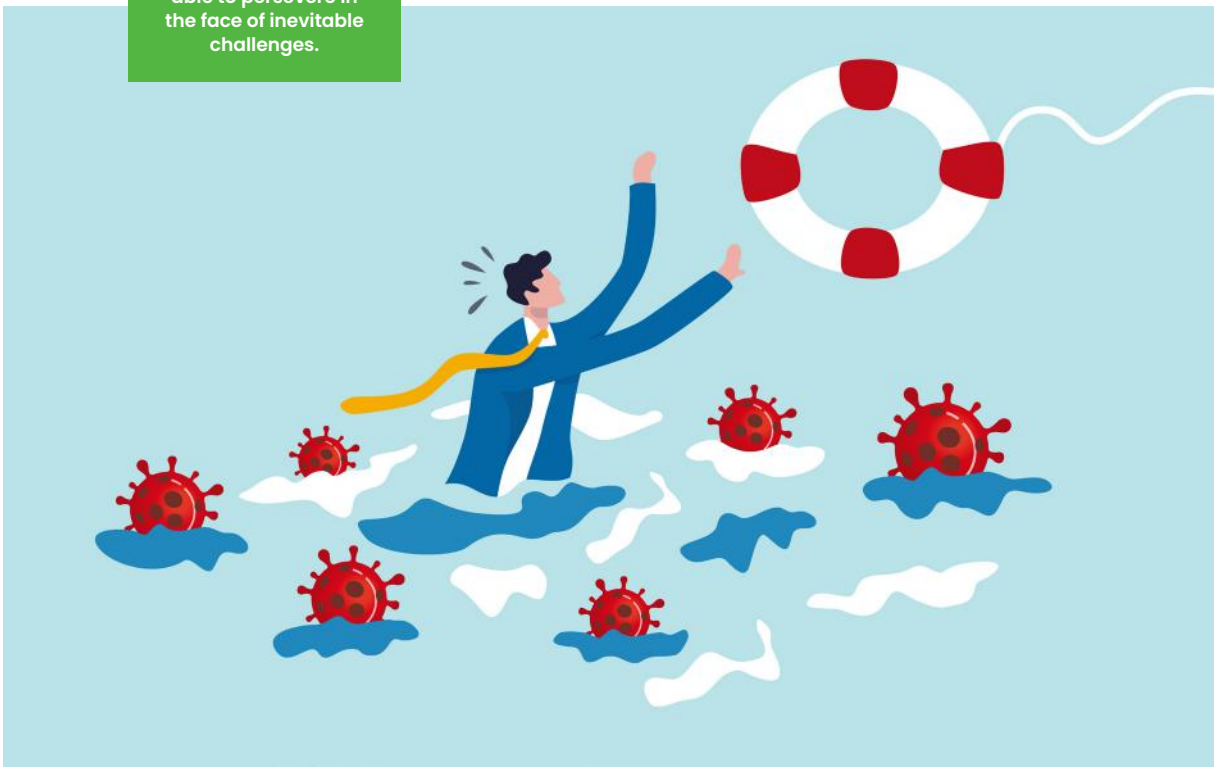
THE Year 2020 will go down in history as a time when the spread of the SARS-CoV-2 virus reached pandemic proportions and threw the world into deadly health crises, economic uncertainty and a "New Normal" rife with uninvited lifestyle changes. Recent progress in vaccine development and effective mitigation efforts have brought some welcome light to the end of the tunnel. But experts still warn that the pandemic is far from over.

Malaysia has not fared as badly as many other parts of the world but is finishing the year in the throes of a COVID-19 Third Wave. Daily reports of new cases hover around four figures and the country's cumulative death toll is now more than 400. Economic effects threaten to be as devastating to national well-being as the disease. Altered consumer spending patterns, business closures and workforce disruption have hit hard at key sectors like airlines, tourism, retail, and entertainment. By late September, the World Bank was forecasting a 4.9% contraction in economic growth, as measured by real GDP.

Even in this dire scenario, a quick and effective response from Malaysia's Government has impressed most local and international observers alike. As early as mid-March, steps were taken to break the chain of infection through movement control mandates and public communication. Malaysia also moved promptly to reduce negative economic effects. The Government has now released four economic stimulus packages. Its most recent, the RM35 billion (USD8.6 billion) Pelan Jana Semula Ekonomi Negara (PENJANA), is primarily aimed at helping affected businesses and families recover from economic disruption during the pandemic.

Sure, there have been challenges, some populist non-compliance and a bit of political theatre at various junctures in Malaysia's COVID-19 story but, most acknowledge that sound public sector headship has driven some reasonably good policy and effective intervention. A new highly-adaptive, innovation-focused ecosystem is emerging. Three key IR4.0 concepts are at the core.

Business sustainability is being able to persevere in the face of inevitable challenges.



RECOVERY VISION LEVERAGING EXISTING ECOSYSTEM STRENGTH

If one theme has predominated the Government's PENJANA package, it is that innovation is the core ingredient to finding our way out. Among the 40 or so initiatives contained within the Plan, each represents a commitment to "new thinking".

Perhaps the most ambitious of these is the impressive National Technology and Innovation Sandbox (NTIS) initiative, spearheaded by the Ministry of Science, Technology and Innovation (MOSTI). Leadership powerlifting on this one has fallen primarily to Datuk Ir Dr. Siti Hamisah binti Tapsir, the Ministry's Secretary-General. An accomplished Civil Engineer, she is a seasoned veteran of senior university posts and has held top management roles in the Department of Higher Education and the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC).

The PENJANA vision for recovery. Three critical policy thrusts, 40 key initiatives: Here are some examples ...

EMPOWERING PEOPLE

- Wage Subsidy Programme
- PENJANA Kerjaya Job Creation
- Social Support for Vulnerable Groups
- Social Safety Net for Gig Economy & Informal Workforce
- Special Aid for Childcare Centres
- Internet for Education & Productivity

PROPELLING BUSINESS

- SMART Automation Grant Scheme
- Low-Interest Micro-Credit Scheme for SMEs
- MyAssist SME One Stop Centre
- Bumiputera Entrepreneurship Financing
- SME GO Scheme to Assist Government Contractors
- PENJANA Tourism Financing
- Micro and SME Digitalisation Campaign

STIMULATING THE ECONOMY

- ePENAJA e-wallet credits to encourage safe, socially distant remote payments and boost consumer spending
- Buy Malaysian Campaign & Product Tagging
- Social Impact Matching (SIM) of crowdfunding initiatives to support social enterprise
- PRS Pre-Retirement Withdrawal
- EPF i-Lestari Withdrawal Facility
- Dana PENJANA Nasional to support business digitalisation by funneling international investment into the local venture capital space
- Agriculture & Food Sector Support providing financial relief and advanced technology access for the agro-sector and food supply industry
- New Incentives for Malaysia as an Attractive Destination for Business Relocation
- Property Sector and Automobile Purchase Incentives
- National Technology and Innovation Sandbox (NTIS) – to encourage innovative priority product development and enhanced digitalisation of services

Dr. Siti Hamisah assumed her new post at MOSTI in March 2020, just as the World Health Organization (WHO) classified COVID-19 as a global pandemic. The world plunged into unprecedented volatility, uncertainty and risk. Events called immediately for a new Malaysian vision built on an appreciation of science and technology. Recently Dr. Siti Hamisah told Fourth Leap, "The human race is facing the biggest crisis since World War II and everyone has to reassess their priorities to ensure survival in this new world. I do mean everyone – from governments to large multinationals and local SMEs, and from tech-enabled start-ups to conglomerates. Everyone."

"But it is also during periods like these that some of the world's most defining solutions for humankind have emerged. For us, the era of COVID-19 can be an unavoidable lesson in how to pivot and fight back through innovation, and how to power onward with human ingenuity."

The decision to place ingenuity at the cornerstone of MOSTI's vision for national recovery makes sense. Malaysia already has a sound reputation as an emerging and thriving innovation environment. The country was ranked in the Top 10 Emerging Ecosystems in Performance and in the Top 20 Emerging Ecosystems in Talent, according to the Global Startup Ecosystem Report 2020 (GSER2020). It ranked eighth in Asia and 33rd overall in the Global Innovation Index (GII) 2020 report released in September 2020 by the World Intellectual Property Organisation (WIPO).

Malaysia also came 27th out of more than 200 countries on the Bloomberg Innovation Index 2020. Germany ranked first, South Korea second and Singapore third.

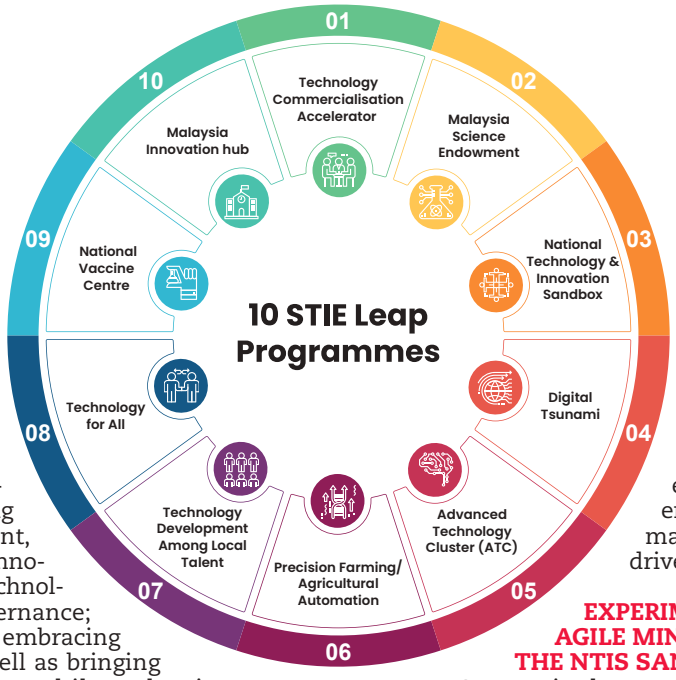
Under Dr. Siti Hamisah's guidance, MOSTI has represented innovation as the key to the nation's economic recovery and beyond. Just a few months ago, Ministry leadership presented a paper to Malaysia's Economic Council titled, *Transforming Malaysia, Fast Forward Malaysia: Accelerating Technology Adoption*. In it, they argued for greater urgency in solving current challenges and proposed a number of prospective directions.

Undoubtedly, some structural weaknesses do persist. According to Dr. Siti Hamisah, there can be disappointing shortfalls in private sector investment and low or uneven commercialisation rates. Regulatory "red tape" and an over-reliance on foreign talent for high-tech solutions also hinder headway in meeting goals for industrial development. "In the past, local tech adoption has been vendor-driven, where Government and private sector entities procure solutions on a need-basis. Developed in silos, we're left with a reality where solutions are incompatible with the larger ecosystem. That drags down future innovation."

"This simply can't happen in the new norm, where innovation, creativity and agility are our main defences against widespread disruption. Malaysia needs a holistic plan for innovation."

And a plan is indeed underway. The National Policy on Science, Technology and Innovation (DSTIN) 2021-2030, launched by the Minister of Science, Technology and Innovation on 8 December 2020, is designed to transform the country from being mostly tech users to tech developers. Through MOSTI, the government addresses innovation inefficiencies and foreign technology dependency while introducing the concept of Science, Technology, Innovation and Economy (STIE), based on 30 niche areas as endorsed by the National Science Council chaired by the Prime Minister in July 2020.

STIE's 10 Technology Drivers on 10 Socioeconomic Drivers (10-10) Science, Technology, Innovation and



Economy (MySTIE) Framework, coupled with six cores, 20 strategies and 46 initiatives of the policy will be key to enable a vibrant and agile National STI Ecosystem.

These six cores revolve around empowering research and development, commercialisation and innovation; the use of local technology; responsive STI governance; STI talent development; embracing and applying STIE as well as bringing STI to the global arena. While Malaysia remains a competitive nation in the region, much effort is needed to increase the level of competency and innovative output to justify its high investment input. This plan will secure the nation's success in the coming years and in the era of the Fourth Industrial Revolution.

Dr. Siti Hamisah pointed out that MOSTI and its agencies like the Malaysian Global Innovation & Creativity (MaGIC) Centre, have already been racing fast to reach the country's future technology goals. In 2019 alone, for instance, over 20,600 individuals participated in MaGIC's various programmes nationwide. These included design thinking and innovation workshop training, boot camp and accelerator start-up programmes, and strategic tie-ups and collaborations with private sector firms, corporates, universities and other ecosystem partners.

Earlier this year, MaGIC took the unparalleled step of sharing its own data and ecosystem management platform as a new open-source platform called OpenHub, making it accessible to anyone in the start-up community – government agencies, private accelerator providers or even community leaders – who wanted to begin managing their own data-driven ecosystem strategy.

EXPERIMENTATION AND AGILE MINDSET. WELCOME TO THE NTIS SANDBOX

Success in the Fourth Industrial Revolution is all about leadership. Gerald C. Kane, a professor of Information Systems with the Carroll School of Management at Boston College conducted a study where he identified the most common leadership traits of the world's best digital leaders. Writing in the MIT/Sloan Management Review, he found remarkable constancy across the various digital maturity levels of organisations he sampled, with executives almost universally preferring to be led by people with high scores in eight specific competencies. Dr. Siti Hamisah would excel in all eight.

Prof Kane found that good digital leaders get people to think differently and to become comfortable working outside the proverbial box. Creating conditions where people are motivated to experiment and are permitted to go beyond the boundaries defining a problem is part of an essential leadership toolkit for IR4.0 trailblazers. That's the idea, too, on which a Regulatory Sandbox innovation model is based.

What traits would business executives most like their bosses to have as good digital leaders?

Leadership Trait	Description	% execs rating it as "most important"
Direction	Providing vision and purpose	26%
Innovation	Creating the conditions for people to experiment	18%
Execution	Empowering people to think differently	13%
Collaboration	Getting people to collaborate across boundaries	12%
Inspirational Leadership	Getting people to follow you	10%
Business Judgement	Making decisions in the face of uncertainty	8%
Building Talent	Supporting continuous self-development among others	7%
Influence	Persuading and influencing stakeholders	5%
Don't know/Not sure		1%

source: MIT/Sloan Management Review, 09 July 2018

MOSTI's flagship PENJANA initiative, the National Technology and Innovation Sandbox (NTIS), has a RM100 million (USD24.6 million) budget to accelerate the creation, commercialisation and expansion of advanced technologies to fast-track Malaysia's recovery from COVID-19 and its progress toward becoming a high-tech nation. The programme offers local innovators opportunities to test products and solutions in a conducive and less-controlled environment, greatly shortening the path from testing to commercialisation.

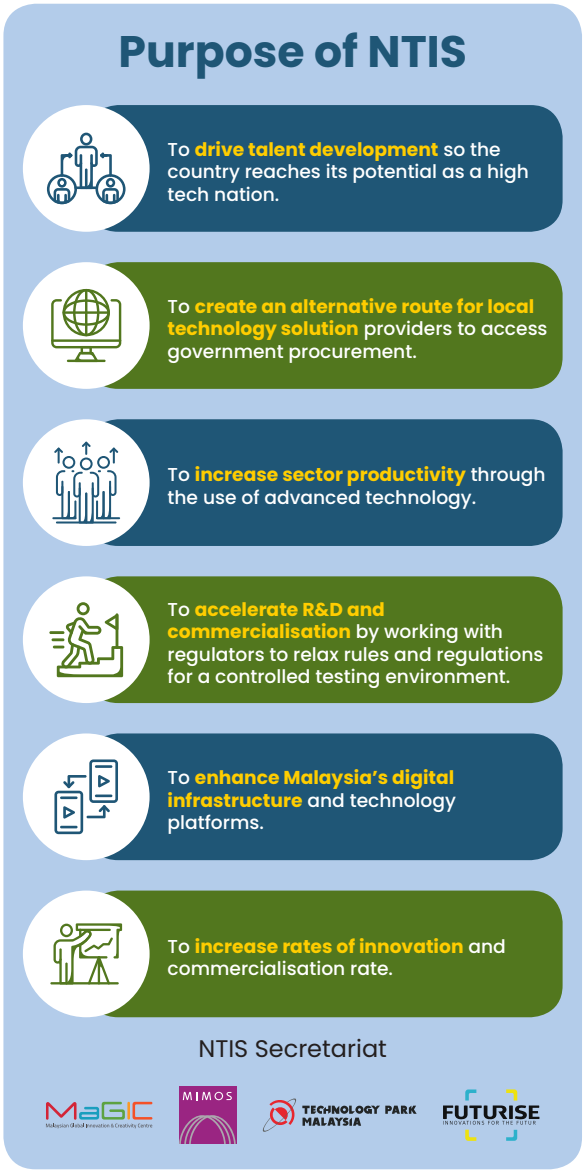
Project governance lies with MOSTI and the initiative is managed by a multi-Agency secretariat led by MaGIC and its talented CEO, Dzuleira Abu Bakar. The Secretariat is charged with the coordination and implementation of key projects.

Dr. Siti Hamisah and Dzuleira elaborated that the Secretariat consists of various government agencies involved in Malaysia's innovation ecosystem including MaGIC, which will lead the group and act as a central repository for ideas, solutions and intellectual property; Malaysia's National Applied Research and Development Centre (MIMOS) and Technology Park Malaysia (TPM), which will identify new solutions, run technology audits and facilitate certification processing; FUTURISE, which will take on the regulatory components of the Sandbox; and the Malaysian Technology Development Corporation (MTDC), the main funding partner for the sandbox.

It should be noted that, internationally, the Regulatory Sandbox concept has been around for a while. It originated in 2016 as a pilot project with the UK Financial Conduct Authority (FCA), which defined it as, "a 'safe space' in which businesses can test innovative products, services, business models and delivery mechanisms without immediately incurring all the normal regulatory consequences of engaging in the activity in question."

In other words, in the Sandbox, the development of selected projects is supported by setting aside certain regulatory performance and reporting requirements. This less fettered creative process offers innovators broader scope and precious time for experimentation with new ideas. It allows greater agility, speed and integration during the proof of concept and prototyping phases, and results in shorter time frames to get solutions up and running.

The model gained slow but steady acceptance around the world, with most use-cases focused on the development of new financial engineering technologies and digitally-mediated financial services. In Malaysia, the model has been recognised as a promising fintech enabler since it was rolled out in February 2018. But Malaysia was also poised to be one of only a few countries planning to use the Sandbox in non-financial verticals, including healthcare, waste management, transportation and energy.



URGENT TIMES, RAPID PROGRESS

In 2020, though, COVID-19 created a critical need for innovation. NTIS was immediately seen as a vehicle to address resulting health and economic concerns. Dr. Siti Hamisah noted, "Prioritisation is key to the nation's stable recovery from this pandemic. Finding pandemic-related solutions allows recovery to be resilient enough to tackle other significant needs, such as waste management and recycling, automated business processes and autonomous vehicles." But these may have to be targeted for later. The present focus is on relief.

