The Role of Malaysian Higher Education in IR 4.0

Cheong Kee Cheok
Li Ran[a]
Universiti Malaya

Abstract: *Defining the 4th Industrial Revolution (IR4.0) as the "digital revolution" which combines human and technological capabilities in industry, this paper poses two questions. First, what is the country's level of attainment of IR4.0 Second, in preparing the population to take advantage of IR4.0, what is the role of higher education and what challenges does this sector face in pursuit of this goal? In Malaysia, the government has rosy projections of IR4.0 adoption, but on-the-ground surveys do not concur. The answer to the second question lies in the preparedness of this sector in meeting the challenges of migration to IR4.0. And in terms of IR4.0 training, competency deficiencies existed among many higher education instructors. With industry still lagging behind IR4.0 adoption, teaching IR4.0 skills is still necessary.*

Keywords: *IP4.0, digital revolution, emerging technologies, TVET, pedagogy*

Introduction

The advance of Industrial Revolution 4.0 (IR4.0) suggests either its inevitability or that its overwhelming advantages would persuade the industry to embrace this new technology. Its benefits are indeed many. With new technology – artificial intelligence, automation, mobile supercomputing, and self-drive cars, for example - come new solutions to global challenges and new avenues for employment as yet unknown (Brown-Martin, 2018). But seldom are its costs highlighted. These include the social disruptions that the adoption of technology brings. These include magnifying the divides between the haves (with the Internet) and the have-nots (without), the polarization of jobs leading likewise to greater inequality, greater capital intensity, and skilled labour shortages, all contributing to greater welfare vulnerability for some less endowed population groups (Sony 2020, p. 260).

But what precisely is IR4.0? The Industrial Revolution began with the invention of steam-powered engines and hydraulic power for the mechanisation of manufacturing in the late 18th century. A second Industrial Revolution was said to occur in the early 20th century with the arrival of electric power, which became the driver of both mass production in industry and at home. The third Industrial Revolution was associated with the emergence of ICT for automation in industry, programmable logic controllers (PLCs) and the development of personal computers, these developments began in the 1970s. The beginning 2000s saw the beginning of the 4th Industrial Revolution (IR4.0) also referred to as the "digital revolution" which combines human and technological capabilities in industry, including cloud computing, beginning with the most technologically advanced countries.

IR4.0's onset prompts each country aspiring to use it to ask itself two questions. First, what is the country's level of attainment of IR4.0? Second, how far short is the country's attainment of IR4.0 that its education system, in whatever form, must bridge? Nested in this broad question are several equally important questions. What does education for IR4.0 entail? What challenges does this sector face in pursuit of this goal? Are there subsectors of education that are particularly suited

a Correspondence can be directed to: liran@um.edu.my

for nurturing IR4.0 upskilling? To the extent that the country has not reached the level of being IR4.0 compliant, is it necessary for education to go all the way to catch up?

These two questions are what this exploratory paper attempts to answer. We pose these questions in the case of Malaysia, a high-middle-income country poised to advance to developed country status in 2020, according to then Prime Minister Mahathir's *Wawasan (Vision) 2020* blueprint, but on account of the country's slower growth since the 1997-98 Asian Financial Crisis, was pushed back to the year 2030 by Prime Minister Najib Razak. *Wawasan 2020* was a vision advanced by Prime Minister Mahathir Mohammad during the tabling of the Sixth Malaysia Plan in 1991. The vision called for Malaysia to advance to the status of a self-sufficient industrial nation by the year 2020 (Mahathir, 1991). Even with this lengthened schedule, doubts have been expressed as to whether this timetable is achievable, given challenges like deindustrialisation (Rasiah, 1995, 2011; Lee, 2022) and money politics (Gomez et al, 2021, Thillainathan & Cheong, 2019) the country has to confront. To achieve its goal of sustained growth, mastering IR4.0 to leverage the latest technology is essential. How far is Malaysian industry from the technological frontier?

Malaysia in the IR4.0 Era

To ascertain the readiness of Malaysia's economy and the world of work for the onset of IR4.0 despite the many announcements of its readiness is the first question to be answered.

