MEPN

MACHINERY & EQUIPMENT
PRODUCTIVITY NEXUS

SUBSECTOR PRODUCTIVITY REPORT

MACHINERY AND EQUIPMENT

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Subsector Productivity Report Machinery and Equipment

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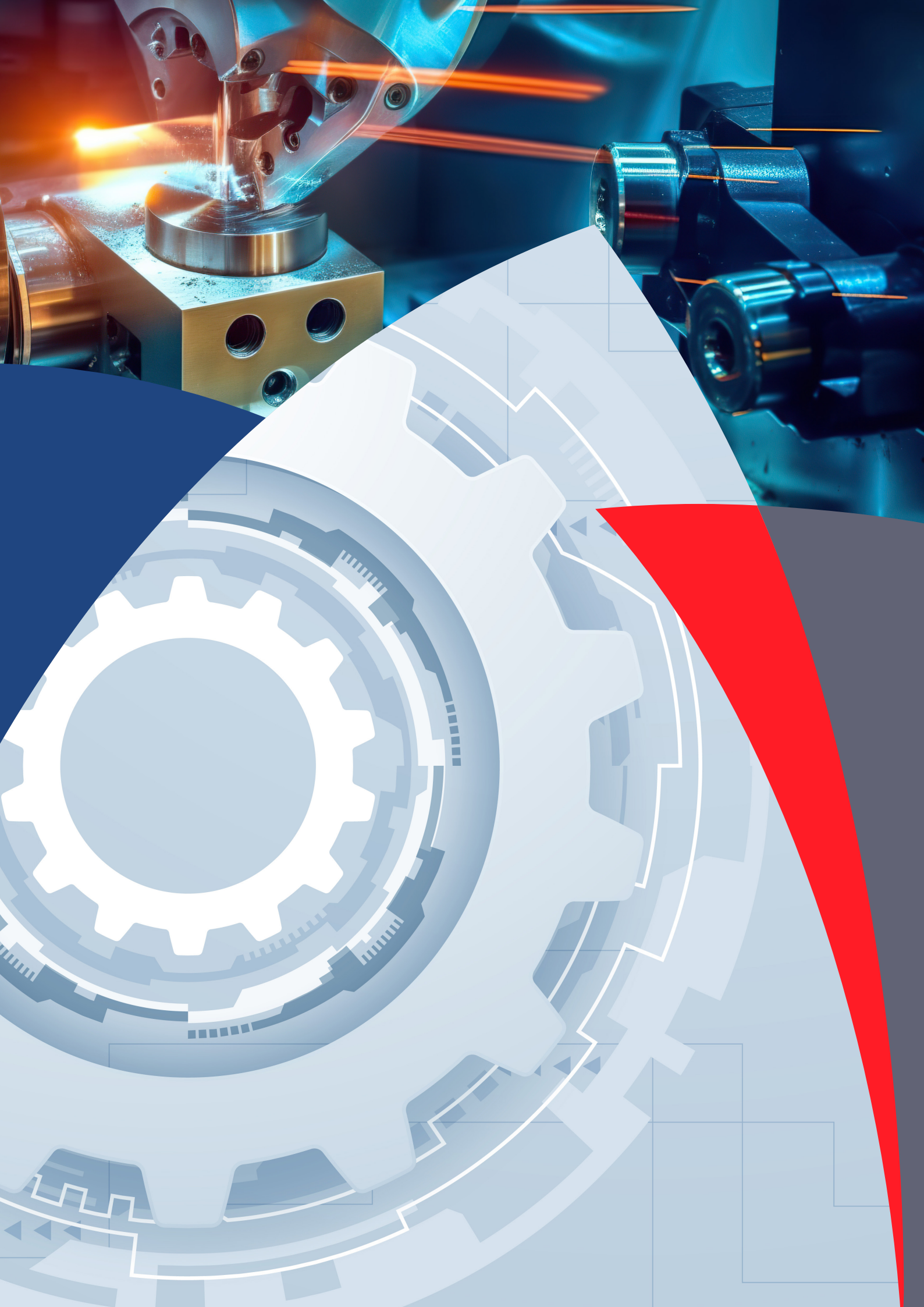