Dzuleira proudly reports that the initiative is now well underway. In December, MaGIC received over 1,834 applications for NTIS, spanning key sectors such as healthcare, agriculture, financial services, manufacturing, education, SMART cities and many more. All proposed solutions have to be at Technology Readiness Level (TRL) 6. TRL is a method, developed at NASA, for estimating the maturity of technologies during the acquisition phase of a programme.

From the initial application and screening process, **six pilot projects** have already been identified to kick-start the NTIS. These include:

- a lightweight mobile robot deployed in agriculture to increase work efficiency and reduce the numbers of workers required
- an easily scalable, first-of-its-kind semi-ventilator to assist patients with breathing difficulties
- a robot to assist the recovery process of stroke patients or other medical conditions involving impaired or limited limb function
- a drone solution to automate high-precision spraying of pesticides, saving time and cost in the agriculture sector and providing safeguards for food supply chains under pressure

- pick-and-place linear robots for use in manufacturing, reducing disease transmission by reducing numbers of factory workers, while increasing productivity, efficiency and production quality

All are solutions that will reduce potential exposure to the virus, enhance food security and assist in medical treatment. Dzuleira points out that NTIS also pays increased attention to the products' business case that will drive economic recovery.

"Sustainability is often misunderstood and seen to be some grand fuzzy concept. In actual fact, it ensures that every part of your business aligns to the ability to persevere, even in the face of inevitable challenges such as we face now. This puts in place a stronger foundation for the future, as we prepare to bounce back from the devastating impact of COVID-19."

"A sustainable business brings in the right kind of ROI, the kind of ROI the world is going to need to emerge from this crisis."

NTIS through MaGIC, collaborated with FELDA recently to:

- Increase the average income of FELDA settlers, through reducing farm operating costs or increasing farm yields;
- Diversify activities in the FELDA plan to create high-value economic opportunities and employment for the new generations of FELDA;
- Drive the development of talent to achieve the potential of becoming a high-tech country;
- Accelerate the R&D and commercialisation process with the cooperation of the regulator (i.e CAAM);
- Increase the rate of commercialisation and innovation.

Five high-technology companies had been selected to stress-test various drone and robotic solutions to improve aspects of harvesting, maintenance and fertilisation of palm oil plantations at two selected FELDA Mempaga implementation sites in Pahang, totalling 25 hectares.

Furthermore, MaGIC signed a Memorandum of Understanding with IIB Ventures, a wholly owned subsidiary of Iskandar Investment Berhad, and with DHL in Iskandar Malaysia to establish the first Drone and Robotics Zone in Southeast Asia. DRZ Iskandar, as the next sandbox test bed under NTIS, will see the conception of a controlled drone and robotics ecosystem to accelerate the creation of local innovations and become a growth engine, talent hub and tech leader for Malaysia and the Asia-Pacific region.

SURMOUNTING CHALLENGES THROUGH COLLABORATION AND A DIGITAL MINDSET

It has to be said. Sandbox models have their detractors. In early FCA trials, regulatory traditionalists and consumer groups expressed concern about relaxing standards during the product development cycle, particularly for digital fintech and medical devices. A former New York State Department of Financial Services Superintendent famously quipped that "Toddlers play in sandboxes. Adults follow the rules." At the other extreme, industry players sometimes feared that gung-ho regulators hosting the sandbox might impose even more restrictive conditions on the development process than in the waived legislation and that progress could be prone to bog down in Ministerial silos.

With NTIS, these conflicts have not arisen. Collaboration and boundaryless communication are the reasons. Dzuleira points to the shared vision within the Secretariat and to the team spirit common to all players. In Malaysia, most governments long ago embraced, at least in principle, the journey to digital transformation. A first-rate *Government as a Platform* (GaaP) portal, cutting-edge data management systems and successful high-level training through the *Digital Government Competency & Capability Readiness* (DGCCR) programme and others have inculcated a digital mindset within the public service. Agile project management, cross-functional teams and a commitment to open, honest collaboration goes a long way to ensuring successful outcomes.

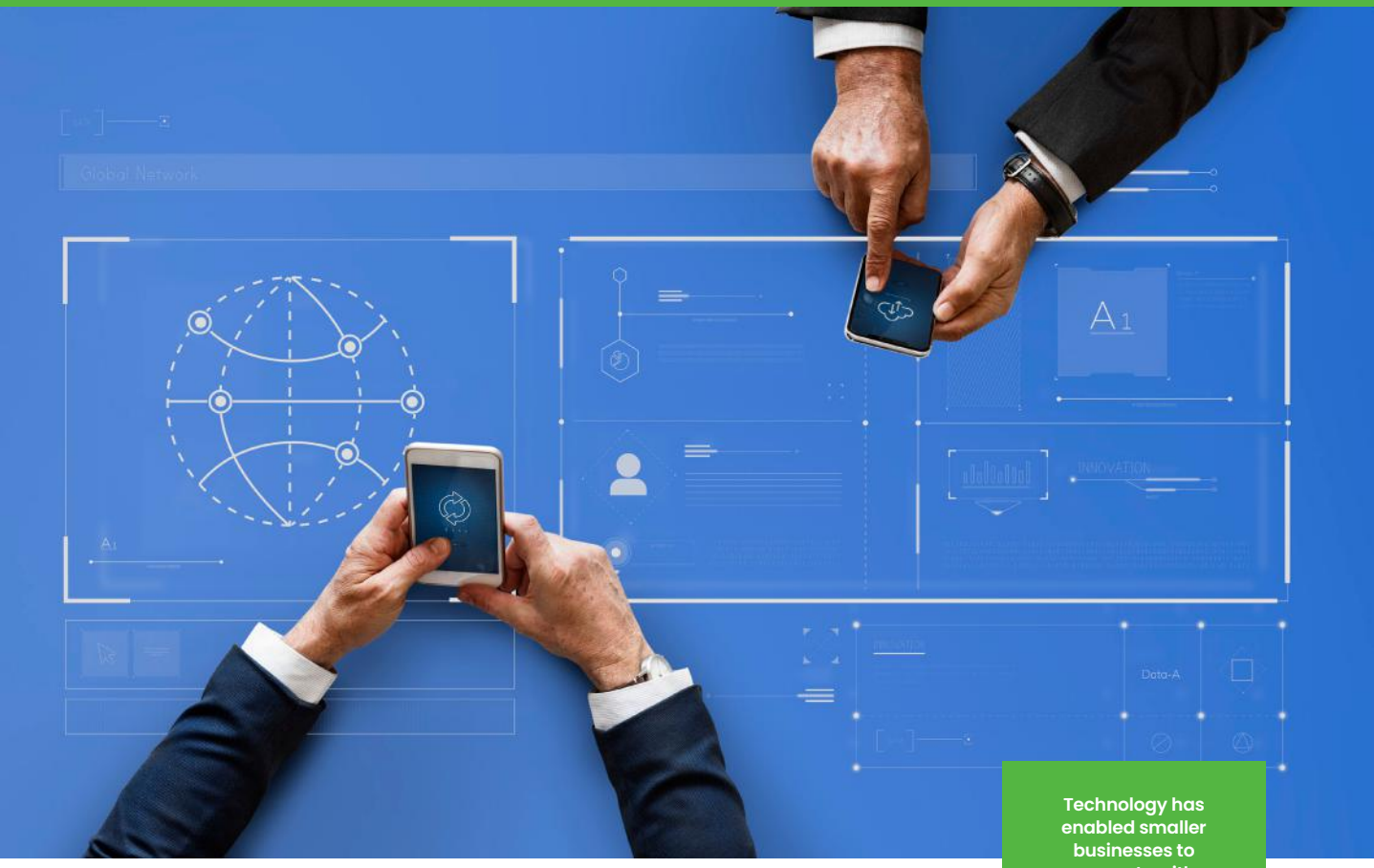
For Dzuleira, this is personal. "I aspire to mould Malaysia's next generation of entrepreneurs to navigate the risks of today and challenges of tomorrow, in preparation for future and rapid change brought about by IR4.0. I know we can do it."

It is personal for Dr. Siti Hamisah too. "This pandemic is going to leave a lasting stain on our DNA as a nation. But this worldwide crisis has also presented us with the opportunity to accelerate change that a lot of governments have put off in terms of empowering people, propelling business and stimulating the economy. These are changes we all should have embraced long ago – digitisation, digitalisation, automation and robotics." Now we have another chance. It's going to be exciting. 0

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

NATIONAL TECHNOLOGY & INNOVATION SANDBOX

Dzuleira Abu Bakar, CEO of Malaysian Global Innovation & Creativity Centre (MaGIC)



Technology has enabled smaller businesses to compete with established players with bigger resources.

DIGITALISING OUR FUTURE

FOURTH LEAP

By Ir. Dr Mohd Shahreen Madros

NEVER waste a good crisis. This adage seems to fit so well with the current pandemic that the world is facing. While we should not belittle nor be insensitive to the impact that the crises have on many lives, we have to acknowledge that the crises have been quite effective in pushing decision-makers, businesses, and society at large, in their decision to adopt digitalisation and the internet. Sadly, it takes a crisis for us to react. That, however, is something for us to ponder, and probably discuss in another article.

A concerted effort to promote digital technology in Malaysia started way back on the 12th of February 1996 when the then prime minister officially inaugurated the Multimedia Super Corridor or the MSC. Since then, we have seen numerous attempts to promote the effort, but until now the results have been uneven at best. MSC was among the key components of vision 2020. It forms part of the knowledge-based society framework that would transform Malaysia into a modern state by 2020. Ironically, here we are in 2020 and we are still struggling to adopt digitalisation, and if not because of the pandemic, we would still not embrace it at the rate we are seeing now.

In some ways, we have been fortunate. Among the many developing nations, we have industrialised faster than most. Based on the records by the Registrar of Companies (ROC), there are about 1.2 million registered companies to date. Out of this, approximately 98.6% are SMI/SME, 1% mid-tiers, and 0.4% large corporations. We have a disproportionately large number of SMI/SME compared to the mid-tiers and larger organisations. Furthermore, you can safely assume that all these smaller SMI/SMEs are owned by Malaysians, and almost 80% of the 98.6% are micro SMI/SMEs with less than five employees.

The SMI/SMEs, however, are mostly in the service sector and the Food & Beverage (F&B) industry. The industries that involve high-technology such as oil & gas (O&G), machinery, electrical & electronics (E&E), and automation, are mainly dominated by the mid-tiers and larger corporations, and a significant proportion of them are made up of foreign-owned multinational organisations. This unevenness on technology adoption compounded by different ownership is where the real crux of the problem lies.

Technology adoption especially among the mid-tiers and large corporations are already quite established. Compared to the SMI/SMEs, these mid-tiers and larger corporations have the financial strength to acquire technology and train their personnel. They are required to do this to be acceptable to their foreign clients that expect a higher level of reliability, and larger capacity of production. Business digitalisation among the local mid-tiers and large corporations may not be perfect, but they are definitely ahead of the SMI/SMEs.

Government agencies have tried promoting the adoption of internet-based technology to help our businesses in the past. The mid-tiers and large corporation digitalisation may include things like integrating their business processes with the foreign MNC's procurement and production supply-chain system. Having a tight integration can ensure a timely and efficient production schedule and a higher level of quality assurance for the customers. This is especially important for foreign buyers that demand reliability from their vendors. Our local players are also encouraged to explore using internet-enabled sensors (the Internet of Things, IoT) that would allow remote monitoring. This would enable continuous automated monitoring that can improve overall production and avoid unplanned shutdowns. There are definitely many benefits to be gained by leveraging technology in businesses, and the mid-tiers and larger corporations stand to benefit from it significantly.

The SMI/SMEs, however, have been slower at adopting new technology mainly due to their financial limitation. Furthermore, what would be the incentive to spend the limited funds available when it is cheaper to hire workers that are available at a lower cost? After all, committing your resources to capital expenditure that only depreciates over time is hard to justify against employing cheap labour that is part of the operational cost that you can retire when time is hard. This logic looks right in the short term, but can never be so wrong when looking at the bigger scheme of things.

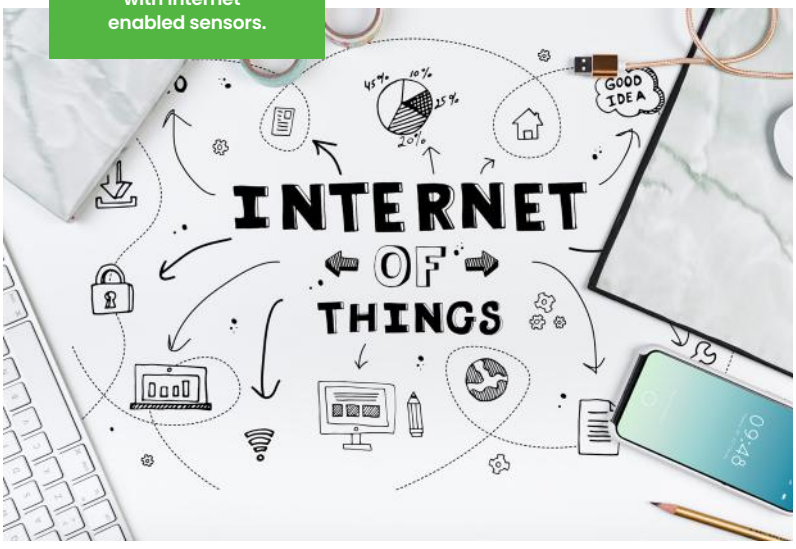
Modern technology has become such a game-changer that for the first time, smaller businesses can now compete with established players with bigger resources. The cost of acquiring certain technology has become so competitive that it is easily affordable by many. Digitalisation of businesses would open up opportunities for smaller businesses like never before. Acquiring assets such as computers, switches, modems, and routers are no longer a luxury. Businesses that are not able to reach out to customers, whether individual consumers or other businesses, miss out on the most crucial link to remain relevant.

Technology has certainly democratised the market place, and our SMI/SMEs must embrace this completely. Especially when the majority of our smaller players are in the service sector and F&B industry. Adopting digitalisation and integrating it with internet marketing channels will allow our SMI/SMEs to reach the global market. We have remained small and stuck in the middle-income trap, partly due to our complacency of being satisfied with playing only within our shores. This is understandable when going abroad was only viable for companies with larger resources. But with the Internet allowing the global market to be connected at such a low entry cost, there is really no reason to remain in the old ways. One thing is for certain, whether or not we venture out of our comfort zone, foreign businesses will venture into ours.

> **"Businesses that are not able to reach out to customers, whether individual consumers or other businesses, miss out on the most crucial link to remain relevant."**

The adoption of digitalisation is currently the fashion of the day. We have agencies with programs and funding made available to encourage our companies to digitalise their business. Our recent budget announcement has put great emphasis and provisions on technology. This is definitely a good effort in keeping abreast with time and future-proofing our economy. We want our society to embrace the internet and social media, for our businesses to have online e-commerce channels, and for our future generations to be trained and conversant with the internet of everything. As a small nation, we must embrace technology to create our own competitive advantage.

Remote monitoring is now possible with internet-enabled sensors.



Ir. Dr Mohd Shahreen Madros has over 30 years of working experience in various capacities. He was a lecturer in Universiti Kebangsaan Malaysia (UKM), with over 20 years experience in the Oil & Gas industry. He was also the appointed CEO of MATRADE from early 2017 until Feb 2019 during which he represented Malaysia in many international trade missions. Dr Shahreen is currently an independent advisor to industries, a board member of a public listed company, a certified coach, and an Adjunct Professor at the Graduate School of Business, UKM.

BEYOND THE INDUSTRY 4.0 HYPE: WHAT'S IN IT FOR THE SMEs?

FOURTH LEAP
By Tan Chiaw Hooi

FOURTH LEAP
By Lee Ying-Han

OVER the years, industries and businesses globally have been constantly disrupted, leaving no room for late adopters. The First Industrial Revolution led to the mechanisation of production from manual processes. The Second (or Technological) Revolution led to the electrification of machines for mass production. The Third (or Digital Revolution) led to automation using computers and electronics.

Now, the Fourth Industrial Revolution (commonly known as Industry 4.0) will transform how businesses operate and the way we work, led by the convergence of web connectivity and digital controls with real-world tools.

It is more important now than ever to embrace change and disruption. Today, only 51 or 10.2% of Fortune 500 companies have remained on the list since 1955 and based on the churn rate, approximately 50% of today's S&P 500 companies may be replaced over the next 10 years.

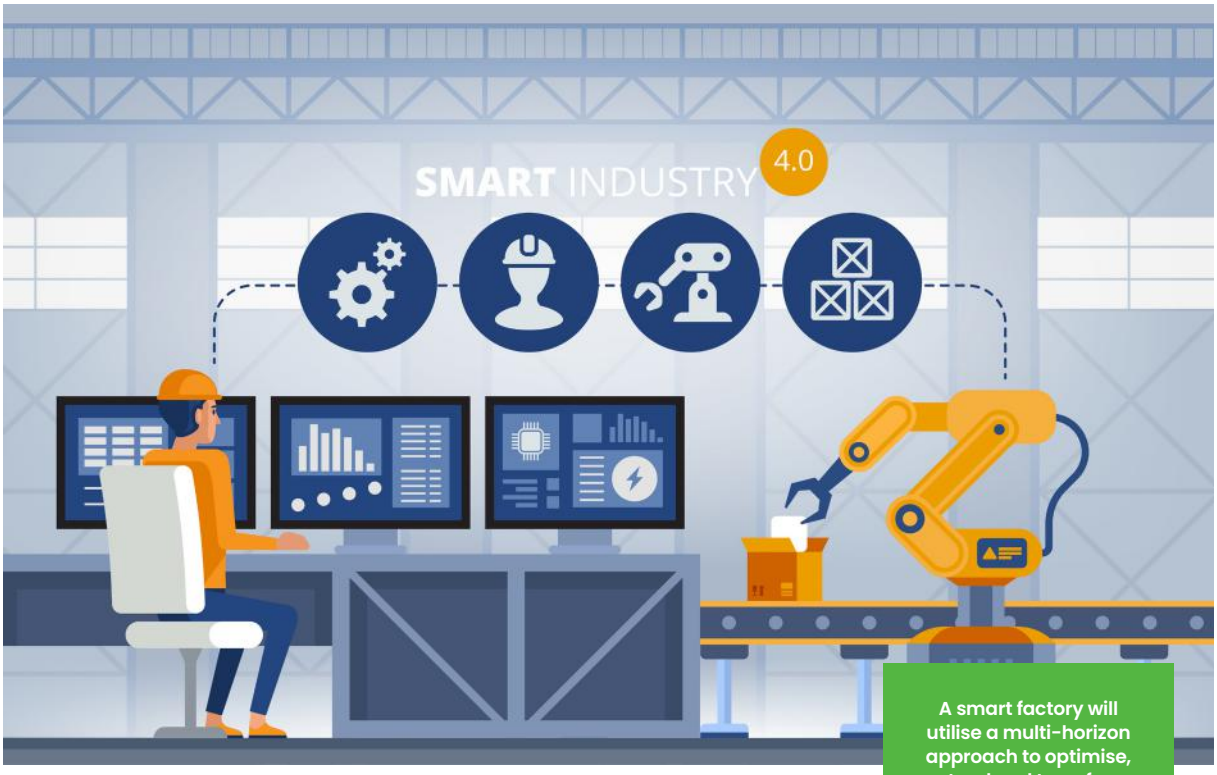
The onset of new technologies brings transformative opportunities for today's manufacturing and supply chain leaders to unlock unprecedented productivity and operational benefits.