Malaysia's Preparedness for IR4.0

International comparisons of preparedness for IR4.0 places Malaysia well up the ladder of IR4.0 achievement. In the World Economic Forum's *Readiness for the Future of Production Report 2018*, readiness is defined as the share of manufacturing value-added and the potential in expanding these shares in the future. The situation is reflected in the structure of production (complexity and scale of operations) and carefully selected production drivers (7 of them). These attributes are estimated for each country and aggregated to country rankings. In addition, they form the basis for classifying them into several archetypes in terms of future production. These archetypes are conveniently classified as (a) leading, countries with strong production bases today that also display a high readiness for the future; (b) legacy, countries with also strong production base but also at risk for the future; (c) high-potential, countries with limited production base, but with the potential to increase future production. And finally, (d) nascent, countries with limited production base today and also exhibiting a poor readiness for the future (WEF 2018, p. 9).

Of the 100 countries surveyed, only 25 are classified as "leading", most of them in North America, Europe and East Asia. The rest consists of 10 Legacy countries, 7 High Potential countries, and the bulk, 58 countries, Nascent.

Table 1 shows selected countries classified according to the criteria defined above. By these definitions, Malaysia has done very well.

Table 1. Readiness for Future Production, Selected Countries

Archtypical Country	Name	Structure of Production		Drivers of Production	
		Score	Rank	Score	Rank
Leading	China	8.25	5	6.14	25
Leading	Germany	8.69	3	7.50	6
Leading	Japan	9.99	1	6.82	16
Leading	Korea	8.85	2	6.51	21
Leading	Malaysia	6.81	20	6.51	22
Leading	Singapore	7.28	11	7.96	2

Table 1. Readiness for Future Production, Selected Countries (continued)

Archtypical Country	Name	Structure of Production		Drivers of Production	
		Score	Rank	Score	Rank
Leading	United K	7.78	13	7.84	4
Leading	US	7.78	7	8.16	1
Legacy	India	5.99	30	5.24	44
Legacy	Russia	5.71	34	5.35	43
Legacy	Thailand	7.13	12	5.45	35
Hi-potential	Australia	4.26	61	7.15	12
Hi-potential	Hong Kong	4.52	58	7.45	8
Hi-potentiak	Norway	5.65	36	7.07	13
Nascent	Argentina	4.91	50	4.25	75
Nascent	Pakistan	3.82	74	3.60	93

Source: WEF (2018, p. 12)

Using this methodology, Malaysia has acquitted itself quite well, it being in the group of "leading countries" with a strong production base and with drivers that show a strong readiness for the future, and with an aggregate score that ranks the country 20th among 100 countries in 2018 (WEF 2018, p. 12). Among ASEAN countries, only Singapore ranks (well) above it.

Is Malaysia's achievement of being qualified to be included among leading countries preparing their countries for production in the future by adopting IR4.0? Is it because of the government's leading role in promoting IR4.0? There is no question of the government's recent promotion of IR4.0; In 2021, no fewer than 3 documents referenced policies or activities related to IR4.0. In February 2021, the government released *Malaysia Digital Economy Blueprint* (MDEB) (EPU, 2021a). The MDEB was intended to support other initiatives of the Government to … transform Malaysia into a digitally-driven, high-income nation and a regional leader in digital economy." (EPU 2021a, p. 10). Phase 1 (2021 to 2022) aims to accelerate the adoption of the digital foundation needed for Phase 2 (2023-2025) which aims to drive digital transformation, and Phase 3 (2026-2030) which builds strong, sustainable growth in the decades to come, positioning Malaysia to become a regional market producer for digital products and digital solutions provider (EPU 2021a, p. 12). The digital economy is of course a part of IR4.0.

In July 2021, the Malaysian government announced through its *National Fourth Industrial Revolution (4IR) Policy* (EPU, 2021b) its policy on IR4.0, a "broad overarching national policy that drives … the adoption of emerging technologies … and builds the foundation to drive digitalisation across the nation, including bridging the digital gap." (EPU 2021b, p. 27). Confidence in achieving its targets was based on Malaysia's readiness to embrace technology through a plethora of plans like the National Policy on Science, Technology and Innovation 2013-2020, National Education Blueprint 2013-2025, National Internet of Things (IoT) Strategic Roadmap 2015-2025, Eleventh Malaysia Plan 2016-2020 with strategy to expand modern services, Malaysia Productivity Blueprint. And Malaysia's "above average ranking in key technology and innovation related global indices … (which) has provided a strong foundation for the nation to seize growth opportunities and mitigate risks arising from the 4IR." (EPU 2021b, p. 33). Grandiose achievements are promised despite Malaysia's admitted decline in competitiveness as shown by global competitiveness indices.