Executive Summary

The Machinery and Equipment Productivity Nexus (MEPN) has released a subsector report detailing its initiatives to improve productivity growth in the Machinery and Equipment (M&E) Subsector in Malaysia. The report provides an overview of the M&E Subsector, including its contribution to the country's Gross Domestic Product (GDP), employment, and productivity growth performance.

The report highlights the challenges faced by the M&E Subsector, including the conventional way of doing business and lack of skilled talent to meet industry demand. Additionally, more than 95% of M&E players are Small and Medium Enterprises (SMEs) with a short-term profit mindset, low adoption of productivity systems, and a "quick fix" mentality, hindering productivity growth.

MEPN has been driving initiatives since 2017 to boost productivity and competitiveness in the M&E Subsector. The report details MEPN's present initiatives and future recommendations for productivity initiatives, highlighting the Nexus's role in addressing the subsector's challenges.

MEPN is guided by the Malaysia Productivity Blueprint (MPB) and the recently launched Twelfth Malaysia Plan, 2021-2025 in setting its future direction. By focusing on technology and digital adoption, MEPN aims to strengthen the role of the subsector at the sectoral and enterprise levels, leading to faster productivity growth aligned with the government's goals in Industry4WRD.

Message from the Director General, Malaysia Productivity Corporation

"The Subsector Productivity Report 2022 presents a roadmap for attaining sustainable productivity gains, fostering innovation, enhancing the overall competitiveness of our industries, and propelling Malaysia towards sustainable economic growth"

Malaysia Productivity Corporation (MPC) plays a pivotal role in bolstering Malaysia's economic growth by driving productivity advancements across all sectors, as outlined in the Twelfth Malaysia Plan (12MP). Malaysia's economy demonstrated promising performance, with a remarkable 8.7 percent GDP growth in 2022, surpassing the 3.1 percent achieved in 2021. This growth can be attributed to the recovery of private spending and investment, a decline in unemployment rates, and the strengthening of the ringgit.

The year 2022 presented both opportunities and challenges for Malaysia's economic landscape. Our nation navigated through a dynamic global environment characterised by technological advancements, shifting market dynamics, and the ongoing recovery from the pandemic's impact. Amidst these circumstances, productivity emerged as a critical driver of economic growth and competitiveness, serving as a key pillar for Malaysia's sustainable development.

MPC strategically leverages the sectoral Productivity Nexus to drive significant productivity growth in the services, manufacturing, and agriculture sectors. These efforts are carried out in alignment with the Malaysia Productivity Blueprint (MPB), which outlines impactful initiatives since 2017, and key policies such as the New Industrial Masterplan 2030 and the 12MP Mid-Term Review. By maximising collaborative efforts across various platforms, MPC actively supports and facilitates the industry-driven initiatives of the Productivity Nexus.

We take pride in highlighting the remarkable achievements of our subsectors in enhancing productivity. Through innovative practices, strategic investments, and a collaborative approach, our industries have embraced initiatives for productivity improvement, charting for an optimistic goal for a labour productivity growth of 3.8% per annum for the remaining 12MP period.

The Subsector Productivity Report 2022 presents a roadmap for attaining sustainable productivity gains, fostering innovation, enhancing the overall competitiveness of our industries, and propelling Malaysia towards sustainable economic growth. We believe that this publication will inspire fruitful collaborations, catalyse meaningful change, and contribute to our nation's shared prosperity.