EMBRACING INDUSTRY 4.0

The Malaysian manufacturing industry has contributed to approximately 22% of the national GDP over the last five years, with Small and Medium Enterprises (SMEs) representing 97.1% of the registered companies. However, there is a nascent intersection between Industry 4.0 and SMEs due to limited awareness.

Many SMEs are not aware that the barriers to new technologies have reduced as implementation costs have declined. With COVID-19 severely disrupting operations,

Only 10.2% of Fortune 500 companies have remained on the list since 1955.



A smart factory will utilise a multi-horizon approach to optimise, extend and transform key value chain activities to create new sources of value.

coupled with new customer expectations, SMEs should reevaluate their business models and embrace digitisation to manage significant cost pressures and improve output quality, while increasing productivity, to remain competitive or speed up recovery.

Global organisations have been re-evaluating their supply chains and production geographies and relocating their operations to ASEAN. This opens up new opportunities for local businesses. However, SMEs are then confronted with a new set of challenges around production scale, rapid growth and sustainability which can be tackled by digitalisation and advanced computing capabilities.

FACTORY OF THE FUTURE: SMART FACTORY

There is a need for an environment that facilitates interconnectivity between critical components, monitoring of the entire ecosystem and optimisation of decisions based on data from the monitoring system. This convergence of digital technologies and cognitive computing techniques is a key enabler of the Fourth Industrial Revolution, which is characterised by digitally enabled smart factories. A smart factory is defined by the co-existence of cyber-physical systems that enable ease of monitoring, experimentation, automation, and faster, more accurate decision-making.

A smart factory will utilise a multi-horizon approach to optimise, extend and transform key value chain activities to create new sources of value. Digitisation of the manufacturing system will be vital for SMEs to build direct links to end-customers and produce innovative, customised products. By fully embracing Industry 4.0, SMEs can not only overcome challenges inhibiting them today but also realise new value-creation opportunities in the future.

So, what are the foundations of a successful Industry 4.0 journey?

START WITH THE PEOPLE

A smart factory may be equipped with the most sophisticated devices and smartest systems, but it is all for nought if they are not supplemented by a capable workforce that is ready for change. The success of a transformation depends on its leaders who should develop a definitive strategy and cascade it to the people. Focus on bridging capability gaps with proper training and change management. This is important as the older and more experienced workers may be worried about being replaced by their juniors to run this high-tech equipment and systems.

“Digitisation of the manufacturing system will be vital for SMEs to build direct links to end-customers and produce innovative, customised products.”

SMEs need to ensure their technology stack can accommodate a continuous flow of data.

START SMALL (WITH THE END IN MIND)

One method to ease the transition is by deploying micro–initiatives to flatten the learning curve. Workers are gradually exposed to the required technologies and they progressively adopt more responsibilities so as not to be overwhelmed by the change. Once SMEs ready their people to be the drivers of Industry 4.0 with promising business cases, they may then double-down on full-fledged initiatives.

Start Being Data-Driven

Today, a large portion of data is sitting in silo systems, recorded manually in production logbooks and/or not being analysed in a way to derive actionable insights. One of the key use cases of Industry 4.0 is to transfer real-time process adjustments to cyber-physical systems that are supported by a myriad of datasets, prescriptive and/or predictive analytics.

An example application is a system that will proactively shut down if the machines measure certain fluctuations or signatures that match previously failed machines. Thus, SMEs should carefully select pilot or proof-of-concept areas to make the most out of all the data gathered from the Internet of Things (IoT) devices.

> **"A large portion of data is sitting in silo systems, recorded manually in production logbooks and/or not being analysed in a way to derive actionable insights."**

START SECURING THE ARCHITECTURE

A modular, interconnected architecture is essential to reap the full benefits for the business. SMEs need to ensure that their entire technology stack (from sensors to cloud platforms or analytics systems) is able to handle a continuous flow of data from cyber-physical systems and is designed in a robust, secure and future-proof manner. This means that strong cybersecurity measures – which are often overlooked – are critical to safeguarding private or proprietary data, as cyberattacks can lead to devastating social and business consequences.

So, what has the Industry 4.0 journey been like for other companies?

Chickens in Korea soon to be raised by AI

Imagine a future when chickens are raised completely by Artificial Intelligence (AI) in unmanned poultry farms. Livestock farmers in China and South Korea are already employing AI smart farm technology to not only improve the productivity of poultry farms but also to promote the welfare of farmers.

Combining camera-sensing technology with poultry big data and deep learning algorithm, the AI is able to monitor the farm environment and automatically adjust the temperature and humidity of the farm to optimal parameters once a change in weather is detected. Besides that, by monitoring the status and size of the chickens, the AI is also able to help predict the shipment time to market.

Large poultry farms are often susceptible to infectious diseases, and as it is difficult to identify the infected ones amongst the tens of thousands of chickens, specific countermeasures are often too late following discovery. It was reported that 33 million chickens (valued at 1 trillion KRW or approximately RM3.6 billion) were buried across 821 farms in South Korea within three months of the H5N1 virus outbreak in November 2016. The AI smart farm technology aims to tackle such a problem by analysing the condition of the chickens for early detection of suspected diseases.

Smart Warehouse and Internet-of-Things driving productivity boost

Amidst external pressures such as rising labour costs and rapidly changing customer expectations, global logistics companies have already started transforming their operations using modern technology, i.e. smart warehouses. The combination of IoT and computational power is able to deliver responsive, agile and scalable operations which is crucial during the COVID-19 outbreak.

Cloud robotics platform and mobile robots are able to increase efficiency by automating transportation of materials, packages or pallets from point-to-point. Success stories have reported approximately 25% productivity increase and 20% operations savings simply by reducing the travel time of workers in the warehouse and shifting time spent on manual picking to value-adding tasks. There are flexible and customisable solutions which are readily available in the market.

Another interesting use case for a smart warehouse is to create a "digital twin" by integrating physical objects with digital and data such that leaders are able to monitor warehouse operations through a virtual model. Data harnessed in the Control Tower can be used to improve inventory management, traffic flow, resource planning and workload allocation significantly. Successful applications have led to goods being correctly shelved and stored rapidly upon receipt supported by real-time stock level simulation.

Understandably, some of these technologies and information are still very new. This may create a psychological barrier to change as the technology jargons may be hard to understand at first. However, don't be afraid to start out small and grow slowly. Start by talking to your people, then look deep into your organisation and identify specific business or operational problems that new technologies can finally solve. There are plenty of micro-initiatives to kick-start your IR4.0 journey without breaking the bank.

Change is coming rapidly – it's time to start preparing before it's too late.

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Digitalisation and innovation must be supplemented by a capable workforce.

ROLE OF AI IN INDUSTRIAL 4.0

FOURTH LEAP
By Guarav Dua

IN recent years, there has been a lot of buzz, hype and excitement around artificial intelligence (AI) and the Internet of Things (IoT). COVID-19 has acted as a catalyst and is further accelerating the rise of the Digital Economy. The digitisation of businesses and governments is only going to increase further from here and at a breath-taking pace too.

Industry 4.0 will be a predicted paradigm shift through bots, e.g. human-robots interaction, cyber-physical systems, driverless cars, etc.

While there have been concerns to implement AI within the manufacturing sector, AI technologies have made tangible improvements to the supply chain and other related functions. Having said that, the manufacturing sector continues to rely on experience, intuition and judgement of their skilled employees for numerous activities and needs to be addressed especially when production must be scaled. This is where manufacturers must think of ways that the combined expertise of the human-robot collaboration can work.

Going forward, while AI is expected to play a central role in Industry 4.0, IOT, quantum computing and 3D printing are all expected to be part of the massive change. As things unfold, we are entering into an exciting world of AI, neural networks, ML, cybernetics, and deep learning. In the future, a smart factory would have humans and cyber-physical systems interacting over the cloud. Remote monitoring of processes and decisions using big data analytics is also bound to happen.

Machine learning is a subset of artificial intelligence. AI and ML technologies are mainly driven by predictive analytics, cloud computing and big data analytics. The reasons for most companies to shift towards Industry 4.0 and automate manufacturing include enhancing productivity, reducing errors and optimisation of production costs.

Industry 4.0 is expected to benefit tremendously from Machine Learning methodologies. Some of these benefits include:

- Enabling machines, humans, software systems, and products interact over the internet
- Advanced digitised networks can be installed for data collection and transfer
- Automating Inspections, supervision, modifications, and communication

There could be a slow uptake initially in regards to AI adoption in the manufacturing sector since it may be considered as a complex and expensive proposition. However, one cannot deny high-efficiency gains and smoother production workflow if AI and IoT are adopted and implemented correctly.

Adoption of AI in the manufacturing sector:
A few areas that will flourish with the adoption of AI in the manufacturing sector:

- **Real Time Inventory Optimisation** – This cuts across supply chains and helps in monitoring progress real time along with resource allocation optimisation through ML and NLP algorithms.
- **Human and Robot Combo** – Integrating industrial robots will be a major game changer in regards to adoption of AI in the manufacturing sector. According to the International Federation of Robotics (IFR), there were more than 2.7 million industrial robots implemented across factories all over the world (as of Oct 2020) and this number is only going to increase manifold as robots eventually take over an advanced role in aspects such as programming and designing.
- **Scaling and Simulating** – This is likely to become much simpler with AI taking over core processes. AI will eventually start creating designs taking specific inputs related to raw materials, design as well as cost from the customer.

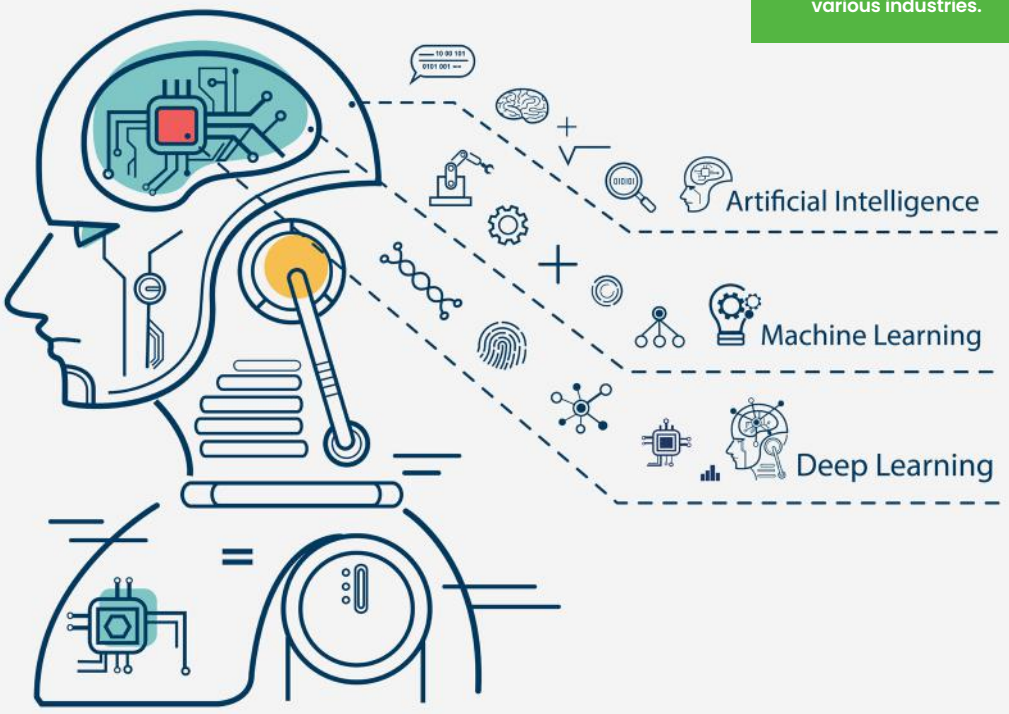
> **One cannot deny high-efficiency gains and smoother production workflow if AI and IoT are adopted and implemented correctly."**

- **Predictive Analysis** – Using ML to predict energy consumption and automate energy management functions dynamically.

The AI and ML Impact on Industry 4.0
The AI and ML impact on Industry 4.0 can be categorised into 5 main areas i.e.

- **Predictive Maintenance:** Machine Learning technology has the capability to dynamically adjust to new data, analyse and understand the actions in real-time.
- **Smart and Agile Manufacturing:** Deep learning provides advanced analytics tools for processing and analysing big manufacturing data. Artificial intelligence and Big Data analytics are making machines smarter than before. As a subset of AI, ML is the key fulcrum of such innovations in the manufacturing sector.

Artificial Intelligence and Machine Learning has limitless potential and applications in various industries.



Robotics are being utilised in factories all across the world.

- **Production Optimisation:** AI implementation in production/industries can function at an exceptional speed while reducing costs and enhancing customer experience. The combination of AI and ML technologies can predict failures and prevent machine downtime, manage inventory, and work on delivering the highest quality products.
- **Quality Enhancement:** With the help of AI and ML technologies and algorithms, an alert can be sent to plant heads even if there is a minor issue that is detected leading to avoiding unwanted outages. The AI and ML algorithms are being leveraged to identify trends and patterns in the data.
- **Change Management and Ability to shift gears on short notice:** Adapting production to real-time demand (especially during COVID-19) is a big concern for the manufactures. AI algorithms can be used to understand the market and identify demand-supply patterns categorised by date, location, socioeconomic variables, macroeconomic indicators, political factors, weather change patterns, and many more. This can be a huge game-changer for the company and will help manufacturers make better financial decisions during these uncertain times.

"Success has not and will not come by one organisation working in isolation when it comes to their AI strategy. Instead, collaboration, co-operation and co-existence with different players across the AI wider ecosystem will be the key to success."

AI USE CASES

Many global MNCs such as Tesla, Siemens, BMW, Nissan, LG, etc., are using AI in their manufacturing processes. Nokia has launched the video application that uses machine learning to monitor an assembly line process in one of its factories in Oulu, Finland. Siemens is now using this prior experience to make headway in the manufacturing sector, using AI to monitor different variables (for example: temperature) on their turbines, which then adjusts the operation of the machine for increased efficiency.

Komatsu Ltd, a Japanese construction major, now provides its customers with drones to monitor construction sites. The data these drones collect is processed by the company's AI algorithms to create 3-D maps and extract construction blueprints. Danone Group, a French multinational is using a ML system to improve planning coordination across sales, marketing, key account management, supply chain, and finance, leading to more accurate forecasts.

GE is building an array of AI-enabled digital twins in order to make significant operational savings. The digital twins are digital reproductions of the company's physical assets, each capable of showcasing the real-time status of its physical twin based on insights and intelligence collected from sensors in the equipment.

Thales SA, a leading supplier of electronic systems is using machine learning to predict preventative maintenance for high-speed rail lines throughout Europe. KUKA, a European manufacturer of industrial robots, has tied up with Huawei, to develop a global network of AI-powered manufacturing robots.

BMW Group is using AI to evaluate component images from its production line, allowing it to spot, in real-time, deviations from quality standards. Nissan is now leveraging AI to design new models in real-time, hoping to reduce time-to-market for the next-generation model series.

FINAL THOUGHTS: PREPARING FOR THE FUTURE

As Industry 4.0 continues to evolve, companies can achieve large scale success by pursuing continuous marginal improvements. Companies evolving within Industry 4.0 require a broad perspective and a deep understanding of the integrations between core technologies. By taking this approach, industrial enterprises can better gauge the appropriateness of specific technologies and how these solutions fit long term objectives. Perhaps most importantly, businesses need to become familiar with how data flows through their organisation.

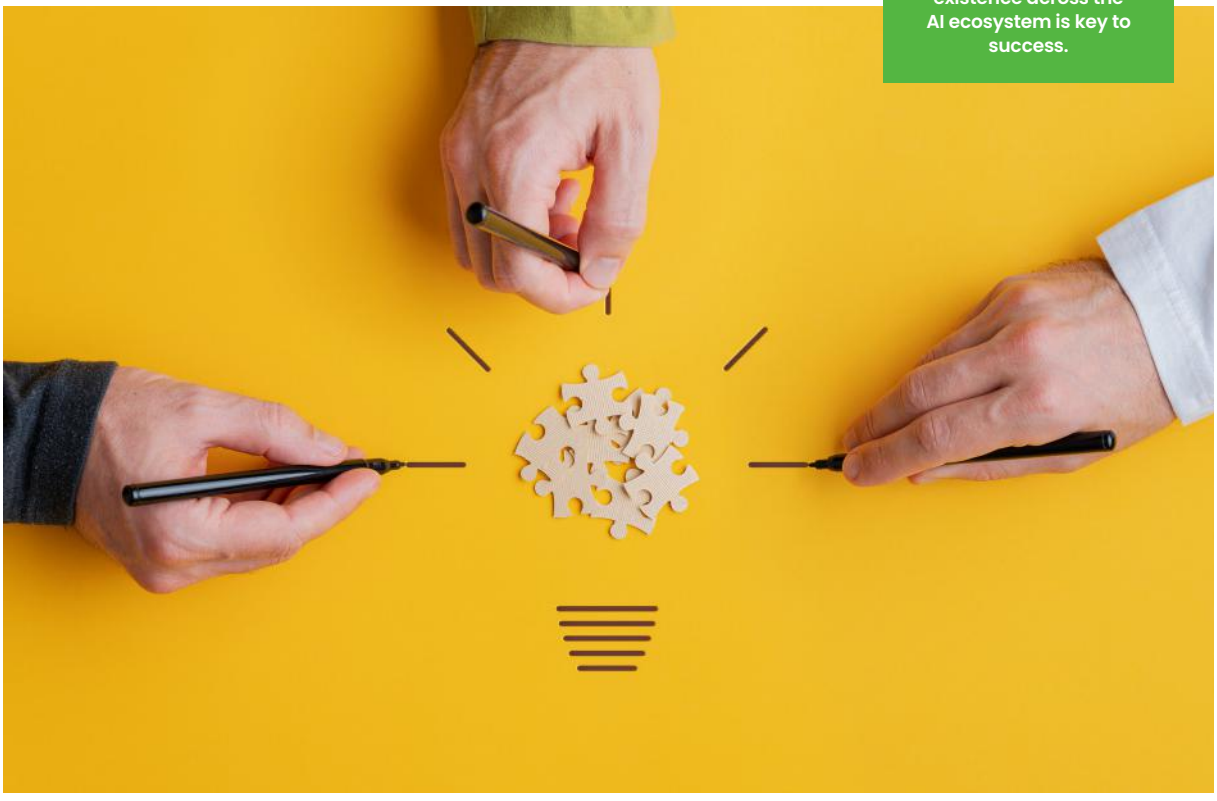
Currently, businesses are not just talking about software, algorithms, automation, robots, and hardware, but discussing more compound concepts like designing and producing goods on demand, dematerialisation, and disintermediation. Additionally, you need systems in place that can coordinate various artificial intelligence systems to prevent artificial intelligence islands.

