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Malaysia on the right path with Industry4WRD



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THE DIFFERENCE BETWEEN INDUSTRIAL REVOLUTION 4.0 AND INDUSTRY 4.0

Technology and industry have always gone hand-in-hand. The terms Industrial Revolution 4.0 (4IR) and Industry 4.0 have been catchphrases in the technological and industrial worlds for a while now and, for those in the know, this is a very exciting time to be involved in manufacturing and industries. The birth of new technologies will eventually revolutionise our lives and lead to a future which holds the certainty of accelerated disruption.

The first industrial revolution occurred in Europe in the 17th and 18th centuries; it began with the mechanisation of transportation and productions through water and steam power. The second revolution spread to the United States, with the advent of mass production and assembly lines in factories taking advantage of electricity. Agricultural societies became more industrialised and urban and inventions such as the transcontinental railroad, the cotton gin, electricity and other inventions permanently. changed society The third revolution began with the adoption of computers and mechanisation. The current evolution is so significant that it is being called 4IR to signify the fourth revolution that is transpiring in manufacturing.

The 4th Industrial Revolution (4IR) refers to the developmental process in the management of manufacturing and chain production. It takes what began in the third revolution and boosts it with smart and independent systems supported by data and device learning. It is characterised by a fusion of technologies that are blurring the lines between the physical, digital and biological spheres. There is

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an astounding convergence technology of emerging breakthroughs such as robotics, artificial intelligence, nanotechnoloay. auantum computing, biotechnology, materials science, energy storage, Internet of Things (IoT), Industrial Internet of Things (IIoT), decentralised fifth-generation consensus, wireless technologies (5G), additive manufacturing/3D printing and fully autonomous vehicles. It has its own technical standards to be adhered to.

What then is Industry 4.0? Industry 4.0 is the technology that has and is being created as a result of following those standards. Industry 4.0 is the digitalisation transformation of production or manufacturing based industries, driven by connected technologies. Industry 4.0 introduces what is referred to as "smart factory" in which cyber physical

systems monitor real time physical progress of the factory and are able to make decentralised decisions. Other terminology includes Smart Manufacturing. Some regard Industry 4.0 as a subset of the 4th Industrial Revolution.

INDUSTRY4WRD & F.I.R.S.T.

Prime Minister Tun Dr Mahathir Mohamad launched the country's National Policy on Industry 4.0 or Industry4WRD on 31 October, 2018. Industry4WRD is mainly concerned digitally transforming with our manufacturing sector and its related services. The policy envisions Malaysia as a tactical partner for "smart manufacturing, a primary destination for high-technology industries and a total solutions provider for the manufacturing sector in the region". Tun Dr Mahathir welcomed Industry 4.0 as "the next phase of evolution in the manufacturing sector".

The manufacturing sector has been significant in driving the growth of the Malaysian economy and contributed 23% to the country's gross domestic product (GDP) in the last five



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years. The government targets a 5.1% average growth in the manufacturing sector between 2016 and 2020 as compared to an average of 4.8% in the five years preceding 2016.

The public, in particular engineers, are keen to understand the role they will play and how they can leverage on the new technology.

STANDARDS AND WHY THEY MATTER

So how do standards come in? Standards are documents that provide requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purposes. Standards address a range of issues, including, but not limited to, various protocols that help ensure product functionality and compatibility, facilitate interoperability as well as support consumer safety and public health.

Standardisation is the activity of developing standards which involves the process of formulation, publication and implementation of guidelines, rules, and specifications for common and repeated use, aimed at achieving an optimum degree of order or uniformity in a given context, discipline or field. Standards and standardisation provide baseline information, technical references. transfer-oftechnology capabilities, best practices, specifications for recognition and benchmarks that will support and enhance implementation the of Industry 4.0. Standards are the key enablers that will drive Industry 4.0 implementation towards systematic a approach, common and consensus-based platforms and recognised conformity assessment ecosystems for check and balance.

Standards form the essential building blocks for product development by establishing consistent protocols that can be universally understood and adopted. This helps promote

compatibility and interoperability and simplifies product development, speeding up time-to-market. Standards also make it easier for competing products to be understood and compared. As standards are globally adopted and applied in many markets, they also drive international trade.

STANDARDS & THE IMPLEMENTATION OF INDUSTRY 4.0 IN MALAYSIA

"Standards create trust," says Datuk Fadilah. "I look at standards from an industry point of view. Everything that is mass produced has standards of some kind. Every product is made up of many components and standards connect the components together to create a cohesive end result. In Industry 4.0, standards provide a tool for components to recognise and communicate with each other. Standards are the bridge, the document that narrates the technical specifications, or also a document providing the definitions of technical terms. It helps different entities from various backgrounds understand

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each other. Standards ensure that operations and procedures are consistent, ensuring a quality control that spreads far and wide.

"It is cheaper to adopt standards than it is to create. The government is paying for Malaysia to become a member of the ISO (International Standards Organisation) and the ISC (Industry Standards Committee). We are then given access to all the industry experts who are participating at an international level and this helps to facilitate trade. As technology is fluid and constantly evolving though, we already have a five-year plan in place."

As a whole, Malaysia's manufacturing sector varies in terms of where it is currently, ranging between 2.0 (mass production) and 3.0 (automation). However, there are industries already in the process of moving towards Industry 4.0 or becoming Industry 4.0 compliant on their own.

"Manufacturing is one of 11 sectors being looked at, though the government and I both feel that food is where most attention is needed. Currently, the food industry has the weakest standards and we need the technology to drive the productivity, yield and quality control. It will also

reduce foreign labour as we will be utilising smart machines. And so we need the engineers to come in and produce those machines and devices," says Datuk Fadilah.