Encik Zahid Ismail
Director General
Malaysia Productivity Corporation (MPC)

Statement from the Champion, Machinery and Equipment Productivity Nexus

"MEPN is committed to rallying the industry players and relevant parties to move in this direction alongside Industry4WRD. It is imperative to maximise the opportunity provided by the government's support and work together to accelerate business recovery and expansion"

As we enter a new year, it is critical for the manufacturing industry to explore opportunities to leverage digitalisation and technology adoption to boost productivity growth and drive economic recovery. Malaysia's government is committed to supporting the manufacturing sector's transition to Industry4WRD, with RM45 million allocated in 2022 for technology adoption and digital transformation in the manufacturing and services sectors. The Machinery and Equipment Subsector plays a vital role in this process, with its cross-cutting linkages with major economic segments. The industry must take advantage of this opportunity to enhance competitiveness, propel innovation and boost productivity.

The Machinery and Equipment Productivity Nexus (MEPN) is dedicated to playing its part in facilitating the growth of the M&E Subsector. The Twelfth Malaysia Plan (12MP) highlights the manufacturing sector's focus on producing high-value and complex products over the next five years, particularly in E&E, chemicals and chemical products, M&E, and aerospace. This is an excellent direction for MEPN, and the organisation is committed to enhancing its initiatives and programmes to support the subsector's growth. The impact of achieving this goal will be significant, including high business productivity, profitability, and performance, translating into prosperity for all.

The government's efforts to support the manufacturing sector's transition to Industry4WRD are commendable, but it is essential for industry players to recognise their role in growing the subsector further. Business dynamism is the result of all parties working together. MEPN is committed to rallying the industry players and relevant parties to move in this direction alongside Industry4WRD. It is imperative to maximise the opportunity provided by the government's support and work together to accelerate business recovery and expansion.

The manufacturing industry's transition to Industry4WRD is critical for driving economic growth and recovery. The M&E Subsector plays a vital role in this transition, and MEPN is committed to supporting the subsector's growth through enhanced initiatives and programmes. Industry players must recognise their role in this process and work together with the government and relevant parties to maximise the opportunities provided by technology adoption and digital transformation. Let us all work together to accelerate productivity growth and drive prosperity for all.

Mr. Mac Ngan Boon
Champion
Machinery and Equipment Productivity Nexus (MEPN)

PART I

MACHINERY AND EQUIPMENT SUBSECTOR PERFORMANCE

MACHINERY AND EQUIPMENT SUBSECTOR PERFORMANCE IN MALAYSIA

AN OVERVIEW

The Machinery and Equipment (M&E) Subsector in Malaysia is a significant contributor to the country's economy, accounting for approximately 7% of the country's Gross Domestic Product (GDP). The M&E Subsector includes various industries, such as precision machining, automation and robotics, medical devices, and aerospace.

The Malaysian government has identified the M&E Subsector as one of the main focus areas for growth and expansion, with the Ministry of Investment, Trade and Industry (MITI) indicating that Malaysia has the potential to be a leading regional producer and exporter of M&E. The Malaysian Investment Development Authority (MIDA) has also positioned Malaysia as the destination of choice within the ASEAN region for the M&E Subsector , with forecasted growth of 10.1% per annum between 2018-2027.

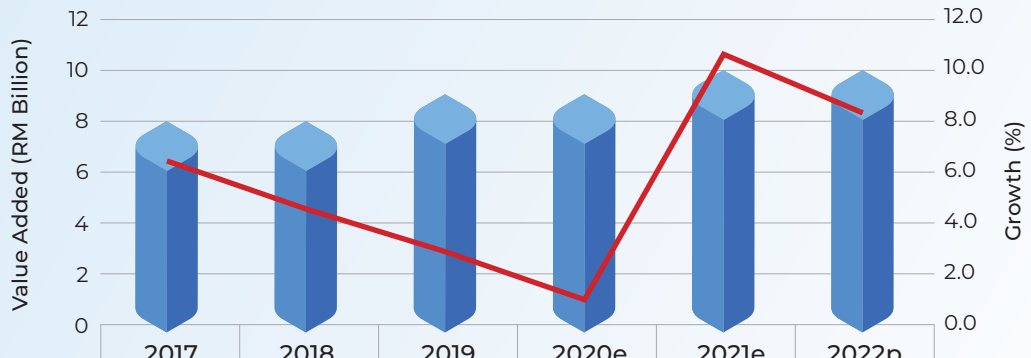
Malaysia's conducive business ecosystem for the M&E Subsector has attracted internationally renowned and advanced M&E companies such as SKF, VAT, Oerlikon Balzers, Favelle Favco, Vitrox, SRM, and FMC, among others. Additionally, SMEs account for more than 95% of M&E players in Malaysia.