Success has not and will not come by one organisation working in isolation when it comes to their AI strategy. Instead, **collaboration, co-operation and co-existence** with different players across the wider AI ecosystem will be the key to success. Instead of trying to build the supporting technology themselves, many manufacturing companies are entering into collaborations within their ecosystems, wherein each participant brings its unique experience, knowledge, IP and value to the solution.

One thing is loud and clear – Artificial Intelligence Is Here to Stay. Manufacturers who embrace AI will be able to leapfrog and will remain relevant and thrive in this age of Digital transformation! *I would end it with this famous quote from Dave Waters:*

> **"Listening to Bill Gates, Elon Musk, and Stephen Hawking talk about Artificial Intelligence reminds me of the Jurassic Park scene where they talk about Chaos theory."**

Gaurav Dua is a Partner and Global Head (KaaS) at Frost & Sullivan with rich and deep expertise in building Research and Advanced Data Analytics Center of Excellence (CoE) for many Fortune 500 companies.



Collaboration, co-operation and co-existence across the AI ecosystem is key to success.

STEP BY STEP IN MATURING TOWARDS THE 4TH INDUSTRIAL REVOLUTION

FOURTH LEAP
By Dr Tan Chee Pin

FOURTH LEAP
By Dr S. Veera Ragavan

FOURTH LEAP
By Dr Chua Wen-Shyan

THE 4th Industrial Revolution (also commonly known as Industry 4.0) has taken the world by storm, bringing with it a wealth of opportunities for those agile enough to seize them, but also threats and disruptions to those who fail to recognise them and adapt. For the food & beverage operator, it could mean efficient delivery of their products to capture a market they were never able to reach before. For us, the people on the street, it has changed the way we lived, changing the way we shop (through cashless payments and home deliveries) as well as the way we take public transport. For the manufacturer, it could mean the automation of repetitive tasks, information at the fingertips for quick decisions, and a fully-connected process from the upstream to the downstream, ultimately leading to improved quality of products, shorter production times, and increased productivity.

However, the journey of embracing the opportunities of the 4th Industrial Revolution (4IR) is not always straightforward. With the many options available, one might not know where to start, and there is the risk of making wrong costly decisions by investing in something that might not be suitable for one's needs.

Based on our experience in developing technologies of 4IR, and working with industries in implementing them, we suggest a step-by-step methodology (see Figure 1), that can be taken in bite-sized and manageable steps, gain some quick wins, until such a time when the industry feels confident to make the investment in the next step. The methodology can be applied to a particular process or machinery (which can be chosen by the business owner, depending on the area of priority). In fact, each step shown in Figure 1, though manageable, could generate immense benefits to the industry, as will be expounded on in the following sections.

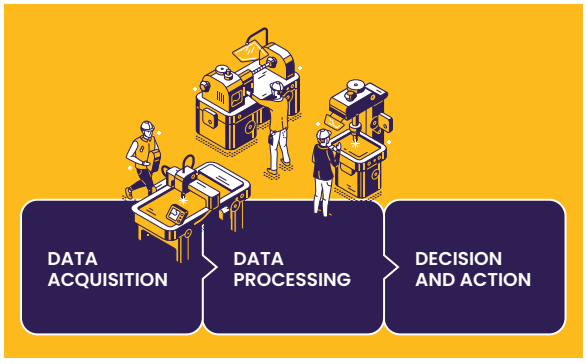


Figure 1: Our proposed methodology for adopting technologies of the 4th Industrial Revolution

DATA ACQUISITION

In 2017, The Economist published a story titled "The world's most valuable resource is no longer oil, but data", and this holds true even in 4IR. Even in its simplest form, data enables a process manager or business owner to get a quantitative picture of what is going on in the process/machinery, at his/her fingertips through an internet connected device such as a smartphone or tablet (see Figure 2). For instance, one could know the number of units produced, the duration of operation, duration of downtime, just from this data.

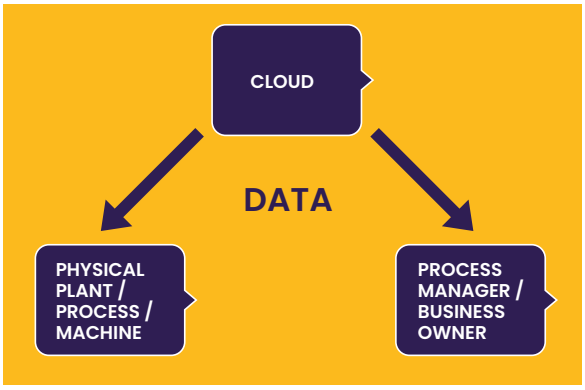


Figure 2: Instant data transmission to process manager / business owner

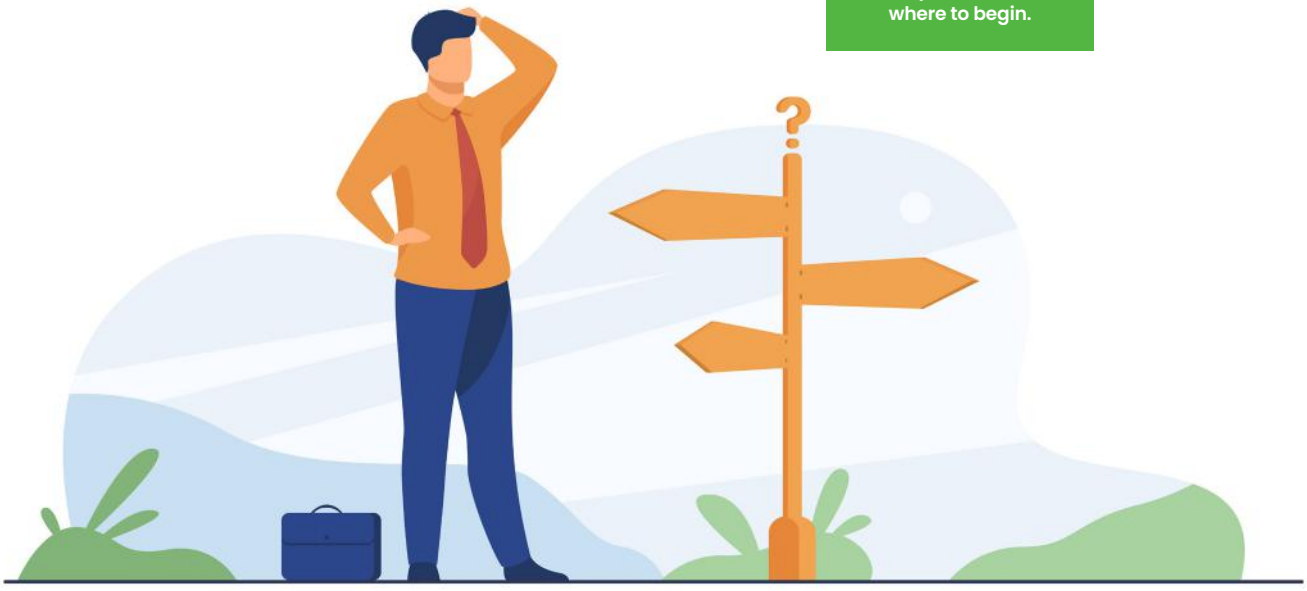
In moving towards 4IR, it is of great importance to generate a consistent stream of data for various purposes, such as to provide information, for analysis, and to facilitate making informed and timely decisions. It is also possible to make an antiquated machine (that can still run for many years) behave as shown in Figure 2, in a cost-effective manner without having to purchase a new machine. It would firstly involve non-invasive re-engineering and retrofitting the machine with appropriate sensors – this would require a thorough understanding of the machine's operations and properties. Following that, the sensor data can be pumped to the internet/cloud, and then stored (for future processing) and/or transmitted to a device such as smartphone or tablet (for instant viewing). Achieving this stage would already be a substantial win, as the data can help a business owner make swift and informed decisions, even though manually.

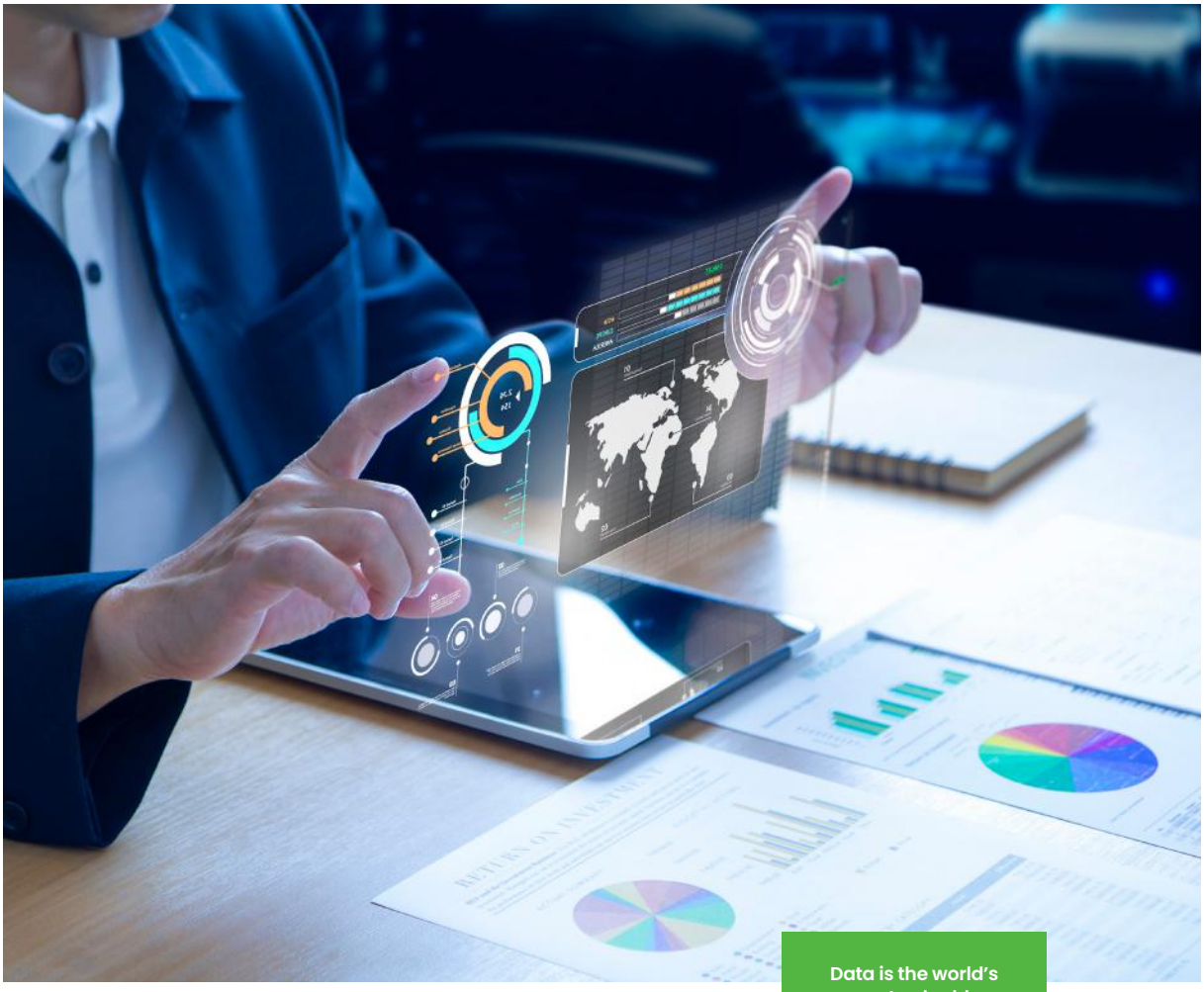
> **"Even in its simplest form, data enables a process manager or business owner to get a quantitative picture of what is going on in the process/machinery, at his/her fingertips through an internet connected device such as a smartphone or tablet"**

DATA PROCESSING

After data has been collected and stored, it can be processed to bring an industry to the next level of 4IR. It can be processed in two ways – firstly to infer the relationship between the variables represented in the data, and secondly to diagnose the condition of the machine in real-time. In the former, the relationship between the variables is commonly known as a model, or sometimes known as the Digital Twin.

Embracing 4IR technologies isn't straightforward and many do not know where to begin.





Data is the world's most valuable resource of this era.

These models can be used to simulate the performance of the system for a given set of conditions; users can try various combinations of conditions, to predict the behaviour of the system, quickly, and at no cost nor risk, and make decisions on the settings to be applied. The models can also be used for training purposes, where they can be used to help a user get more familiar with operating the system or to gain more insights about it; this can quicken the training process. The second way of processing data, which is to diagnose the condition in real-time, uses real-time data in conjunction with the model (in parallel) to make an inference of the condition of the system, this is known as condition monitoring. The concept is to inject the process/plant/machine input into the model, and compare the outputs of the model and the process/plant/machine, and the discrepancy is further processed (using artificial intelligence or machine learning algorithms) to make a diagnosis (see Figure 3 for an illustration of the concept).

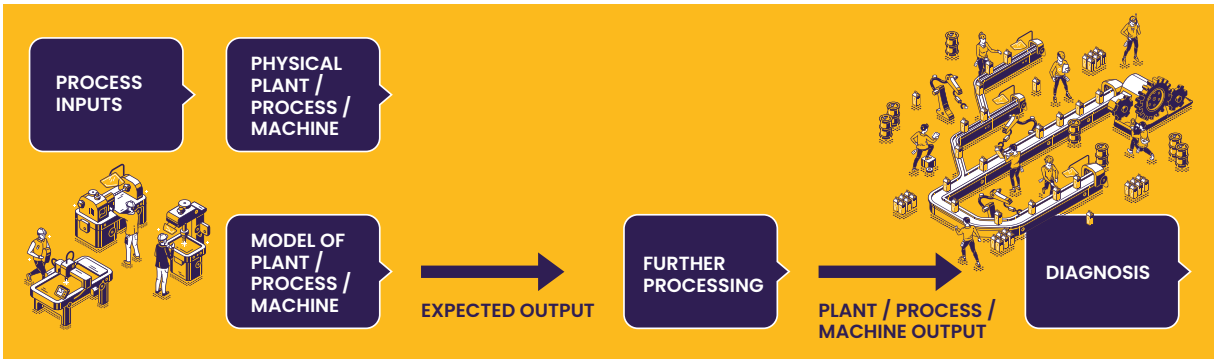


Figure 3: Schematic figure of model-based condition monitoring

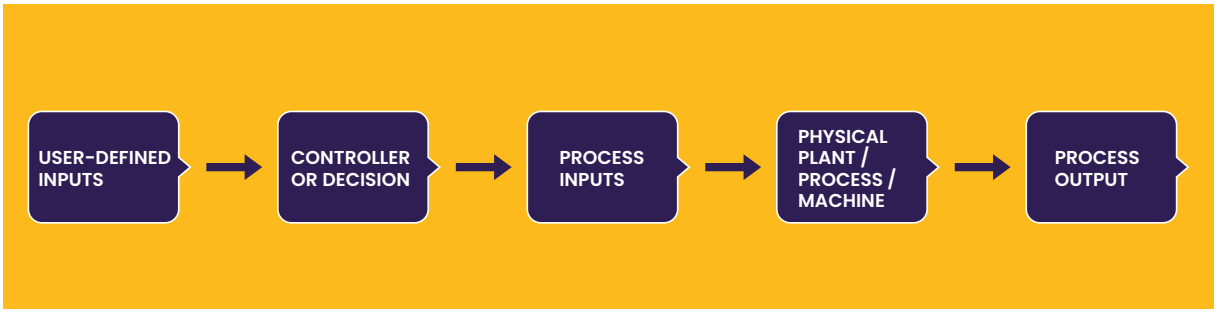


Figure 4: An illustration of an automated decision

This diagnosis can automatically generate an alarm if an abnormal condition is detected, or predict the future performance of the system and estimate when it will break down, which is known as predictive maintenance – that can help a business owner make plans on maintenance or replacing the machine. Finally, online and real-time data can be used in a feedback loop to make automated decisions.

DECISION AND ACTION

After data (and/or diagnosis) of the process is available, then decisions/actions can be taken, either manually or automatically. For example, if a machine is diagnosed to be behaving abnormally, the process manager can decide to either proceed with production and schedule repairs later on, or to halt it immediately (as the abnormality could reduce product quality or damage the process); this is a manual decision. An example of an automated decision is the machine-based adjusting of an input (such as a valve opening or motor voltage) in a feedback control loop, where the decision could be derived based on various methods such as control theory or artificial intelligence. Figure 4 illustrates this concept, where the condition monitoring block in Figure 3 could form part of the Controller/Decision block in Figure 4.

The next level of actions, that are more complicated, could be new ways of actuation or handling products. For example, this could be the design of a new robot or mechanism to handle textiles/apparel, or to handle odd-shaped or delicate products such as tomatoes and eggs. In this situation, there are many more possible scenarios or configurations to be considered, and the development of these kinds of mechanisms could be much more costly.

CONCLUSION

In summary, 4IR offers many opportunities for an industry to move to the next level of productivity, and we have described a step-by-step methodology to achieve it. Each step can be executed separately, offers immense benefits on its own, and builds on what has been achieved in the previous step. In this way, the business owner can incrementally improve on the development of his/her processes at a comfortable and manageable pace, depending on the financial resources available and constraints imposed (without having to make an upfront huge financial commitment to implement all steps at one go), and reap the benefits along the way whilst gaining the confidence to move on to the next step.

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Dr S. Veera Ragavan worked for several multinational companies in various capacities from a Design Engineer to Business Unit Head. He has more than 17 years of industrial experience in design and development of Factory Automation Systems and has executed several projects from concept to commissioning. He is currently a Senior Lecturer in the Robotics & Mechatronics Engineering program at Monash University Malaysia, training many students and helping many industries in moving towards the 4th Industrial Revolution.