In September 2021, the Malaysian government released the Twelve Malaysia Plan 2021-2025. Though not targeted specifically at IR4.0, it made ample references to it, beginning with accelerating

technology adoption and innovation as a "policy enabler". In giving ample coverage to IR4.0 and the digital economy, the Plan is explicit on the challenges it faced, including low investment in R&D, low commercialization and experimental research, and shortage of Science, Technology, Engineering and Mathematics (STEM) graduates. The declining trend in Malaysia's competitiveness and product innovation have also been noted (EPU, 2021c).

Table 2. Malaysia's Drivers of Future Production 2018

	Score	Rank
Structures of Production	*6.81*	*20*
Complexity	6.80	30
Scale	6.82	7
Future Production Drivers	*6.51*	*22*
Technology & Innovation	5.85	23
Human Capital	6.52	21
Global Trade & Investment	7.39	7
Institutional Framework	6.56	30
Sustainable Resources	5.98	60
Demand Environment	6.32	17

Sources: WEF (2018, tables B1-B8)

However, these optimistic pronouncements were not matched by a closer analysis of the factors that make up the future of production (Table 2). Of the factors that made up the structure of production, the country's score is boosted by "scale", the proportion of manufacturing in total output. Manufacturing has not diversified to become more complex, which would be in keeping with industrial deepening. Malaysia's dependence on extractive or agricultural production for its exports has also hurt its economy in times of stress (Narang, 2020).

More telling are the scores for drivers of future production. Scores for "technology and innovation", "human capital" and "sustainable resources" were particularly weak, the first two factors signifying the widely known fact that Malaysia, using a low-skilled/semi-skilled imported labour model to keep wages low to compete with other low-cost countries like Indonesia and Vietnam. To this story is added Malaysia being locked into low-technology production with Malaysian employers reluctant to take on new technology that might require the hiring of anything beyond low-skill workers but which would propel Malaysia up the technology ladder and hence towards high-income. As a result, the same manufacturing establishments produce the same narrow range of products, only more of them, the only exception being with the arrival of international supply chains. Evidence of this labour intensity is seen in Malaysia having only 34 industrial manufacturing robots for 10,000 employees, below the Asian average, China, long the symbol of labour intensity, has twice as many robots, while leaders Singapore and Korea, with 488 and 631 robots are way ahead. As a consequence, Tan (2021) quoted Bank Negara noting that "This results in foreign multinationals relocating lower value-added processes to Malaysia, while moving higher productivity and value-added processes to neighbouring economies such as Singapore and PR China. In the end, this self-reinforcing image further locks Malaysia into this low-cost bind that would take significant resources to undo".

Besides these drivers, the "institutional framework" is wanting. Malaysia's institutional weaknesses received extensive coverage, especially from Gomez (1994), Narayan (1996), and Rasiah (1995). More recently, critical work has come from Tan (2007), Gomez (2017) and Thillainathan and Cheong (2019), all of which point to rent-seeking by vested interests, whether public or private, or both collaboratively. The result is development funds siphoned off to benefit vested interests.

Apart from these revelations, there is the phenomenon of what is labelled "negative deindustrialisation" – the premature move to services even before the industrialization process has run its full course (Rasiah, 1995, 2011). In this process, the move away from manufacturing began well before the manufacturing sector reached maturity, and investor funds lured away by the promise of high returns from real estate construction projects.

Given these challenges confronting the economy, what has been observed on the ground? Although piecemeal, the picture that emerged is mixed – major deficiencies are reported as frequently as stories of successful implementation. In a reported interview on July 28, 2017 (Mibrand, 2017), the Chief Executive Officer of the Human Resources Development Board (HRDF), Vinaeswaran Jeyandran was of the view that despite the hype, Malaysia is not yet in IR4.0. Just over 30% of Malaysia's 15 million workforce have been equipped to handle IR4.0 processes. HRDF is attempting to increase the proportion to 35-40%. *Techwire Asia* reports an even lower adoption among Malaysian Small Medium Enterprises (SMEs) of 10 to 15% taking steps to adopt IR4.0 processes with the reasons cited being the lack of structure and collaboration between the private and public sectors in driving the country's IR4.0 agenda (Tech Wire Asia, 2019). The same article reported that only about 90 of the approximately 500,000 Malaysian SMEs were eligible for funding under the national blueprint. Uncertainty as to how to access government funds to migrate to IR4.0 proved to be an additional hurdle. A separate study found fault with Malaysian Company research innovations which focused on unlocking value in new businesses rather than revitalising their core businesses (Techwire Asia, 2019).