The electrical and electronics, aerospace and the automotive sectors are more advanced in terms of Industry 4.0 adoption. Through Malaysia Productivity Corporation (MPC), the Ministry of International Trade & Industry (MITI) is currently carrying out an Industry 4.0 Readiness Assessment to assist up to 500 small and medium enterprises (SMEs) to assess their industry level and to identify the gaps for them to migrate to Industry 4.0 technologies.

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Industry4WRD Readiness Assessment (Industry4WRD-RA) is a comprehensive programme to help firms assess their capabilities and readiness to adopt Industry 4.0 technologies and processes. This assessment uses a pre-determined set of indicators to understand their present capabilities and gaps, from which firms will be able to prepare feasible strategies and plans to move towards Industry 4.0. The Industry4WRD-RA will help firms to:

- 1. Determine their state of readiness in the adoption of Industry 4.0 technologies.
- 2. Identify the gaps and areas of improvement for Industry 4.0 adoption as well as opportunities for productivity improvement and growth.
- Develop feasible strategies and plans to perform outcomebased intervention projects. MITI is keeping track and the success stories by industry captains will be showcased as Industry 4.0 examples that can be emulated going forward.

On standardisation, the National Standards Committee for Information Technology, Communication and Multimedia (NSC G) is responsible for looking into the needs for standards in Industry 4.0. NSC G is in the process of reviewing its Technical Committees (TC) to include relevant new areas of Industry 4.0 such as Artificial Intelligence and Smart Manufacturing. Under NSC G, there are 23 National Mirror Committees (NMC) which mirror the international committees at the International level.

INDUSTRY 4.0 ROADMAP

The strategic enablers have been categorised into Funding, Infrastructure, Regulatory, Skills & Talent and Technology (F.I.R.S.T). Standards Malaysia is responsible for the enabler under Technology called the T2 strategy, which is designed to establish and implement standards for interoperability, quality and safety for smart manufacturing and industry 4.0 technologies.

- The strategic outcomes for T2 are:
- Standardisation for interoperability of Industry 4.0 technologies and processes.
- Seamless integration and interoperability in local and global manufacturing and supply value chains.

HOW INDUSTRY 4.0 WILL BENEFIT THE NATION

"Malaysia can only benefit from this," says Datuk Fadilah. "We will



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ACCESS TO SMART TECHNOLOGIES & STANDARDS



see changes and improvements in every sector - medical, food even halal compliance. It will increase national competitiveness bv increasing the quality of product/ services and productivity. There will be less dependency on lowskilled/foreign workers, particularly in the manufacturing sector. The adoption of new technology will ensure companies are more efficient, productive and more competitive to compete in the global market.

"There will be wealth generation with the increase in quality of product/ services, efficiency and productivity, leading to a high income generation, as well as a global market access and borderless trade.

"With the increase in service deliverables from government and suppliers as well as access to better products and services, the quality of life for the people will improve."

ANTICIPATED CHALLENGES & ETHICAL ISSUES

"Industry 4.0 is a disruptive technology, so we should expect some challenges, especially on socio-economic activities. Some positions may not be relevant in the future, such as service counters or factory operators, but this will lead to other job opportunities as well, including data scientists or social media strategists, in tandem with the market forces at that point in time," says Datuk Fadilah.

"In the world of standards, the issues revolve around the harmonisation of inputs, terminologies, practices and implementation approaches to achieve consensus-based documents that pin down variations of inputs. As the ecosystem that leads the way for others, standardisations will have to work within a limited time frame while being ahead of the pack in delivering a document that can be referred to by the world."

She believes that the associated ethical issues on autonomous and artificial intelligence are subject to specific countries, communities, cultural, belief and time, and that such issues are best viewed in their specific time frames as we go along the path to implementation of Industry 4.0.

INTERNET OF THINGS & 5G MOBILE TECHNOLOGY

The Internet of Things is a giant network of interconnected "things", an evolvement of Internet connectivity into physical devices and everyday objects. Devices embedded with electronics, Internet connectivity and other hardware can communicate and interact with others over the Internet; they can also be remotely monitored and controlled. They include everything such as mobile phones, coffee makers, microwave ovens, air conditioners, televisions, washing machines, home security systems and headphones.

Datuk Fadilah is enthusiastic about IoT and 5G. "As a combination of cyber-physical systems, these will increase automation and transform the way we do things. It is a disruptive technology and will be able to convert many traditional tasks to smart systems, process, input and output.

"For example, with IoT and 5G we will be able to transform a regular factory into a smart factory much more easily than we would have otherwise. This will result in machines becoming smarter and being able to access data and transforming them into meaningful outputs and will reduce human intervention. With 5G, data transfer will be more efficient, resulting in access to more analytical capabilities that increase efficiency and productivity. Ultimately, this network of machines will be digitally connected with one another through IoT and 5G, resulting in the creation and sharing of information that results in immense industrial power."

CONCLUSION

"Change is important. If we do not adapt, we will be left behind. We must change; we must keep up with the times," says Datuk Fadilah. "If we do not know what is going on with technology, we will become a dumping ground for obsolete technology. So we must be in the know at all times. It is not only about creating new products and setting standards for new products. It is also about updating old standards and eliminating those which no longer apply.

"We need the engineers and engineers need to get involved as technical experts in Technical Committees for standards development by providing technical input and expert opinions which are relevant to the implementation of 4IR. Engineers need to come in to help increase compliance to standards to increase national competitiveness."

She also wants to see more interns from the engineering fields. "This will benefit the students, the engineering field and us as the interns can see how standards are developed and eventually, sit on the committees."