Dr. Chua Wen-Shyan is currently the Head of Malaysian Smart Factory 4.0 under the Selangor Human Resource Development Centre (SHRDC). He is also appointed by the Malaysia Productivity Corporation (MPC) in collaboration with the Machinery and Equipment Productivity Nexus (MEPN) as one of the mentors (advisors) for the PRODUCTIVITY1010 initiative to support the industries in their journey towards digital transformation.

4IR offers many opportunities for an industry to move to the next level of productivity.

GRID MODERNISATION AND DIGITAL TRANSFORMATION

Disruptive technologies such as AI and big data will become common technologies in the future.

FOURTH LEAP

By Anthony S Rajamanickam

ELECTRIC power utilities are modernising and transforming their grid and business in line with government and regulatory policies on decarbonisation, decentralisation and deregulation. This is largely due to the global emphasis on energy conservation, climate change, sustainability and changes in market and business models.

They are adopting strategies to improve energy efficiency in grid operations and to provide new and enhanced customers services. To achieve these goals, grid modernisation and business transformation initiatives are being actively pursued through digitalisation, automation and adoption of innovative and disruptive technologies. Some of the initiatives include "grid of the future", advanced metering infrastructure (AMI), renewable energy integration, electric vehicle (EV) charging infrastructure, distributed energy resources (DER), demand-side management (DSM), volt/var optimisation, advanced distribution automation and digital platform.

Electric power utilities are therefore migrating from the traditional business of merely providing electricity to fully embracing digital transformation to modernise the grid and provide a multitude of products and services to meet regulatory and customer requirements. Integration of operational technology (OT) and IT has enabled value-added services focusing on customer benefits and bringing vast improvement in grid reliability and operational efficiency.

With deregulation and competition in the electricity retail market, utilities need agile and innovative products and services to be relevant and ahead of others. Using a vast volume of AMI data from digitalisation, information on customer bills and consumption patterns allows utilities to offer new service packages to attract and retain customer loyalty including opportunities to provide data services to third parties using a digital platform.

GRID OF THE FUTURE

Grid of the future is a vision that entails a smart or intelligent electricity grid from generation to end-users with a two-way flow of energy and information for clean, efficient and reliable power and that allows customer participation and empowerment in energy production and consumption. The grid of the future or smart grid enables seamless integration of renewable energy, large scale EV charging stations, AMI, micro-grids, virtual power plants, energy storage, demand-side management and other innovation and technologies.

Grid of the future allows increasing adoption of distributed energy resources by customers such as in Australia where penetration of rooftop solar generation is among the highest in the world. Integration of solar generation, battery storage and implementation of micro-grids require distribution network and market reforms to enable a two-way flow of energy and peer-to-peer energy trading. Regulatory policies are expected to allow open network access and pricing for DER providers while ensuring grid security and reliability.

AMI is a key grid of the future components implemented in many electric power utilities in the US, Europe, Australia and Asia to fully automate the billing process and provide other beneficial services to both customers and utilities. Digitalisation through AMI has enabled electric power utilities to empower and enhance customer offerings and services. Customers are now able to view their daily electricity consumption; plan their electricity usage with time-of-use pricing information; set energy bill threshold alerts; be automatically notified of power outages and restoration status; participate in DSM; renewable energy programmes such as roof-top solar generation and peer-to-peer energy trading. Information is now

available to customers via mobile apps and web portal.

Integration of smart meter data with advanced distribution management system (ADMS) and geospatial information system (GIS) allows distribution network operators to automatically locate and identify power outages and carry out corrective actions for quick power restoration. Customers need not call utility call-centres to complain or enquire about power outages or obtain updates on power restoration status.

The benefits of AMI implementation in Malaysia was evident during the COVID-19 pandemic lock-down period when manual meter reading and bill rendering activities were halted for several months. While customers with conventional meters were given estimated bills for the lock-down period as the meters were not read, customers who installed smart meters, on the other hand, received actual bills on-time digitally through mobile apps and email. This is an example of the benefit of automation and digitalisation where business processes can continue normally in crisis situations such as that due to Covid-19 lockdown, thus potentially avoiding customer complaints on getting high bills when the process for actual bills resume.

Digitisation of distribution network assets, integration with AMI and other grid automation systems enables deployment of innovative applications for improved business processes and operational efficiency. For example, voltage levels are automatically controlled and maintained for optimising distribution network losses and ensuring supply quality by using low voltage network data captured by smart meters as inputs for processing and control by volt/var optimisation systems.

DISRUPTIVE TECHNOLOGIES AND CORE INFRASTRUCTURE

Disruptive technologies such as big data analytics, blockchain, augmented artificial intelligence, predictive and prescriptive maintenance are being used now and will become common technologies in electric power utilities in the future. We see increasing use of drones or unmanned aerial vehicles by transmission network operators for transmission line maintenance, tower-top inspection and/or vegetation management. Accurate real-time data is available to maintenance crew for analysis and decision for appropriate action. Similarly, predictive and prescriptive maintenance techniques are used on grid equipment to detect and provide preventive action before the equipment fails, thus significantly improving network reliability and cost.

A core infrastructure consisting of communications networks and IT systems need to be established, operated and maintained as the basic building block or foundation over which disruptive technologies will be integrated to provide new operational and business services. This core infrastructure collects huge amounts of data from field sensors and devices such as smart meters using various communications networks to data centres for storage, validation, processing and analysis for integration to other systems and applications. A strategic decision is required on selecting the most appropriate communications network technology to ensure it is future-proof, reliable, secure, fit for purpose and cost-effective. A secure, reliable and scalable core infrastructure that supports open integration, operated and managed by a team of well-trained and competent staff is expected.

REIMAGINING UTILITY BUSINESS

Electric power utilities are reimagining their business strategy and operations through digital disruption and business innovation in response to decarbonisation, digitalisation, deregulation and greater customer expectations for new and/or improved service options and reliability. Utilities need to develop a comprehensive long-term grid of the future plan beginning with establishing the core foundational infrastructure for ensuring structured development and realisation of the various initiatives defined in the plan. Huge investment is required that will require regulatory approval as the operational and societal benefits must outweigh the cost with minimal impact to electricity tariff.

The grid of the future or smart grid enables seamless integration of renewable energy.

This article is a contribution by Professor (Adj.) Anthony S Rajamanickam, Advisor, NicheTech Advisory. He has more than 35 years experience in Tenaga National Berhad (TNB), the premier electric power utility company in Malaysia wherein he was responsible for the development of TNB's digital telecommunications network since 1991.

How do you ensure customers remain on your page? User experience matters!

BLUEPRINT FOR ECOMMERCE MEGA CAMPAIGNS

FOURTH LEAP

By Sam Kon

WHAT originated from Nanjing University as a celebration for singles and bachelors have now turned into a massive eCommerce campaign popularised by Alibaba Group – Single's Day. This mega sale phenomenon has been widely participated by eCommerce platforms, brands and even offline retails throughout China; and in most recent years, Southeast Asia. Alibaba reported a whopping USD 74.1 billion (MYR301 billion) in just one day. A few years after its inception as an eCommerce campaign festival, it has even eclipsed the likes of Black Friday or Cyber Monday in the United States.

"Rome was not built in one day". Single's Day or commonly known as Double Eleven have been wildly successful to date due to a few reasons. According to Forbes (2019), Alibaba not only expanded their product categories for shoppers but also expanded their eCommerce inside and outside of China, reaching new markets. The entire experience leading to "11.11" can be exciting for consumers as they are waiting for the year's largest sale ever.

In the movie Field of Dreams – "If you build it, they will come". This quote certainly does not resonate with the competitive eCommerce landscape today. eCommerce requires the necessary investment of time, effort and strategies. So, I am going to highlight four pivotal points for businesses who want to leverage eCommerce campaigns in 2021.

PRODUCT POSITIONING

Every business would like to put their best foot forward for the product or service they offer. So if you are in the business of serving the best burger in town, how do you get your customers convinced to try it?

In product positioning, one of the strategies is demonstrating the product value. Does your product help to solve a particular pain point for customers? Does your product provide specific benefits for your customers and users? What about the unique selling points of your product versus that of other competitors?

eCommerce business is not just a simple matter of upload and having it discovered during campaigns. It requires the above questions answered and tested for validation. To do so would be to gather feedback, to know your customers' understanding of your product listing, and if they are convinced with your product positioning. Always remember the KISS principle - Keep It Simple and Succinct.

OPTIMISE AND REFINE

In China, successful eCommerce sellers plan their Single's Day campaigns as early as 9 months. Devising a marketing strategy gives you a clear idea of how you can reach targeted audiences utilising organic or paid initiatives. This would then dictate the timeline in executing the entire campaign leading to the mega campaign.

Many would be surprised *"Why 9 months of planning ahead?"*. Here is a simple industry secret – all your prices are tracked. So how are you going to position your products to get the best pricing from the campaigns you have targeted for? These require months of planning. Every other logistic and operation details will naturally follow from there. Going online is a whole different ball game that requires proper planning, continuous optimising and refining.

PROFITABILITY FOR SUSTAINABILITY

In Asian countries, the price war is inevitable for eCommerce businesses. However, having deep discounts to succeed in the eCommerce business is clearly a misconception. Everyone loves discounts. Who doesn't? But for any business, profits help to keep the business sustainable.

Gambling profit margins with constant deep discounts, in the long run, can be detrimental to any business. In my experience when running training courses for my clients, many are surprised there are more than three pricing strategies for every product. Coupling this with applying the different pricing strategies at different environments opens out more opportunities and variables.

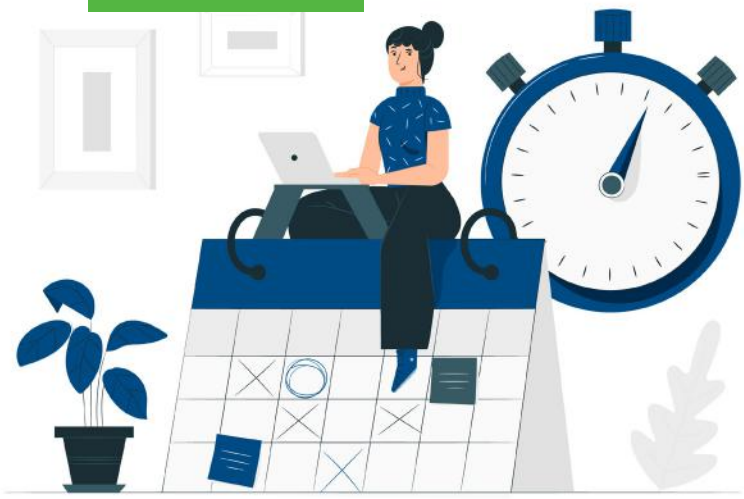
Two of the fundamental questions I always ask during my eCommerce masterclass - *"How many tiers of product pricing do you have?"* and *"Which product brings you the highest profit margin?"*. Based on their answers we then set out to incorporate some of this critical information into their eCommerce campaign blueprint, which will be their playbook for the year.

My question to readers is this; *"What is your plan?"*. *"Do you have clear strategies during campaigns, to balance between promotion and profit, for a long-term sustainable eCommerce business?"*.

X MARKS THE SPOT

Traditionally, a customer may have to travel to a few brick and mortar stores to compare a product they are interested in. With the boom of eCommerce stores today, customers can visit any other eCommerce stores selling the same product as you, in just a click of a button. So what makes you unique?

Successful eCommerce sellers plan their campaigns as early as 9 months .



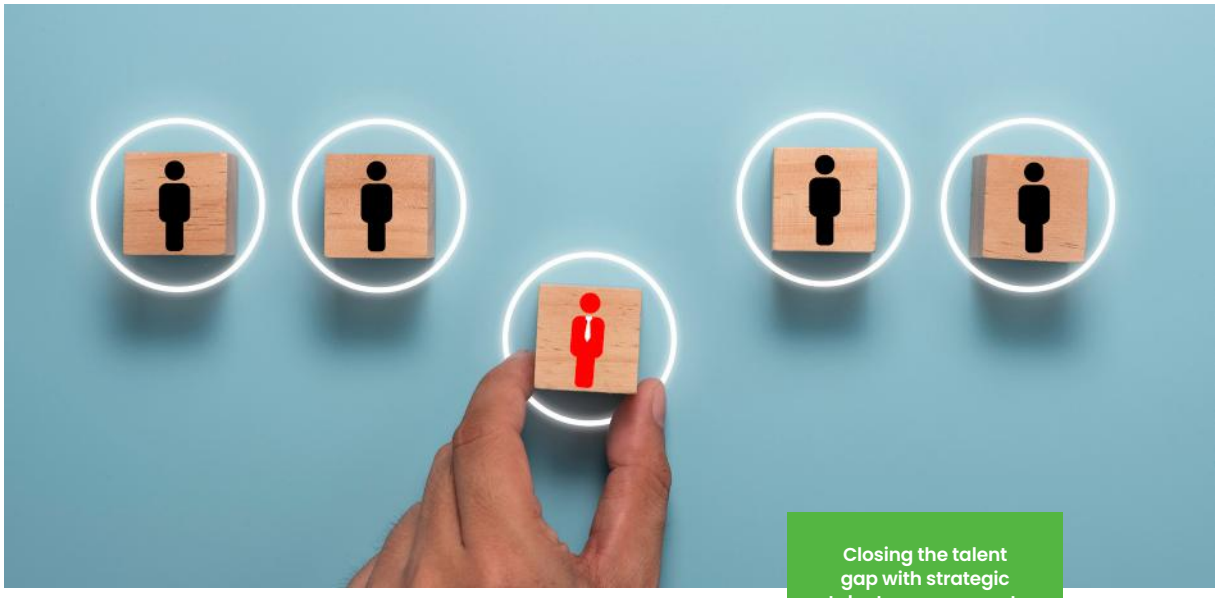
> **"In today's era of eCommerce, user experience matters. Your eCommerce store is not a maze puzzle to be solved; instead, it should be a treasure map with a clearly marked path to the 'X' spot."**

In today's era of eCommerce, user experience matters. Your eCommerce store is not a maze puzzle to be solved; instead, it should be a treasure map with a clearly marked path to the "X" spot. So here is an exercise I often do with my clients: Put yourself in the customer's position and navigate your eCommerce store. While doing this exercise, ask yourself these three important questions – *"How to keep them on the page?"*, *"How can my store help customers find what they need?"* and, *"How can customers discover what they want?"*.

Businesses can leverage eCommerce campaigns to create more visibility and attention. Nevertheless, don't be disillusioned that it can "magically" get you sales. If you do not have a plan, you are merely driving in the dark. High time to draft your playbook now and get help if you need to. Your "9 months" have started ticking.

Sam Kon is an eCommerce consultant from Beyond Infinity Consultancy (BIC). He is also a certified eCommerce trainer by Alibaba Business School and Taobao University; Enabling and empowering businesses to boost their revenue by going from offline to online (O2O).

STRATEGIC TALENT MANAGEMENT: ARE YOU READY FOR IT?



Closing the talent gap with strategic talent management.

FOURTH LEAP

By Helen Selvanathan

RESKILL, Retrain, Readjust, Reboot – we have heard it all in the past ten months. The question then arises: are our Malaysian companies ready for Strategic Talent Management beyond the pandemic?

Chief HR officers (CHRO) and management stakeholders have been kept on their toes to support and play a central role in reimagining talents to build resilience and continue to drive value in organisations.

While some organisations have taken a "Longer Term WFH" approach, many are considering plans for the return to offices as it will foster connectivity and lower other related employee manageability issues. Employees too feel it would be a change of dimensional perspective from never having experienced a "locked in" situation.

In a recent 2020 report, Mercer LLC commented 48% of the organisations surveyed, the executive's top work concern was supporting employee's health and well-being while 44% of the responses noted "automation at work."

In Racing to Reskill, reinvigoration of career paths will take place. It will help restore workers' financial and emotional stability, subsequently leading to a balanced workplace that we all want to build.

The CHRO mantra and playbook has taken a twist in crafting an efficient and effective way for sustainability in strategic management. The COVID-19 crisis has additionally accelerated "pre-existing" trends in talent management in CHRO priorities.

These priorities can be clustered to areas of:

- Enhancing Employee Experience
- Right Fitment to Hiring
- Keeping the Performance Alive
- Optimisation of Talent/Workforce
- Closing the Talent Gap

ENHANCING EMPLOYEE EXPERIENCE

Working remotely has blurred the line between work and life. This means that employee experience is even more crucial now then before. We must continue finding solutions that will support the talent needs, roles that are crucial and how to collaborate for excellence. Most Malaysian Small Medium Businesses have survived the past months by ensuring empathy-based employee management is applied.

Organisations need to consider an analytic way or tools that can be utilised to understand and promote connectivity and engagement from social network analyses to listening tools. It is all about winning with empathy as the future of talent management.

RIGHT FITMENT TO HIRING

Efficient and effective hiring remain as important as ever. Finding the right person to match any responsibility is not an easy task. Most MNCs have

tried on-campus interviews, internship through educational institutes. Some organisations have taken a higher percentage between 10%-20% for temporary employment. This is done to ensure a faster recovery. Organisations should have a plan and ready to leverage flexible employment in additional ways to support sustainability.

With the advent of tools and AI-based technologies, it has become a smoother effort for many organisations in Malaysia to leverage talent matching platforms. 70% of CHROs mention talent retention as the main obstacle to internal mobility.

Employees look forward to CHROs taking a fresh look at tools that make it easier to connect people to employment, based on a deeper understanding of their skills and how those will match with available jobs.

KEEPING THE PERFORMANCE ALIVE

CHROs must consider the effects of large workforce transitions accelerated by the COVID-19 crisis and the key role that reskilling plays in helping to close talent gaps.

Every organisation must have an agenda for post-pandemic support especially in learning and development beyond reskilling with cost effective enablement. The pandemic has accelerated much-needed shifts in both the physical and in mindset, and how organisations can better manage performance rewards. Most organisational leaders become dependent on the current performance management system that may not accurately identify top performers during such times. And as in most situations, employees do not feel that the performance management process accurately reflects their contributions.

I am always reminded that to "stay alive" in ensuring you are doing your best; you need to have the same goal in line with your organisation. Today, most organisations with a Virtual Work environment are setting expectations of work-life balance. And our performance can only be optimal if we know how to juggle work and other life priorities.

OPTIMISATION OF TALENT/WORKFORCE

Many Malaysian companies are seeking ways to optimise their talent pool. From ensuring availability of broad based digital training in essential skills to upskilling those rooted in traditional job scopes, it has been an uphill task for CHROs.

In this aspect, MDEC has taken the right steps in driving an initiative as part of Malaysia's #MyDigitalWorkforce campaign to encourage unemployed Malaysians to reskill during this pandemic through various digital courses.

Today's economy does not allow Malaysian organisations to plan long-term simply because of the business landscape being volatile and complex. As such, ensuring optimisation of the available talent pool is crucial to supporting the ecosystem will help organisations transform towards a more sustainable work environment.