In terms of contribution to the economy, the M&E Subsector plays a critical role in supporting various industries, including the manufacturing, construction, and transportation sectors. The M&E Subsector also contributes significantly to job creation, with over 100,000 people employed in the sector in 2021.

The M&E Subsector is a vital component of Malaysia's economy, with its growth and expansion playing a crucial role in the country's economic development and global competitiveness.

CONTRIBUTION TO MALAYSIA'S ECONOMY

Figure 1 : Machinery and Equipment Subsector Value Added, 2017 - 2022



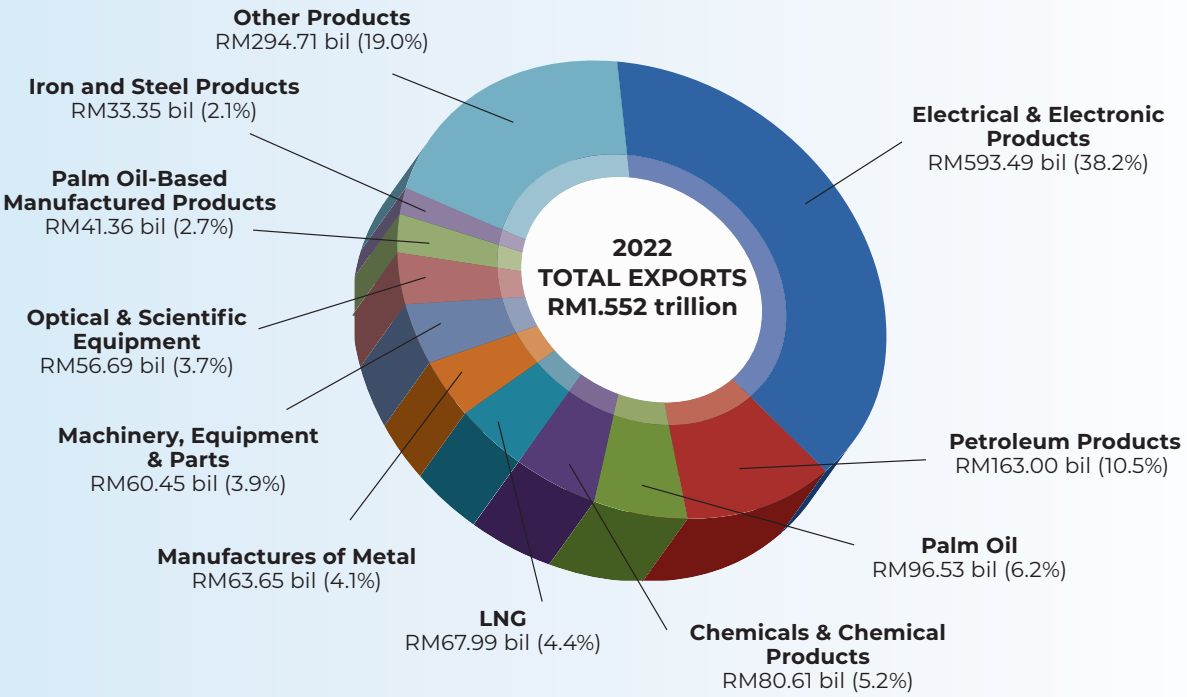
	2017	2018	2019	2020e	2021e	2022p
Value Added (RM billion)	8	8	9	9	10	10
Growth (%)	6.2	4.4	3.5	1.5	10.5	8.3