No more optimistic was Kaur (2019a) who concluded that Malaysia was falling behind in IR4.0 adoption. *TM One* (2019) concurred. "In general, Malaysia is still struggling to adopt IR4.0, and many businesses are stuck at Industry 3.0, in terms of manufacturing technology… many manufacturers still rely on low-cost labour, i.e., foreign workers, and are hesitant to invest in innovative automation technologies." Among other manufacturers, those that adopted IR4.0 were no fully cognisant of its impact while those that had not adopted did not understand what it was for (Lee et al, 2019).

And surveys of members of civil society offer no more clarity. Idris' (2019) survey of 400 public university students found a majority who had heard of IR4.0 (90%), had some (understanding of IR4.0 (70%), recognized the importance of education funding to upgrade IR4.0 knowledge and skills (75%), were aware of the advantages of IR4.0 in terms of lowering production cost (65%), reduced manual work (65%), increased income (50%) insufficient (55%) and that there was insufficient supporting infrastructure (60%). The opposite results came from another survey of students of a private university (Chalil, 2019). The survey of 550 student respondents found students (and parents) lacked clarity about and felt unprepared to join an IR4.0-capable workforce. They also felt that higher education was not doing enough. More than 50% of the students were unable to articulate the substance of IR4.0, while more than 50% of the parents were unable to discuss IR4.0. Respondents felt that universities stressed theoretical and academic teaching, and did not expose students to IR4.0. Critical thinking, problem-solving, and leadership have not been adequately addressed.

Another survey conducted by Market Research Malaysia of more than 200 companies focusing on manufacturing, logistics and healthcare. It was found that the overall average score for current readiness for IR4.0 to be no higher than 2.65 out of a maximum of 5, and for future readiness to be only still 3.11. Manufacturing seems to expect a moderately high impact of IR4.0, with 45% expecting IR4.0 likely to hit their business. Out of the technologies, only cloud computing, big data and the Internet of Things stand out and these are in the logistics and healthcare sectors (Market Research Malaysia, 2019).

Beyond issues on the ground, Malaysia encounters structural advantages as well as challenges. Sharifah (2020) notes a lack of confidence among Malaysians in using the various types of e-wallets, worried about how secure these e-wallets are. She also noted technical issues related to the use of the Internet – the average connection speed in Malaysia being 13.3 megabits per second, compared with Thailand's 17.06 megabits per second and Singapore's 60.39 megabits per second. Internet stability and accessibility are also still issues in Malaysia. In addition, Yong et. al. (2020) identified the many challenges – long payback period, high cost of adoption, ambiguous IR4.0 concept, shortage

of strategic guidance of roadmaps, absence of cost-benefit analysis of IR4.0 technologies, technical challenges, no standardization, insufficient knowledge of talent needed for IR4.0, exposure to cyber threats, scalability, and psychosocial risks for the existing workforce – as obstacles to adopting IR4.0.

Admittedly, Malaysia's advantages include:

- Its strategic location as an e-commerce and logistic hub
- Its good infrastructure, with 30 highways, 5 international airports and 7 international seaports having good access to all parts of the country, with the Malaysian Communications and Multimedia Commission 2018 statistics showing 39.4 broadband subscriptions, 3G and 4G/LTE systems reaching 94.7 and 79.7% population coverage
- One of lowest rents in Grade A office space, the lowest living cost in Asia. Investment funds are also abundant, and developers/construction companies experienced.
- Industrial zones offering investment incentives. But these incentives are not unique to Malaysia.

On the other hand, some challenges are:

- Companies are reluctant to embrace change in the face of costs and uncertainty;
- Shortage of talent – of STEM graduates, and insufficient focus on digital literacy and innovation, resulting in a less adaptable workforce (Kaur, 2019b);
- Stringent regulation – red tape, endemic corruption, many sectors tightly controlled by state monopolies or government led corporations (GLCs); and
- Technical and Vocational Education and Training's (TVET) limited success, graduate unemployment, racial discrimination, and political issues prompting brain drain that adversely affected high-tech and high-value industrial production (Mustapha 2017; Selangor Journal, 2022).