CLOSING THE TALENT GAP

In a McKinsey survey, respondents globally cited that workforce planning, strategy and change in the HR spending categories are most likely to increase over the next 12 months. Given that we want to continue building talents that are valued long-term as leaders.

Critical roles, skills pools plus workforce-planning tools are supporting CHROs by ensuring talent gaps are matched. Analytics of the workforce is now very apparent as there are many solutions and companies that support the building of AI-based tools in the pre-hire ecosystem. Innovation has made it easier to connect people to employment via deeper matching of talents.

KEY TAKEAWAY

Preparing for tomorrow requires every employer to transform quickly – to redefine jobs and careers, to rearticulate what it means to reignite and retire, and what it means to be responsible. If we can galvanise our people's talent, we can build a sustainable, better future for us all.

Strategic talent management at Malaysia is recognised as a focal point in organisations as they determine firm decisions, capabilities, competitive advantages and performance during this crisis.

However, we need to speed up to ensure we are not one step behind in our focus to build a knowledge-based worker community.

What will the next decade bring? Winning with empathy to accelerate transformation! Along with biometric authentication; along with drone delivered parcels and virtual reality conferencing; alongside AI technology applied to our jobs, we hope that technology will not just enhance productivity but make life better in real-time to nudge us towards a positive future.

This article is an observation of Helen Selvanathan, Senior Director, Partner Go-to-Market, Software Solution Partners, SAP Asia Pacific & Japan. She supports business partners who innovate and build solutions that leverage SAP products. Helen also chapter leads for Malaysia, a global SAP employee engagement initiative known as SAP Business Women Network that looks to develop SAP employees both in the aspects of professional and personal.

IN IR4.0: SHOULD WE BE TEACHING CHILDREN (AND EVERYONE) HOW TO GROW THEIR OWN FOOD?

FOURTH LEAP

By Dr Alan Downe

With increased awareness of botanical cycles and how our daily choices impact the environment, growing your own food becomes a natural progression. Once you get into it, there is so much personal satisfaction gained from harvesting your own produce, the momentum becomes self-sustaining."

Monica Tindall, worldwide editor for *yumlist.net* and balcony gardening enthusiast

A couple of weeks ago, I was chatting online with a friend who teaches pre-school children at a Montessori School. She told me all about a recent class project where she taught her students about indoor gardening, planting and caring for varieties of lettuce, spinach and carrots.

"It was a great experience. The kids really got into it," she said. "And it teaches them so many things. Patience. Responsibility. Respect for nature. When they see how much devotion goes into nurturing their own little vegetable garden in the classroom, they develop a greater admiration for farmers and the food industry. They avoid food wastage, even when veggies aren't their favourite. I sometimes wish we could teach all children about growing their own food."

Malaysia. Monica Tindall agrees. "Yes! We should be teaching children (and everyone else, for that matter) to grow their own food. Every little bit counts – not only in reducing our carbon footprint in terms of food miles, but the more green we put into the urban setting, the cleaner our air is too."

Monica is the worldwide editor and driving force behind The Yum List, an Award-winning online blog and social media outlet described as a "gourmet food and luxury experience finder". She also writes occasionally about the vegetable garden she maintains on the balcony of her own Kuala Lumpur apartment. Lately, she has noticed a burgeoning interest among her readers in growing their own edibles.

"With so much information available on the Internet, easy how-to videos on YouTube and interest groups on various social media platforms, it's not hard to find what you need to not only get started but to problem solve along the way." At first, with pandemic restrictions, people often ended up with additional time on their hands and had to find something to do. "But, with increased awareness of botanical cycles and how our daily choices impact the environment, growing your own food becomes a natural progression. Once you get into it, there is so much personal satisfaction gained from harvesting your own produce, the momentum becomes self-sustaining." As one of her readers put it, "Monica, it must be so nice to be salad-independent."

AN EXPANDING IR4.0 MOVEMENT

Argentina. The momentum for home-gardening edibles and enhanced food self-sufficiency is trending worldwide. But, in many places, it's not all that new. In Argentina, the *ProHuerta (Pro Vegetable Garden) Programme* has been in place for the last thirty years. Established as a joint initiative of the National Institute of Agricultural Technology and the Ministry of Social Development, it is aimed at helping families and organisations facing food insecurity.

According to María Agustina Macías, a Buenos Aires digital transformation consultant and former advisor to local authorities on SMART City planning, the programme has achieved widespread success assisting individuals and groups involved in the production and sale of their own foods and guaranteeing access to a balanced and diversified diet.

Prof Brainy and growers on the farm in Bida, Niger State.

DoobaGrow assembly on tree planting with students and teachers at Fomwan Secondary School in Minna, Nigeria.

Eager to learn ... Growing plants teaches us to be more patient, respectful and responsible.

"It has done this by promoting agro-ecological vegetable gardens and farms, working together with families, local institutions and dedicated community spaces," she said. The initiative also includes technical assistance and training, capital financing for water access projects and support for sales of produce through markets and peoples' fairs. Presently, the ProHuerta Program reaches more than 4 million people, promotes 637,847 local vegetable gardens, occupies 9000 promoters, organises 744 agro-ecological fairs and gives more than 16 thousand families access to water.

"Environmental education for all ages is a big component too," stressed Agustina. "Increased awareness changes behaviour and leads to consumption patterns which meet community needs through balanced resource management. Digital technology gives us a definite edge in getting the message out, but it's the generations-old attraction of re-engaging with the land and with nature that keeps families and communities committed."

Nigeria. This sentiment is echoed by Dr Ibraheem Dooba, a prominent journalist, author and community organiser in Niger

> **It's the time-saving digital age innovations that make life easier. Those are the ones propelling our home-farming success."**

State, Central Nigeria. In 2017, he founded DoobaGrow, a registered social business with the purpose of encouraging youth, families and local women's cooperatives to plant fruit. Participating organisations are given 1,000 seedlings or saplings and are coached online or through face-to-face gatherings.

"While machines can do our tasks faster, longer and more efficiently, they can't be humans," he said. "So, we should delegate to machines what they do better and let us keep the things alive in ourselves which make us human. And, as humans, we grow plants. It is what we do."

Affectionately dubbed "Prof Brainy" by an admiring local media, Dr Dooba is a tireless advocate of community empowerment through increased awareness, skill training and start-up support for small scale gardening projects. His Dooba Foundation goes to schools throughout Central Nigeria to teach children how to plant fruit trees at home and in school gardens. They donate seedlings and show teachers how to integrate tree planting into the entrepreneurship curriculum.

"We also donate trees to any parent who is interested to help a child plant at their birthdays, so that the child can grow up together with the tree. We want to inculcate "birthday planting" by children so that they plant in sacks on the balcony or in the backyard."

"It goes beyond goals of economic opportunity, food security and traditional medicine," Dr Dooba said. "Planting is one of those things that connect deeply with our psyche and improves wellbeing. There is ample scientific evidence of that. Above all, people here, especially Muslims, want to plant trees so that they earn a reward even after death because both humans and animals will benefit from them as shelter, food and medicine."

"With DoobaGrow, we are trying to consolidate what we have, in time for the Fourth Industrial Revolution. Africa has 600 million hectares of farmable land. That's more than what's available in all the other continents combined. In my own Niger State alone, we have 76,000 square kilometres and 80% of that is arable. With the right balance of passion, knowledge and technology, Africa can feed the world!"

TECHNOLOGY AS EMPOWERMENT IN IR4.0

Technology development to assist the new cohort of balcony farmers is on the fast track. There are apps available in the Play Store that recognise plant species from uploaded photos, and provide all the details you would ever want to know. There's a company – Babylon Vertical Farms in Selangor Malaysia – that designs and rents shelving for indoor urban vertical farming, capable of rendering 15 sq ft of balcony space equivalent to 2,000 sq ft of farmland, replete with sensors for IoT monitoring of growing conditions and harvest times. Many of the pre- and pro-biotic plant stimulant products used by home growers to treat flowerpot soil are made using nanotechnology.

"Sure, the agro-tech that's hitting marketplaces now is very, very cool," said Agustina Macías. "And so is the way it has been made scalable for household or urban use. But for me, that's not what's driving this new trend."

"Instead, it's the time-saving digital age innovations that make life easier. Those are the ones propelling our home-farming success. It's improved ICT and better connectivity, new applications for remote shopping, IoT-enabled home appliances, and fintech solutions like the ones we are working hard to perfect in Argentina."

"In a way, it feels like non-human gadgets and networks are empowering us with the time and the knowledge we need to do things that really make us more human – things like falling in love with the idea of growing our own food. I think that's kind of beautiful, don't you?" o

Dr Alan Downe is a research fellow with the Digital Cities Research Institute at Malaysia's Multimedia University (MMU) in Cyberjaya and a 4th Leap senior contributor. His specialises in strategy and operations in service industry firms, with deep knowledge in talent management, outsourcing, technology adoption and more.

María Agustina Macías ... "Technology empowers us to do more human things."

THE STICKY SIDE OF IR4.0

FOURTH LEAP

By Jerry Durant

THE fourth industrial revolution, as a paradigm concept, received noteworthy attention in 2011 at the Hannover Trade Fair in Germany. Later in the decade (2016) Klaus Schwab, Executive Chairman of the World Economic Forum renewed the arrival of the fourth industrial revolution at the Devos, Switzerland event. This means most of us share equal starting positions in the journey forward into the industrial revolution 4.0 (IR4.0). It is an early period involving enlightenment, discovery, exploration and ample amounts of nervous reservation that have been further amplified by disruptive events.

It is important to affirm our understanding that IR4.0 consists of three (3) foundational pillars; smartness (intelligence from within), interconnectivity (ability to traverse services without intervention) and cyber (technology enabled & facilitated). To establish these conditions, cohesion becomes a requisite enabler. Cohesion is defined as an action/fact representing a whole and the sticking together of elements made up of the same substance. This is decisively different from an interface as used in the context of IR3.0 where causal interaction exists.

STICKY STUFF

Cohesion occurs when intellectual bonding takes place between the elements of IR4.0, thus creating an interoperability state. It commences from a stable base and a deliberate determination pertaining to adoption extent. It is irresponsible to state that we are broadly adopting the paradigm; responsible behavior reflects the extent of employment. Over the course of time, maturing will result in change and expansion, but at the onset, conservative care is taken as a means of controlling convoluted overachievement endeavours. This infers that a purposeful industrial engineering approach be used to achieve respectable positive value-based outcome based upon knowledge of conditions.

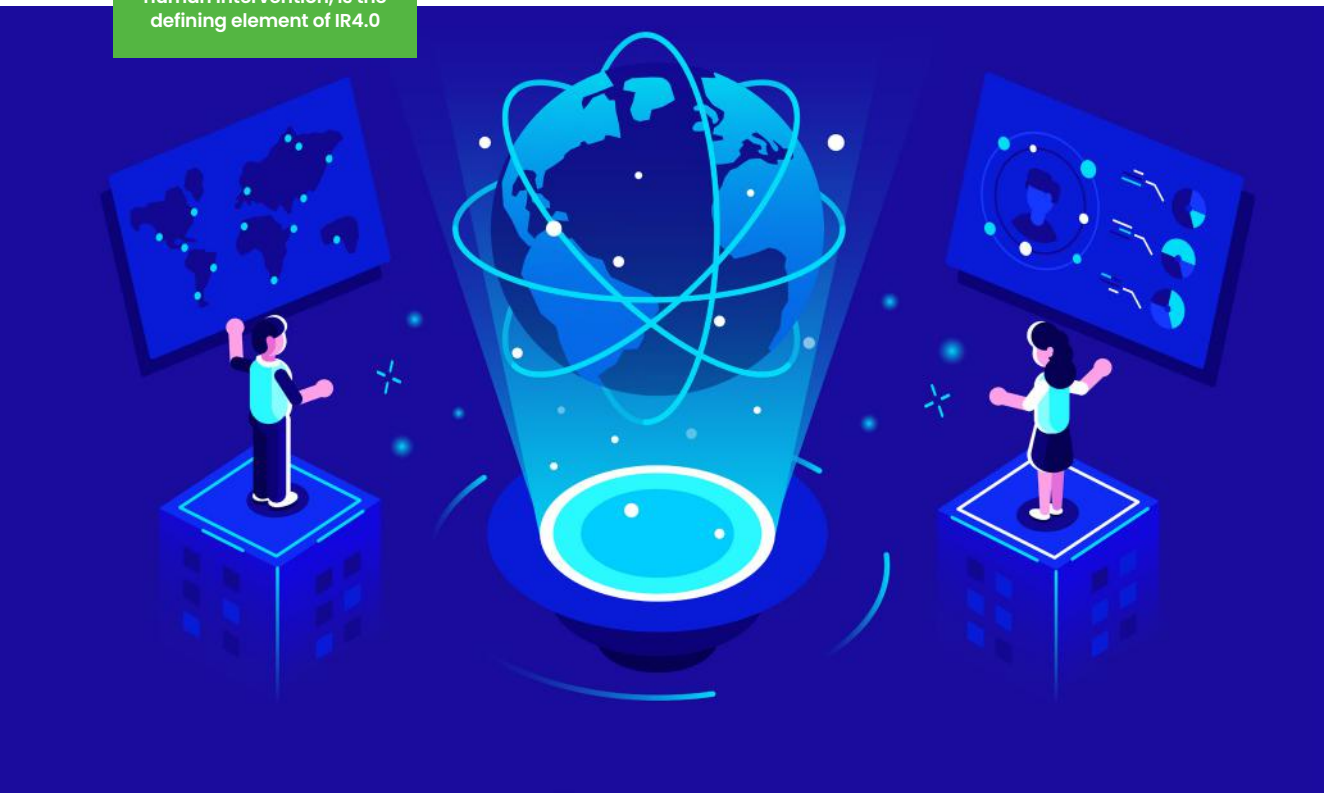
The sticky cohesive becomes the enablers by which element interchanges relationships occur. There is a tendency to think with a data mindset (IR3.0), but in IR4.0, this changes to one that requires a holistic and seamless internalised interchange focus. With this shift, we see that in addition to parsing data, the IR4.0 environment will encompass directives, action commands, rule modifications, alert/attentions and automatic stimuli that feed intraoperative continuous

flow of cascading events. All of which occurs with minimum human intervention. Active and ongoing machine infused communications transcends the routine of momentary data exchange as we knew it.

As IR4.0 implementers, a predetermined extent must be established in order to set the degree of cohesion between elements. The more autonomous it is, the less intervention is required. At the same time, this implies that added attention be given to involved decisions. In highly dynamic IR4.0 paradigms, this creates the potential to impede productivity and inject human imprecision. Likewise, recognise that embedded autonomous rules and relationship formation also has risks resulting from design and adoption malfeasance.

"Many companies have explored elements of IR4.0 with laser focus on the technology, but blind to their roles in the broader context."

The cohesiveness of technology, with minimal human intervention, is the defining element of IR4.0

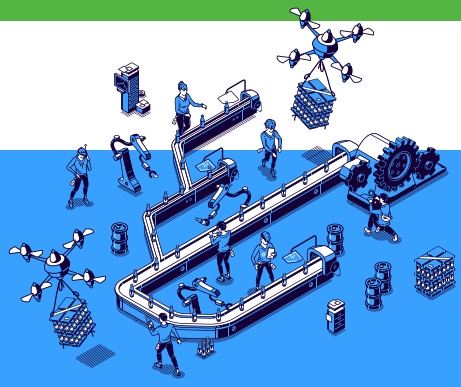


An example involving the pervasive nature of IR4.0 involves retail orders. In the IR3.0 mindset, there are discrete service elements that involve purchasing, inventory, and sales. The shift in context to IR4.0 creates an amalgamation of opportunities and need expansion that envelops the full range of elements. Analytics for forecasts, big data activity tracking, internet-of-things for stock and order activity, AI to proactively adjust sales prices and controlling production in the smart/adaptive factory, blockchain control and a security blanket to stand guard insuring protection. All of which creates a self-contained ecosystem.

As illustrated, there is some natural cohesion that occurs from natural relationships. For example, the relationships between AI and Analytics, Analytics and Big Data, New System Models and System Integration, etc. The extent and depth of formed relationship cohesion is influenced by your IR4.0 deployment vision.

STUCK ON YOU

As previously stated, cohesion transcends the basic interface principals. It will embrace purposeful rights, rules, responsibilities, co-integrity, limits, authorities and control along with the traditional data interchange. This enables a contract of exchange that represents operative legitimacy.



IR4.0 is pervasive and dynamic, representing a paradigm that is built on cohesive unity.

The Foundation Set of Six (6) Elements

- Industrial IoT (IoT)
- Cyber Security (CS pervasive influence)
- Big Data/Analytics (BDA)
- Cloud Computing (CC pervasive influence)
- System Integration (Horizontal/Vertical) (SI)
- Smart/Adaptive Factory (SAF)

Supplemental IR4.0 Element Additions

- Simulations & Augmented Reality
- Autonomous Robotics (*member* of SAF)
- Supply Chain (***member*** of SAF)
- Artificial Intelligence/AI
- New Business Models (*member* of SI)
- Mobile Technology
- Fin-Tech
- Digital Marketing
- E-Business (*member* of IoT)
- Blockchain Control (*member* of SI)

Many business leaders are too fixated on the technologies and lose sight of the broader context .

Why is this needed? Etched in the fundamental concept of IR4.0 is technology enabled service. To achieve this purpose, we define relationships but we also encapsulate checks and balances to sustain integrity. This level of defense can only be achieved by a cohesive adoption within the trust relationship. Trust then becomes a joint custodial trait that is shared by all participants. This results in resilience, synchronised coordination and ongoing integrity delivered through unwavering security.

The shift from IR3.0 to 4.0 has been taking place silently and without detection. Many companies have explored elements of IR4.0 with laser focus on the technology, but blind to their roles in the broader context. These endeavours – because of investments made – will need to be unified if a IR4.0 mindset has been adopted. This exemplifies the change in thinking from discrete services to one that utilises cohesiveness as a powerful dynamic contributor to value.

STICKY SKILLS

The shift in paradigm involves the modification of resource needs. Technology still needs to be implemented in order to utilise and form relationships with other paradigm elements. At the same time, we need to contemplate and develop a state of comprehensive delivery. This shift in mindset suggests the need for adaptable creative minds and talent whose strength involves applied industrial and technical engineering.

Most human capital resources talent can be obtained from organisational repurposing, unless pre-conditions were such that disciplined behavior did not exist. In this case, external resources (temporary, contractual or new hires) become a secondary source for consideration. Recalibrating mindsets is not effectively resolved via training.

IR4.0 may appear to some as a threat on livelihoods but it is in actuality a threat on those that are resistant to change. It is similar to conditions experienced in the IR3.0 paradigm shift.