Year

Source: Department of Statistics Malaysia (DOSM)

As depicted in Figure 1, the Machinery and Equipment (M&E) subsector displayed steady growth in value added from 2017 to 2022, with a consistent value of RM 8 billion in 2017 and 2018, followed by incremental increases to RM 9 billion in 2019 and maintaining that level in 2020. Subsequently, the subsector experienced notable expansion, reaching RM 10 billion in 2021 and maintaining this figure in 2022. These value-added figures corresponded to fluctuating growth rates over the same period, starting with a robust 6.2% growth rate in 2017, followed by 4.4% in 2018, and 3.5% in 2019. The subsector demonstrated resilience with a 1.5% growth rate in 2020. However, the most significant growth occurred in 2021, recording an impressive 10.5% increase, which was followed by a still commendable 8.3% growth rate in 2022. This data underscores the subsector's consistent contribution to economic expansion and its increasing significance within the broader economic landscape.

Figure 2 : Malaysia's Exports in 2022

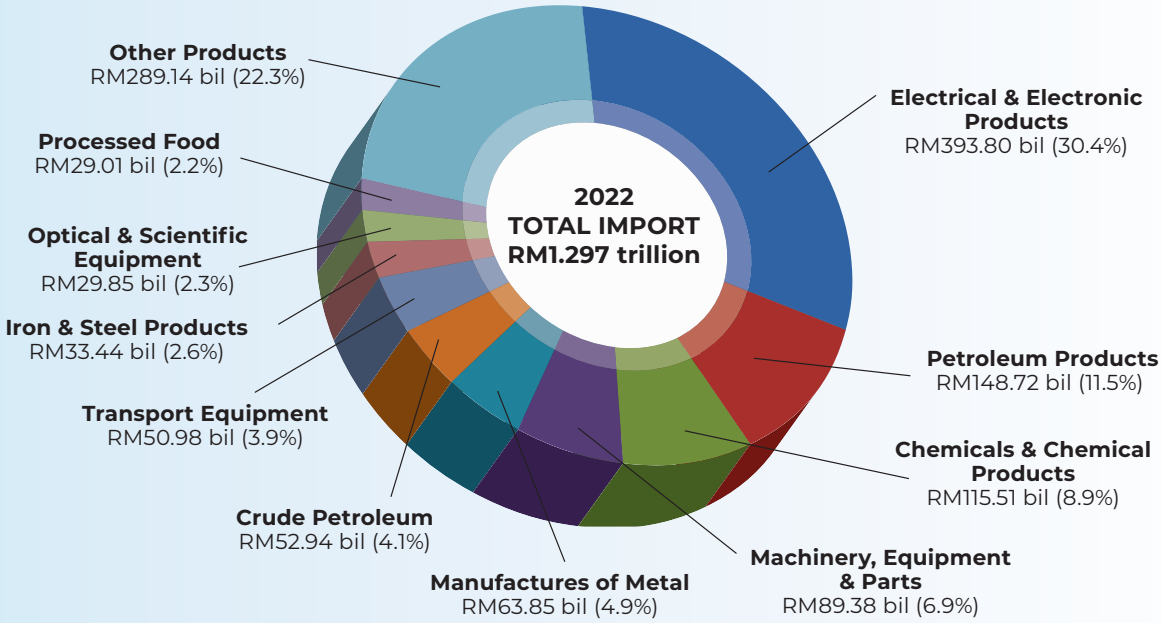


Source: Department of Statistics, Malaysia (DOSM, tabulated by MATRADE)

Figure 2 illustrates that the Machinery and Equipment (M&E) Subsector made a substantial contribution to Malaysia's export performance, accounting for 3.9% of the total exports in 2022, with a value amounting to RM 60.45 billion. This highlights the significant role played by the M&E Subsector in the country's export-driven economic activities and underscores its importance within the broader context of Malaysia's international trade.