Add to these the phenomenon of premature deindustrialization (Rasiah, 2011) and the plunge into real estate services (Gomez et al, 2021), it is difficult to concur with the government's rosy projections of accomplishments. Or doubt the various stakeholders' scepticism that IR4.0 is now in place. It is therefore little wonder that an article in the magazine *TMOne (*2019) asked: "Industry 4.0 is here: where are the manufacturers?" pointing its fingers at the reliance on "low-skill foreign workers." The answer to this question lies in upgrading Malaysia's human capital. That task is shouldered by education.

Higher Education and IR4.0

The arrival of IR4.0 poses major challenges for education, defined to cover the formal academic especially higher education sector to which most students and their parents gravitate, but also work-based training generally referred to as TVET which has not received much attention until recently. Both subsectors have to deal with so many changes in the environment in their role in nurturing the workforce to be IR4.0-ready. These changes include the nature of employment as there could be reduced demand for entry-level graduates while those with specializations would remain to be sought after. The structure of employment will also change as the demand for different types of goods and services change. Technologies at work and for learning are also changing. Partly responding to technological changes, student study habits will evolve to take advantage of new capabilities. The new environment will require a major restructuring of education systems and pedagogy just to keep pace. At the same time, these disruptions offer a real opportunity for fundamental education reform that, if successful, will produce a creative and innovative workforce.

Given these deficiencies, what role can education, specifically higher education, play to enable all stakeholders to be current in IR4.0 knowledge and use? And what type of education is best suited to ensuring proficiency? To answer these questions, those who will form the workforce in the future IR4.0 environment need to be profiled. Kozinski (2017) characterized these Generation-Z students as fully engaged in learning but wanting to control this process. They do not fear challenges. enjoy group discussion and collaborate in teams in a highly interactive environment. For them, learning is not limited geographically and intertemporally; they can learn anywhere and anytime and have familiarity with the latest technology.

In this environment, what constitutes the appropriate pedagogy and approach that can be effectively utilized? Pedagogically, communication and collaborating and collaborative skills would assume greater prominence, together with digital and data literacy. There should be opportunities for more individualized modes of learning to suit individual students' needs (Mustapha, 2017). The use of blended learning between traditional instruction and Massive Open Online Courses (MOOCs) and deeper learning through more use of practice-oriented learning or learning-by-doing should be prioritised. At the same time, the multitude of skills required in IR4.0 would mean the offer of packages of interdisciplinary course offerings such as engineering, business administration and computer science. Corresponding to IR4.0, this state of education has been called Education 4.0 (Haron, 2018).

The success of this transformation depends crucially on at least three factors. First, because digital technology relies on the Internet, the use of this technology is available only to those with Internet connections, possibly magnifying the divide between the more affluent haves and the less affluent have-nots. Second, even for students with the means to develop new ways of learning, the role of teachers in motivating learning while introducing new ways of doing things is even more vital. Miranda et al, (2021, p. 1) listed the following attributes teachers needed to possess: competencies, learning methods, ICT and infrastructure. Even as students need to master vital media for guiding and transferring new skills, teachers' commitment matters. Some resistance to change, given uncertainties over methods and outcomes, as well as gain familiarity with new techniques, is inevitable. This resistance may take the form of complaints of insufficient time to integrate new content with old, focus on ensuring students pass examinations, loss of control in trying new content, reliance on textbooks and lack of ICT familiarity. Arguably the greatest change in teacher mindset will come from recognising that the student, rather than the teacher, should be the centre of attention (Gerstein, 2014).

But what are Malaysia's higher education system's weaknesses that require rectifying, especially with respect to IR4.0 readiness?

The first is the overall decline of standards that have seen a widening gulf between Malaysian public universities and their peers in neighbouring Singapore and Hong Kong. The National University of Singapore has been ranked as high as third in THES' Asia Rankings, while Nanyang Technical University placed 5th in 2021. The University of Hong Kong placed 4th, Chinese University of Hong Kong 7th. Malaysia's top university, the University of Malaya, achieved at most 49th position. The reasons for this widening gulf are well-known. Mukherji and Wong (2011) compared the National University of Singapore with the subsequently established University of Malaya and found that while the former enrolled students by merit, the latter also does so based on affirmative action. This academic distortion supplements the shortage of Malaysian graduates on account of the high attrition rate among male students during secondary school (Cheong & Yong, 2022)

Affirmative action-based policies have also distorted the composition of higher education enrolment, skewing enrolment away from STEM subjects towards liberal arts and social sciences subjects, allowing those students to opt for "softer" subjects and draining the already modest supply of the stock of expertise in the physical sciences.