AI without purpose is just automated opinion; analytics without basis is just reports; IoT without enlightenment is wasted motion and a smart factory without process insight represents mechanical iron."

FLYPAPER

The only one who dislikes flypaper is the fly. But in the context of IR4.0, the flypaper of cohesiveness is what makes enablement possible. No element of IR4.0 receives full acclaim until it becomes a part of the much broader collective.

AI without purpose is just automated opinion; analytics without basis is just reports; IoT without enlightenment is wasted motion and a smart/adaptive factory without process insight represents mechanical iron. Do not overlook the value of cohesion, the role it plays, importance it carries and the purposeful value provided by enabling our exploited embracing of IR4.0.

Jerry Durant is Chairman and Founder of The Clarity Group Global an established advisory consultancy committed to technological and organisational advancement. Clarity Group also is engaged in various progressive ventures involving challenged enterprises recovery, intelligent philanthropic investments and greenfield research.

INDUSTRIAL ADOPTION RACETRACK
Activity and effort subject to conditions and resources

Status Event (s)	Task Event (s)	Estimated Effort
Present	Ground Stabilisation	2-4 months
	Transitional Digitization	6-12 months
	IR4.0 Architectural Definition	3-6 months
Adoption	Prep Existing Entities	6-12 months
	Formulated Cohesion Paradigm	1-2 years
	Incremental Adoption	2-4 years
	Refinement & Adoption	Ongoing
Maintenance	Adaptive Oversight	Ongoing
	Cohesion Modifications	Ongoing
	Ongoing Applicable Adoptions	Ongoing

PUSHING THE DIGITAL INCLUSIVITY AGENDA IN HEALTHCARE

FOURTH LEAP

By Shamala Hinrichsen

As you step outside into the streets in an urban setting, one commonplace observation would be that each and every person has a mobile phone. At any instance, a smartphone would be held in the palms of a pedestrian.

Germany, one of the world's most developed countries, has an 88.48% mobile phone penetration rate. But this is not limited to the developed world. Kenya, Tunisia, Namibia and Morocco have exceeded 100% mobile phone penetration rates. Thus, it is safe to conclude that everyone has a phone these days.

This provides a great starting point for the agenda of digital inclusivity, especially in delivering healthcare. The year 2020 has forced us to live in a new normal with COVID-19 serving as an amplifier. In the midst of change and uncertainty, one thing is for sure – digitisation is driving adaptation.

LEVERAGE EXISTING TECHNOLOGY

A combination of three delivery approaches can catalyse health systems of rural areas. A great way to improve the lives of people is to employ community-based health officers, adopt mobile phone-based telemedicine, and deploy networks of mobile health clinics. In addition, organisations that work on the ground to bring healthcare information to the people they serve will now – in the era of a pandemic and hopefully soon, post-pandemic – need to evaluate their delivery mechanisms.

To exemplify, 28-year old Katja sells chillis daily in the local market in Naivasha, Kenya. It takes her two hours to travel to and fro daily to support her family of four children, all aged below ten. Time is of crucial essence for Katja and like the other 80% of rural Kenyans, she will never see a doctor in her lifetime. However, Katja does have a mobile phone which she uses to communicate, to entertain herself, and to also keep updated. She is adept at using her mobile phone for online transactions, payments and appointments – to name a few.

> **"It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change."**
>
> **Charles Darwin**

Leverage existing technology to provide all with equal access to healthcare services.

Healthcare NGOs operate locally in the fields of malaria, polio, sexually transmitted diseases, contraception, domestic violence – a myriad of services, but they operate labour intensively. Teams of local healthcare communicators need to step into the field, making home visits, recording feedback manually. Reporting back to donors is also very tedious and adherence to the key performance indices can be complicated.

What if, for example, an arbitrary organisation called "contraception adherence network" completely digitises its work process? Informing Katja on her options, giving her a quiz to see which available options suit her best, and sending her timely reminders to check in on her adherence.

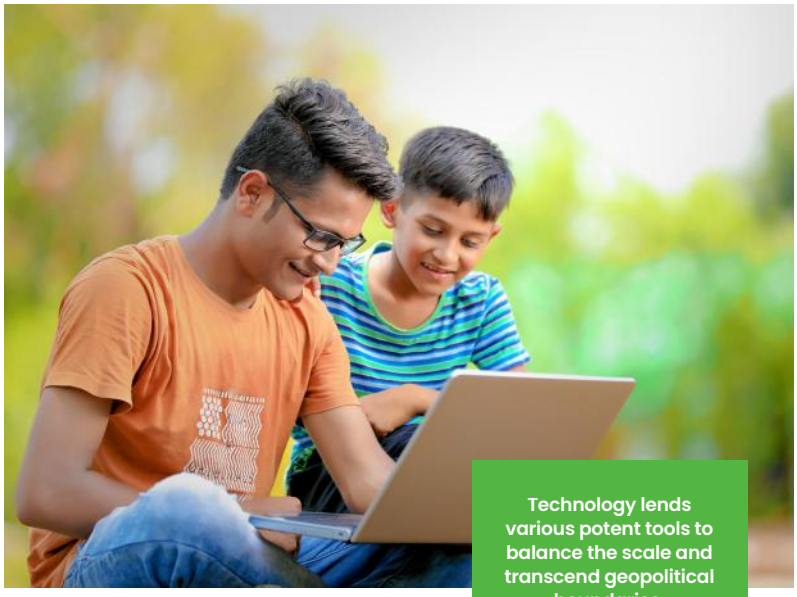
Many services are digital especially in developing countries but organisations need to ensure they write in a request for digitisation in their funding requests – both for the deployment of the services of the respective NGO or social purpose organisation and ultimately for ensuring the funds are used most effectively.

The use of digital health solutions empowers individual women who may have been excluded in the overall digital inclusivity process. The advantages for resource-constrained healthcare systems are huge – especially leveraging off existing infrastructure and resources. Importantly, governments would have access to data to make accurate decisions.

EQUALITY WITH DIGITAL INCLUSION

A success story so far is through Agnes Kam, an indigenous woman who lost her mother due to complications delivering her eighth baby in Sarawak, a Malaysian state on Borneo. Agnes has taken the role of community champion, empowering community members – teams of women in each longhouse, village and town she visits. She involves them in digital tools and speaks to community members to overcome traditional barriers to healthcare access. This, essentially, created a support network of peers, guided by technology.

Her community presence while constantly pushing last-mile delivery to include all digitally is definitely a hopeful way forward in bringing equal healthcare access. Urban West Malaysia enjoys universal healthcare akin to developed countries; however, rural areas and East Malaysia are left behind due to various geopolitical reasons. Digital awareness and inclusivity in bridging the healthcare gap will go a long way in bringing equal access to healthcare. This requires a combination of community health workers, digital tools, and medical facilities.



Technology lends various potent tools to balance the scale and transcend geopolitical boundaries.

People like Agnes work tirelessly to better the community they serve. As Steve Jobs once said: "You've got to start with the customer experience and work backwards to the technology." Digital inclusivity means creating products that can be fully utilised by the people who most need them.

Empathic design is crucial in ensuring an emotional relationship between the user and the product created. Working from the ground up in a collaborative process is definitely one of the strongest ways of building a digital tool that would be most efficient. Looking at local literacy rates, pivoting to video and audio where required are part of digital inclusivity. Speaking in local languages, in tones that are applicable will make any digital tool far more palatable.

Back to Katja, the burden of unpaid work during COVID-19 is hitting her harder than many others living through this pandemic. Managing the finances of her household while trying to keep up with her own health, and her children's health – which she prioritises over hers – slowly but surely adds on a mental burden. Digital tools will enable her to keep up to date with vaccinations, adherence to medications, and digitally connect with a mental health service provider. All of these could be a big leap in ensuring her well-being.

PASSION FOR INCLUSION

The good news is that there is no necessity to reinvent the wheel. Digital education and access tools are abundant, sophisticated and yet simple. The ingenuity would be to remain useful – working with lower bandwidths, and importantly, not simply shifting the problem to another place.

Digitisation of healthcare – be it in rural Kenya, Borneo, or Germany calls for a reexamining of the existing healthcare system – the gaps, the wins, the eventual user benefits. The pandemic has limited person-to-person contact and has pushed those of us working in the sector to examine better methods of reaching those excluded by general health services – often the world's most vulnerable. In the words of Lady Gaga, we have to believe in a passion for inclusion.

Shamala Hinrichsen is the founder and CEO of Hanai. Her mission is to bring equal access to healthcare to women – anywhere. A scientist by training, she switched gears to medical writing – working in corporate, research, and government. She founded Hanai after a four-month sabbatical mapping the rural healthcare landscape in India. Hanai connects the organisations that need to reach rural and marginalised communities and their beneficiary base via a technology platform – apps.

BLOCKCHAIN TO IR4.0

FOURTH LEAP

By Samsurin Welch

BLOCKCHAIN has come a long way from its techno-libertarian origins of Bitcoin. Global spending on blockchain is projected at USD$4.1 billion (RM16.7 billion) in 2020 , a 62% CAGR since 2017, and forecasted at $20 billion (RM81 billion) by 2025. PwC estimates that blockchain's contribution to global GBP will reach USD$1.7 trillion (RM6.9 trillion) by 2030.

Pick any industry and you will find many active initiatives. Yet, like every technology, blockchain is good for some things and not for others and should be considered as part of an overall solution with other technology and business aspects. Let us consider how blockchain can impact IR4.0.

A WORD ABOUT HYPE: A NECESSARY EVIL

Blockchain has arguably passed its peak hype, which is optimistic. Hype actually plays an important role in the maturation of novel technologies. When technologies such as blockchain or AI first emerge, their use and benefits are ambiguous. Hype and tech bubbles bring in necessary capital and market attention to fuel experimentation and development of nascent tech into viable commercial opportunities. We will not understand how blockchain or AI can benefit aerospace, automotive, oil & gas, or finance until we experiment with it. Some ideas may flop – this is consistent with an explorative rather than exploitative view of innovation at the cutting edge. This necessarily weeds out the bad from the good. When technologies pass peak hype, we really figure how it is useful.

For IR4.0, Blockchain provides a digital trusted data backbone, with interesting opportunities when combined with other IR4.0 technologies. One way to think about it, *Internet of Things (IOT)* sensors provide granular data, which can be securely stored and exchanged on a blockchain, on which *artificial intelligence or machine learning (AI/ML)* can be applied for predictions and insights.

It is promising to hear Malaysia Digital Economy Corporation (MDEC) Chairman Datuk Wira Dr Hj. Rais Hussin mentioning blockchain as part of Malaysia 5.0. Malaysia joins many countries such as China, the European Union and United Arab Emirates that have elevated blockchain as national imperatives for innovation leadership and economic growth.

Exciting developments are also happening in ASEAN, Africa, and Latin America, where private and public sector parties are leapfrogging infrastructure and institutional voids with new technologies. Increasing policy support and regulatory clarity such as the upcoming EU Markets in Crypto-assets (MiCA) framework means this space is becoming less the "Wild Wild West" it used to be.

WHAT IS BLOCKCHAIN: SEEING PAST THE NOISE

However, blockchain still does have a PR problem. With any technology, it is important to ignore the clatter and focus on its essential features. By doing so we can envision its wider potential.

[1] *Statista. Forecast adjusted due to COVID-related reduction in spending*

What it is not: Blockchain is NOT just Bitcoin or cryptocurrencies. These are just types of applications based on blockchain. Blockchain is also not "mining", anonymous or completely open systems – these are just characteristics of certain types of blockchain applications.

What it is: Blockchain is a technological system that helps multiple parties better coordinate, share, and transact over trusted data and business processes. At the heart is a shared ledger of data which everyone agrees on and has confidence it has not been tampered with. With trusted data, programs or *smart contracts* can be triggered to automate business processes.

Most businesses are interested in *permissioned* variants of blockchain. These differ from *permissionless* or *public* blockchains such as Bitcoin and Ethereum by enabling tighter controls and identities on who can participate, data confidentiality, and does away with resource intensive "mining". These characteristics are important for commercial enterprises.

Why blockchains matter: One word – TRUST. Blockchains are not purely technical solutions; they help resolve *socio-political problems of coordination*. Data and ecosystems are at the heart of today's economy and most companies and public sector agencies are grappling with how to better coordinate with your partners. Such *co-opetition* – cooperation + competition – between organisations, who may also be your competitors, has many complexities including data confidentiality, legal and regulatory issues, and competitive dynamics.

Blockchains provide a part of the solution and we have a better understanding today of its use. Let us explore examples.

SUPPLY CHAINS: TRANSPARENCY, COORDINATION AND PROVENANCE

A promising use case is ensuring resilient, efficient, and ethical supply chains, especially in our post-COVID world where tighter integration is needed between partners. Most companies face challenges dealing with the data and documents needed between their supply chain partners for better planning and ensuring authenticity of goods. Consumers also increasingly want to know the provenance of their products – where it came from, was it sourced ethically and sustainably, and so on.

> **"Hype and tech bubbles bring in necessary capital and market attention to fuel experimentation and development of nascent tech into viable commercial opportunities ... When technologies pass peak hype, we really figure how it is useful."**

One example is IBM Food Trust, with participants including Walmart, Nestle and Carrefour, using blockchain to track the provenance of food products from farm to fork for effective planning and ensuring food safety. Blockchain can help address the complexity of tracking products across the multitudes of parties involved – manufacturers, repackagers, distributors, retailers, financiers and third-party logistics.

In the pharmaceutical sector, Mediledger is applying a similar concept. The upcoming US Drug Supply Chain Security Act (DSCSA) will require granular digital tracking of drug products, identifying their origins and protecting consumers from counterfeits, contamination, or stolen products. Similar projects are being done in aerospace, automotive and manufacturing

This can be combined with IOT and machine learning. Sensors can track location, storage and transit conditions and prove that food and drugs have been kept below required temperature or humidity thresholds. This data forms part of the item's immutable record on the blockchain and can trigger automated actions such as payments, insurance, or customs processes on arrival. With greater data visibility, machine learning can be applied for better forecasting.

Cryptocurrencies such as Bitcoin are just types of applications based on blockchain.

DATA SHARING AND FEDERATED MACHINE LEARNING

Another potential is data aggregation and analysis between multiple parties in secure and privacy-compliant manners. Generally, with machine learning, the more data we have, the better predictive models we can develop. However, aggregating data across different companies has legal and competitive challenges. Blockchain can be combined with *federated machine learning!*

An example is machine learning for fraud detection in the financial sector. Collectively different banks or insurance companies hold scores of data on customers and transactions. Combining this would provide rich data for developing highly accurate fraud detection models. However, this is very unlikely for competitive and regulatory reasons.

Instead, these companies could collaborate to develop better models using *federated* machine learning with blockchain. Confidential data stays safely in the companies, and only machine learning models that do not contain any personal or confidential data are shared over a blockchain network.

These same banks could also leverage blockchain to share KYC (Know-Your-Customer) information to improve customer onboarding experience and compliance, providing better experiences while reducing duplicate work. Regulators could also get direct insight if needed

This could apply in other sectors where all parties can benefit from a mutualistic approach to confidential data analysis, such as analysis of healthcare data, operational and safety in oil & gas, or autonomous vehicle data.

IDENTITY AND PEOPLE

More broadly, secure, trusted, and easy to use digital identification for individuals and organisations has implications for how we live, work, and participate in society. Yet this continues to be a challenge.

Identity is actually a multifaceted construct. An individual's identity comprises multiple credentials from different government agencies such as national identity cards and drivers' licenses. It also includes private sector credentials such as credit scores and educational qualifications.

Considering this fragmented view, blockchains can be a secure backbone for connecting and verifying disparate identity credentials. The individual or organisation can get a unified view of their credentials in a simple to use digital format, such as a smartphone ID wallet, and they can easily share and control who gets to view it.

Fungibility is the ability of a good or asset to be interchanged for another good or asset of like kind. Like goods and assets that are not interchangeable, such as owned cars and houses, are **non-fungible**. (Investopedia)

Non-Fungible Tokens (NFT), in contrast to fungible cryptocurrencies like Bitcoin, **are Rare**, **Indivisible**, and **Unique**; thus, not mutually interchangeable. They are tokenized versions of digital or real-world assets. (Binance Academy)

IDENTITY AND "THINGS"

Identity can be extended to "things" as well. Parts and materials that go into products can have blockchain-based identities containing their origins, compositions, ownership, conditions, and maintenance records. This information can also enable recoverability or recyclability objectives in circular and sustainable business models. For example, in aerospace an aircraft comprises millions of parts with an active secondary market. Honeywell and Boeing are using blockchain to track and sell over $1 billion of these assets.

"Things" can also be intangible such as intellectual property. Blockchain and so-called *non-fungible tokens* (NFT) could be used to manage distribution and consumption of digital assets such as 3D printing blueprints or media assets for licensing, IP protection and micro-payments. This could lay the foundation for novel business models such as industrial design and content creation marketplaces.

Blockchain resolves the issue of trust and socio-political problems of coordination.

Multifaceted application... Digital tracking, record-keeping and when combined with Machine Learning, allows for fraud detection.

TRADE FINANCE

Financing for trade transactions also involves numerous parties including buyers and sellers, banks, insurance companies, etc, exchanging all kinds of paper documents such as Letters of Credit. Projects such as we.trade, Voltron and Marco Polo are using blockchain to digitalise this process to be more efficient while fighting fraud.

This is particularly beneficial for financial inclusion for small to medium businesses (SMEs), for whom the cost and access to financing and cash flow issues can mean life or death. Trade finance systems can also be linked to IOT-based supply chains or logistics networks, such as triggering financing or insurance processes when goods arrive at warehouses.

By increasing efficiency and reducing cost and risk, blockchain-based trade finance could benefit large corporations and support financial inclusion, helping more SMEs to participate in the economy.

THE WAY FORWARD

Blockchains hold much promise for making coordination across partners and ecosystems more efficient. However, the journey can be complex and requires thoughtful planning. A good reference for this is the World Economic Forum Blockchain Deployment Toolkit.

Blockchain projects always involve multiple, potentially competing parties. Aligning everyone's common goals is always complex. It is important to consider consortium governance mechanisms, such as participation rules and data standards. Also consider any regulatory or legal requirements, such as data privacy or anti-competition.

Another consideration is last-mile integrity – linking physical things with the digital record. For example, Everledger uses blockchain to prove authenticity of diamonds and are not conflict diamonds, but they need to ensure the digital record refers to the correct physical stone. They use identifiers based on unique gemological properties of the stone that is impossible to fake.

Interoperability between blockchain systems is also a hot agenda item today – let us not recreate silos in blockchain networks. Organisations such as ISO, IEEE and INABTA are developing standards for the blockchain economy. Finally, as any technology, good system design such as cybersecurity and usability are key, especially reflecting needs for inclusive use.