Figure 3 depicts the import performance of the Machinery and Equipment (M&E) Subsector, which comprised 6.9% of the total imports in 2022, amounting to RM 89.38 billion. This highlights the substantial role played by the M&E Subsector in meeting domestic demand for machinery and equipment, underlining its significance within the broader landscape of Malaysia's import activities.

Figure 3 : Malaysia's Imports in 2022



Source: Department of Statistics, Malaysia (DOSM, tabulated by MATRADE)

Table 1 provides a comprehensive overview of Malaysia's total exports across various Machinery and Equipment (M&E) subsectors, spanning the years from 2018 to 2022. These subsectors include Power Generating M&E, M&E for Specific Industries, Metalworking M&E, and General Industrial M&E, Components and Parts. In the context of Power Generating M&E, the data reveals a fluctuating trend in exports over the specified period, with 2019 exhibiting the highest export value at RM 3.86 billion and 2020 marking a notable decrease to RM 2.58 billion.

However, the sector recovered in 2022, reaching RM 3.00 billion in exports, with primary destinations being Singapore, USA, Japan, Germany, and the UK. M&E for Specific Industries experienced a consistent upward trajectory, with exports surging from RM 16.13 billion in 2018 to RM 29.44 billion in 2022, driven by strong demand from Singapore, USA, Japan, Indonesia, and Thailand. Metalworking M&E exports remained relatively stable, fluctuating between RM 1.47 billion in 2020 and RM 2.10 billion in 2021, with key markets including Singapore, Hong Kong, Japan, and the USA. General Industrial M&E, Components, and Parts showcased a consistent growth pattern, increasing from RM 19.29 billion in 2018 to RM 25.95 billion in 2022, primarily driven by exports to Singapore, Hong Kong, Japan, the USA and Australia.

This data highlights the dynamic nature of Malaysia's M&E exports, with specific subsectors showing distinct trends and market preferences. The export performance of these subsectors reflects their varying degrees of competitiveness and global demand, with M&E for Specific Industries emerging as a standout performer, while Metalworking M&E experienced more modest fluctuations. General Industrial M&E and its associated components and parts have consistently expanded their export footprint, underscoring Malaysia's growing role in the global supply chain for industrial machinery and equipment. Understanding these trends is crucial for policymakers and industry stakeholders seeking to enhance Malaysia's economic resilience and competitiveness in the international M&E market.

Table 1 : Malaysia's Total Exports by M&E Subsector Main Categories (2018 – 2022)

Sub-Sectors	2018	2019	2020	2021	2022	Major Destinations
	RM bil (US$ bil)*	RM bil (US$ bil)**	RM bil (US$ bil)'	RM bil (US$ bil)''	RM bil (US$ bil)'''	
Power Generating M&E	3.33 (0.83)	3.86 (0.93)	2.58 (0.62)	2.54 (0.61)	3.00 (0.68)	Singapore, USA, Japan, Germany, UK
M&E for Specific Industries	16.13 (4.00)	16.17 (3.90)	17.39 (4.15)	23.70 (5.71)	29.44 (6.69)	Singapore, USA, Japan, Indonesia, Thailand
Metalworking M&E	1.91 (0.47)	1.48 (0.36)	1.47 (0.35)	2.10 (0.51)	2.01 (0.46)	Singapore, Hong Kong, Japan, USA
General Industrial M&E, Components and Parts	19.29 (4.79)	20.10 (4.85)	18.00 (4.30)	21.58 (5.21)	25.95 (5.90)	Singapore, Hong Kong, Japan, USA, Australia
TOTAL	**40.67 (10.09)**	**41.60 (10.04)**	**39.45 (9.41)**	**49.92 (12.04)**	**60.41 (13.73)**	