A further factor not favourable to Malaysia's human capital accumulation is the tendency for boys more than girls to drop out at critical points of their educational journey (Cheong & Yong, 2022).

This has robbed male students of their opportunity to proceed to tertiary education. The combined impact of these factors is a smaller proportion of students in tertiary education.

The limited number of tertiary education students notwithstanding, a significant number of university graduates remain unemployed 6 months after their graduation, suggesting that there may be a mismatch between what they learned and what employers expect (Roy, 2020). The role of English language proficiency for communication, critical thinking and problem solving particularly important for IR4.0 are often cited as missing among Malaysian university graduates, and cannot be nurtured by the existing courses arbitrarily imposed by the Ministry of Education, such as on Islam and moral studies.

The second weakness of Malaysian higher education is the tight control exercised by the government over the sector. All political activity is not allowed for students who are required to sign a pledge before enrolling. Now that the voting age has been lowered to 18, forbidding students' involvement in political activities no longer makes sense. It is the constitutional right of students to be politically active. Indeed, these regulations are unconstitutional. Besides, political participation constitutes an important pathway to grooming leadership.

All course content and new course offerings require Ministry approval but this has not stopped the Ministry from mandating course offerings that have little to do with the creative thinking required for mastery over IR4.0 processes. All senior appointments have to be approved by the Ministry, with political appointees not uncommon.

Malaysian universities' loss of autonomy dates from the Universities and University Colleges Act (UUCA) in 1971 shortly after the 1969 race riots. The UUCA severely curtailed whatever autonomy universities had, with the vice chancellor being appointed on the advice of the prime minister. As Chang (2017) noted, universities' autonomy are rhetorical, at best. Universities have limited freedom in allocating research grants or funding, given the need to follow strict procurement procedures. This view was corroborated elsewhere (Wan Saiful, 2016).

In terms of private sector education, regulations also apply to course offerings even by private tertiary institutions even though the government has no funding obligations for them. Arguably, the greatest obstacle is the tradition of teaching in academic circles to prepare students for assessments and focus on knowledge. This approach is antithetical to what is required for IR4.0.

A final factor is the subsidiary role assigned to TVET as a discipline, the public impression being that TVET is the refuge of students unsuccessful in their academic studies (Cheong & Lee, 2016). This has been the reason why the quotas for TVET in Malaysia remain unfilled despite government promises to elevate its status. The fact that most TVET programmes are offered at low levels and that paper qualifications still dominate TVET staff recruitment will require some convincing. Malaysia's enrolment of under 200,000 TVET students pales beside the enrollments of 600,000, 500,000, and a similar number in Germany, Singapore and South Korea (UNESCO UNEVOC, 2018; 2019). It did not help that a multitude of institutions under various government ministries offer TVET programmes but programme coordination is wanting. Employers for their part have begun to give fuller recognition to TVET graduates. But still not fully. As a result, as Boo (2018) noted, despite Malaysia enjoying near full employment, youth unemployment was much higher than the national average, with graduate unemployment a major share of youth unemployment. Many of these issues represent a reprise of those raised in the World Bank SABER Report (World Bank, 2013) a decade ago.

Conclusion: Implications for Malaysia

Malaysia has reached a critical juncture in its industrialization with the opportunity to upgrade its production technique and enhance competitiveness. But in terms of Malaysia's preparedness to take advantage of IR4,0, the conclusion must be that it is not there yet, Surveys of Malaysian businesses show the lack of preparedness, blame the government because they lack knowledge on how to access government support and because the full benefits offered by IR4.0 have not been widely publicized. The government for its part felt that it has given the importance of IR4.0 adequate publicity. The

enterprise sector itself is not blameless, opting to select the low-cost low-skill model and resisting all efforts to raise minimum wages and being reluctant to upgrade technology.

Education could have been used to increase awareness and acceptance of IR4.0 techniques but even here, despite many models available, limited progress has been made. Education technology and pedagogy need to be readily available. It is the government's approach, reflected in its education policy, that proves to be antithetical to the aims of IR4.0. For instance, the government's tight control of the education system, including recruitment of staff, course content and research, with no room for 'thinking outside the box", will not permit creative thoughts. Add to this adherence to the traditional system of education in which teachers see their performance judged by how well they can coach their students to pass examinations, and any move to Education 4.0 will be difficult to materialize.

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