Blockchain has graduated beyond its hype peak and holds much promise for IR4.0, and should be in serious consideration by any organisation, more so in our post COVID-19 world as the World Economic Forum stated.

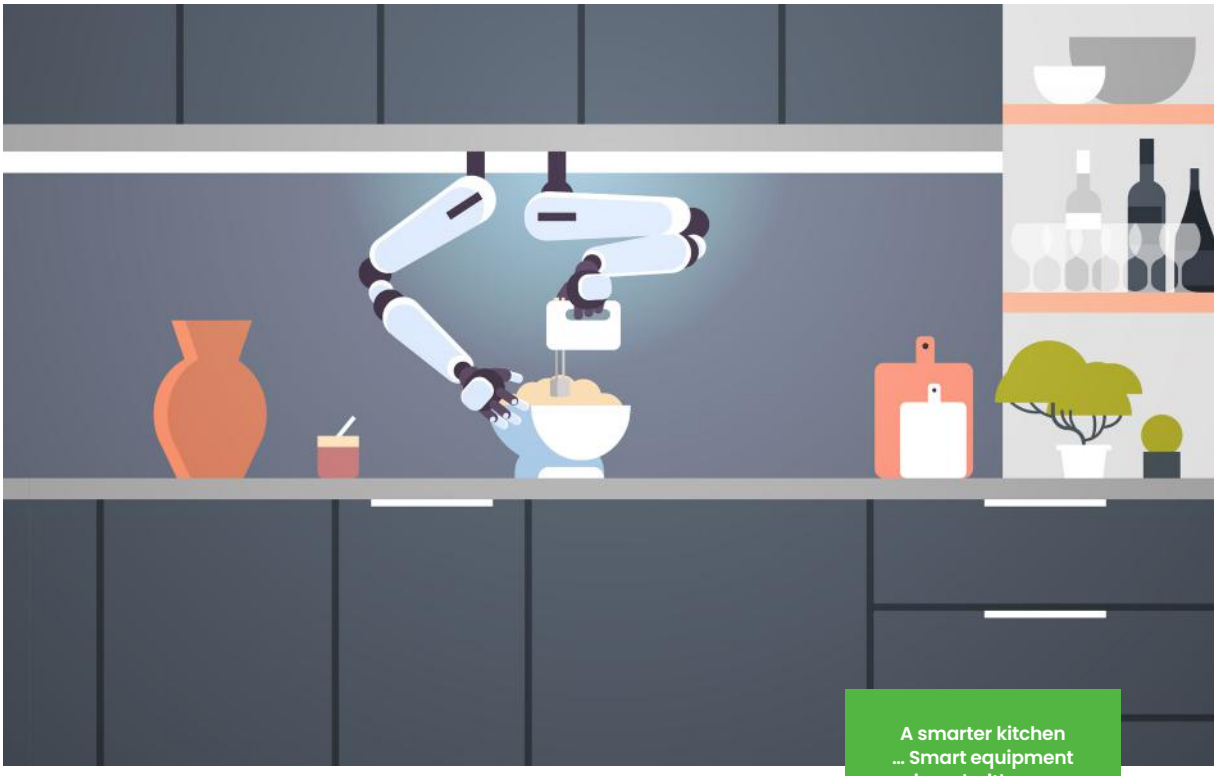
"The case for blockchain is stronger as the COVID-19 pandemic underscores the need for more resilient global supply chains, trusted data and an economic recovery enabled through trade digitisation."[2]

"The case for blockchain is stronger as the COVID-19 pandemic underscores the need for more resilient global supply chains, trusted data and an economic recovery enabled through trade digitisation."

Samsurin advises business leaders on strategy and digital transformation. He is the co-founder and Chief Technology Office of uVerify, and is also completing his PhD at the University of Cambridge, researching how emerging technologies such as AI and blockchain impact industries and society. He formerly held senior leadership roles in digital innovation and IT strategy for the national oil & gas corporation of Malaysia.

[2] *World Economic Forum Redesigning Trust: Blockchain Deployment Toolkit*

AUTOMATION & TECHNOLOGY IN THE RESTAURANT INDUSTRY



A smarter kitchen ... Smart equipment equipped with sensors will ease a chef's burden.

FOURTH LEAP

By Jonathan Weins

WE are living in unprecedented times. Technology is progressing at an accelerated pace and impacting every industry. After many decades of limited innovation in the restaurant industry, there are big technology trends looming on the horizon. The impact of those technologies have the potential to lead to bigger changes over the next 25 years than in the past 1,000 years of the restaurant industry's long history.

AN INDUSTRY WITH SLOW TECHNOLOGY ADOPTION

Fundamentally, restaurants fulfil a dual purpose: to serve the necessity of food for customers, and more importantly, to act as a place for social gatherings and entertainment. It is hard to pinpoint exactly when the first restaurants were started but both the ancient Romans and Chinese dynasties had restaurant-like establishments.

Since those historic times, little has changed in the way restaurants operate. It is a manual labour-heavy industry that completely relies on people cooking food in the kitchen and on people taking orders from customers. In its essence, a restaurant today closely resembles a restaurant 200 years ago.

> **"Many upscale restaurants are using smart combination ovens that can execute multiple functions such as baking, roasting and steaming and can run simple programmed sequences."**

Most significant changes in the industry typically centre tweaking of the business models, locations and concepts. One of the biggest recent innovations was probably the invention of the QSR business model in the second half of the 20th century. Speed and convenience of service were the main benefit and with it, came new innovations such as assembly line cooking and drive-throughs.

The last 20 years have been very sluggish in innovation however, if we compare eating at a restaurant to other areas of our life. The internet and the smartphone have fundamentally changed the way most of us spend our time at home and work. While customers constantly use their phones in a restaurant to text or to share pictures, the restaurant itself is completely disconnected from the customer's phones. Until recently, however, there was also little reason for a faster technology adoption as most innovations did not have a significant impact on the customer experience or the economics. This is about to change dramatically over the next decades.

BIG TECHNOLOGY TRENDS ON THE HORIZON

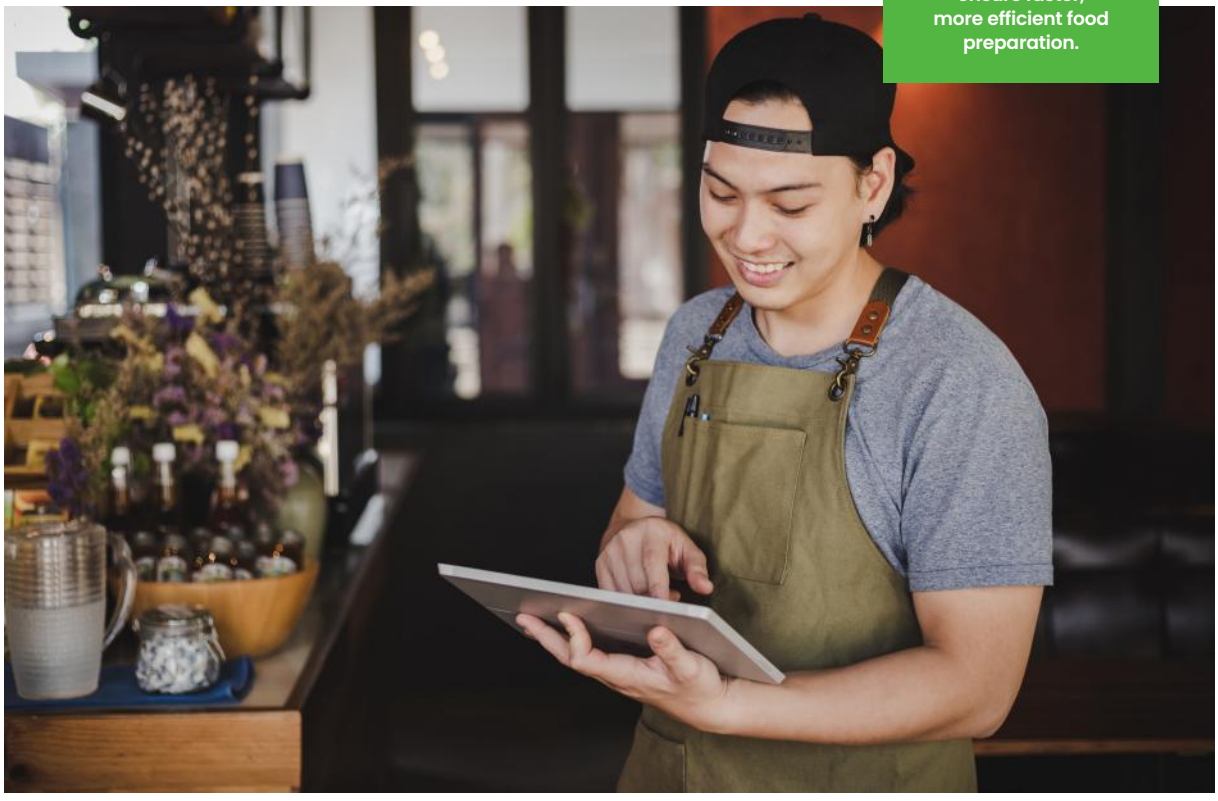
Several big technology trends that are lurking on the horizon though have the potential to completely change the customer experience and the restaurant economics. Those trends are already happening today but hard to recognise. It is typical for big technology shifts as the issue is that technology is progressing exponentially. As humans, however, we live in a mostly linear world so our thinking and perception is used to linear change. Yesterday's progress might be barely noticeable today, but it might change everything tomorrow.

The big tech trends are not some hidden secret trends but instead, they are features of the big technology trends of our current time which will impact most industries: Robotics & AI; explosion of collection and usage of data through connectedness and IoT; 3D printing and even advancements in genetics.

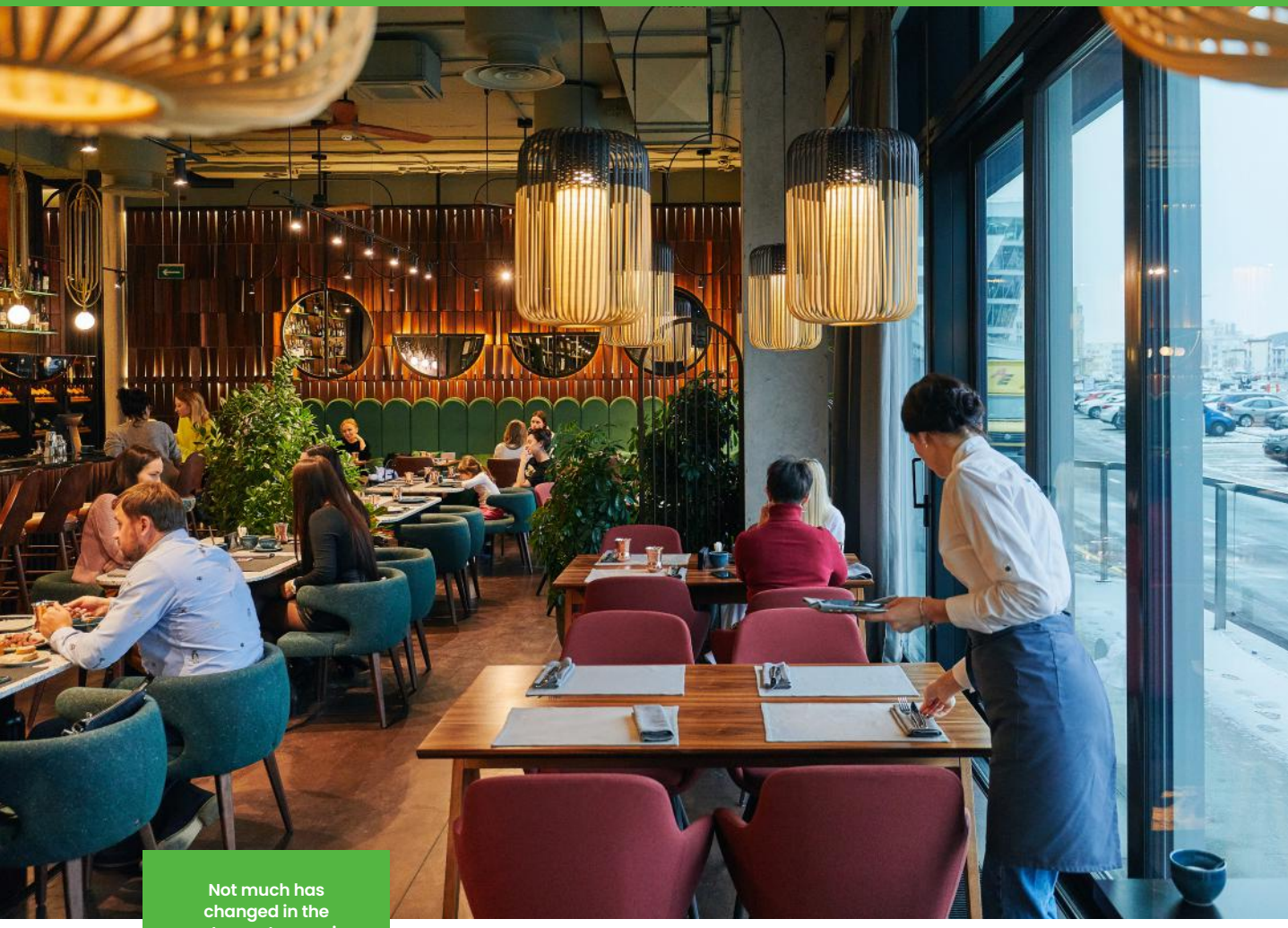
AUTOMATING THE KITCHEN

When thinking about technology in restaurants, robot-waiters like Softbank's Pepper or Burger flipping robot arms like Flippy come to mind. Robotics, AI and IoT are rapidly advancing fields; however, the use of robotics in restaurants will look differently from what most of us marvel at in the entertaining videos that go viral online.

"Instead of human-looking robots, the impact of robotics, AI and IoT will occur very differently in the industry. Increasing computational power combined with decreasing computing costs is leading to an intelligence explosion in which intelligence will be added to almost everything."



Cloud software, service applications and a fully paperless environment will ensure faster, more efficient food preparation.



Not much has changed in the restaurant scene in the past 1,000 years of restaurant history.

“Data is the new oil of the 21st century. We are living in a connected world in which online to offline will get more and more integrated in the most seamless way imaginable.”

Keeping the initial capex cost as low as possible has high priority for restaurants, especially for franchised chains that need to ensure fast paybacks for franchisees. A typical robot arm like Flippy still costs tens if not hundreds of thousands of US dollars today. This capex is prohibitive and doesn’t make economic sense given the limited cost saving of replacing human tasks. On top of that, maintenance costs make the calculation even worse. Unlike computing power and software, costs for robots have only been slowly coming down.

Instead of human-looking robots, the impact of robotics, AI and IoT will occur very differently in the industry. Increasing computational power combined with decreasing computing costs is leading to an intelligence explosion in which intelligence will be added to almost everything. Making previously “dumb” kitchen equipment smart will allow a new level of automation.

Today, many upscale restaurants are using smart combination ovens that can execute multiple functions such as baking, roasting and steaming and can run simple programmed sequences of that. In this way, the combination oven has already replaced lots of cooking steps of chefs. More and more “dumb” kitchen equipment is now receiving intelligence. Woks are getting upgraded with sensors to automate and control the cooking sequences and simple vegetable cutters use image recognition to cut vegetables into any possible shape.

Making existing equipment smarter will be further accelerated by software through connecting different kitchen equipment under a kitchen operating system. So far, a lot of paper is already getting replaced in many restaurants by cloud software as a service applications. Currently those applications still only handle isolated tasks like POS, bookkeeping or inventory management. In the next couple of years, more applications are getting fully integrated and through the use of AI, planning workflows, inventory management and revenue management will get significantly automated and optimised. Not just kitchen equipment that is getting smarter, the entire restaurant operation is upgraded with artificial intelligence.

FASTER, EASIER & EXACTLY HOW YOU WANT IT

A lot of the previously mentioned, innovation will change the Back of House (BOH) and be only indirectly noticeable to customers. However, the impact on customer experience will be profound.

Faster and more efficient cooking and order processing will significantly affect service speed and all of a restaurant's biggest variable costs. With that, customers will get their food faster and receive more value for their money. In low budget restaurants, the front house staff will completely be replaced by self-ordering kiosks or apps. Orders will be taken through screens or even voice command through voice-recognition. Payments will be instant and cashless through technologies such as face-recognition payments or proximity sensors.

In the BOH, most of the kitchen will be automated and completely streamlined. As a result, food will get more affordable and customers get more value for their money while at the same time, customers get served faster. But value does not just mean lower prices or bigger portions as technology completely redefines the customer experience and relationship with a restaurant.

A true revolution for the industry will come through connectedness and the use of data. This revolution allows restaurants to go back to the roots of the hospitality industry. The roots in which the chef and kitchen staff know his regulars by name and know exactly what they like to eat and how it should be prepared.

Data is the new oil of the 21st century. We are living in a connected world in which online to offline will get more and more integrated in the most seamless way imaginable. Data combined with artificial intelligence will allow any retail business to get to know its customers intimately and to build a direct relationship with them. There are many implications from a direct relationship: customisation of the dining experience, highly relevant marketing and rapid menu innovation are just some of them.

Tech-enabled QSR concepts such as Southeast Asia's Pop Meals already use technology to build a direct relationship with its customers. Pop Meals receives every day thousands of customer feedback data through the Pop Meals app. Customers rate their orders, share detailed feedback about each meal and suggest new meals for the menu. In the kitchen, the in-house R&D chef team is using algorithms to make those data points actionable for the ongoing R&D process. The result is a crowdsourced menu, data-driven quality monitoring and continuous innovation of the menu. It is the first time in the industry that this kind of data has become available and actionable.

In the functional food space, customisation is even benefitting from progress in the fields of genetics and molecular biology. Nowadays, a personal DNA test already costs less than a hundred dollars and costs are quickly reducing. In the future, advancement in genetics will allow all of us to understand our DNA better, we will know how to avoid allergies, numerous diseases and even understand genetically driven food preferences.

This may sound far-fetched; however, concepts such as the upcoming Singularity Sushi restaurant in Tokyo are already trying such a concept in 2021. Singularity Sushi is planning to collect biosamples from prospective customers prior to the visit and it is then using 3D printing to "cook" customised food for each individual customer. For many of us, the price point for those niche food applications are prohibitive and it might even sound too weird to try. But what is clear is that the next 25 years in the restaurant industry will be extremely exciting and nothing like what we have seen in the past. o

Jonathan Weins is the CEO & Co-founder at Pop Meals (previously dahmakan).

Data-driven environment ... The F&B industry will rely on data and artificial intelligence to revolutionise the industry in the next 25 years.

"Yet another meeting ends with the totality of your input being a yawn and a stretch."

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