Source: Department of Statistics, Malaysia (DOSM, tabulated by MATRADE)

*Exchange rate as indicated in Table 1: *USD1=RM4.03, **USD1=RM4.14, 'USD1=RM4.20, ''USD1=RM4.14, '''USD1=RM4.40*

Table 2 : Malaysia's Total Imports by M&E Subsector Main Categories (2018 – 2022)

Sub-Sectors	2018	2019	2020	2021	2022	Major Sources
	RM bil (US$ bil)*	RM bil (US$ bil)**	RM bil (US$ bil)'	RM bil (US$ bil)''	RM bil (US$ bil)'''	
Power Generating M&E	15.06 (3.74)	15.26 (3.68)	11.13 (2.66)	10.61 (2.56)	13.94 (3.16)	China, USA, Taiwan, Singapore
M&E for Specific Industries	23.89 (5.92)	21.00 (5.07)	19.17 (4.57)	24.38 (5.87)	32.45 (7.37)	Singapore, USA, Japan, Indonesia, Thailand
Metalworking M&E	4.67 (1.16)	4.71 (1.14)	3.36 (0.80)	4.13 (1.00)	5.15 (1.17)	Singapore, India, China, Japan, USA
General Industrial M&E, Components and Parts	30.16 (7.48)	28.67 (6.92)	26.47 (6.31)	29.52 (7.12)	37.84 (8.59)	Singapore, Hong Kong, Japan, USA, China
TOTAL	**73.78 (18.29)**	**69.64 (16.81)**	**60.13 (14.34)**	**68.64 (16.56)**	**89.38 (20.29)**	

Source: Department of Statistics, Malaysia (DOSM, tabulated by MATRADE)

*Exchange rate as indicated in Table 2: *USD1=RM4.03, **USD1=RM4.14, 'USD1=RM4.20, ''USD1=RM4.14, '''USD1=RM4.40*

Table 2 provides a comprehensive overview of Malaysia's total imports within various Machinery and Equipment (M&E) subsectors over the period from 2018 to 2022. These subsectors encompass Power Generating M&E, M&E for Specific Industries, Metalworking M&E, and General Industrial M&E, Components and Parts. In the context of Power Generating M&E, the data illustrates a fluctuating trend in imports, with 2018 recording the highest value at RM 15.06 billion and 2020 marking a notable decrease to RM 11.13 billion. However, imports rebounded in 2022, reaching RM 13.94 billion, with major sources being China, the USA, Taiwan, and Singapore. M&E for Specific Industries exhibited varying import values over the years, peaking at RM 32.45 billion in 2022, driven by substantial demand from Singapore, the USA, Japan, Indonesia, and Thailand. The Metalworking M&E subsector demonstrated relative stability in imports, with values ranging from RM 3.36 billion in 2020 to RM 5.15 billion in 2022, primarily sourced from Singapore, India, China, Japan, and the USA. General Industrial M&E, Components and Parts followed a consistent upward trajectory, increasing from RM 30.16 billion in 2018 to RM 37.84 billion in 2022, driven by imports from Singapore, Hong Kong, Japan, the USA and China.

This data underscores the dynamic nature of Malaysia's M&E imports, with specific subsectors exhibiting distinctive trends and source markets. The import performance in M&E subsectors reflects varying levels of domestic demand, global competitiveness, and supply chain dynamics. Notably, M&E for Specific Industries emerged as a significant contributor to Malaysia's imports, while Metalworking M&E remained relatively steady. The expansion in imports of General Industrial M&E and its associated components and parts signifies Malaysia's integration into the global industrial supply chain. A nuanced understanding of these import trends is essential for policymakers and industry stakeholders to assess Malaysia's trade dynamics and make informed decisions regarding trade policies and industrial development strategies.

LABOUR PRODUCTIVITY GROWTH OF THE MACHINERY & EQUIPMENT SUBSECTOR IN MALAYSIA

Table 3 : Labour Productivity Growth for Main Economic Subsectors, 2017 - 2022

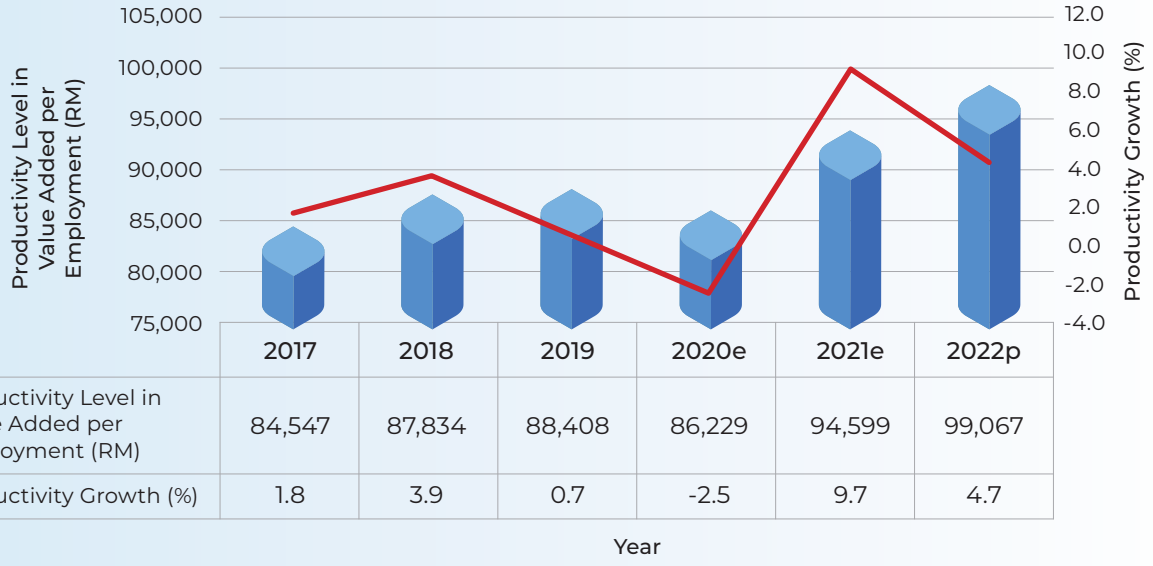
Sector	Subsector[1]	Value Added per Employment, RM '000		Average Annual Growth Rate, %
		2017	2022p	2017-2022p
Agriculture	Agrofood	89.2	92.8	0.8
Manufacturing	Chemicals and Chemical Products	291.1	311.5	1.5
	Machinery and Equipment	84.5	99.1	3.3
	Electrical and Electronics	164.8	216.2	5.6
Services	Retail and Food & Beverages	44.4	47.4	1.6
	Tourism	66.9	67.8	14.3
	ICT Services	339.2	383.9	2.5
	Professional Services	76.9	82.9	1.8
	Private Healthcare	61.3	68.2	2.3
	Overall	**82.7**	**91.8**	**2.2**

Source: Department of Statistics Malaysia (DOSM)

p = preliminary

Table 3 presents the labour productivity growth within Malaysia's Machinery and Equipment (M&E) Subsector, in comparison to other main economic subsectors within the three sectors, namely agriculture, manufacturing, and the services sector. In 2017, the value added per employment in the M&E Subsector stood at RM84.5 thousand, which subsequently rose to RM99.1 thousand in 2022, reflecting an average annual growth rate of 3.3% within the five-year period from 2017 to 2022. This data highlights the steady improvement in labour productivity within the M&E subsector, underscoring its role as a vital contributor to Malaysia's economic development.

Figure 4 : Labour Productivity Level and Growth of the Machinery and Equipment Subsector : Value Added per Employment, 2017-2022



	2017	2018	2019	2020e	2021e	2022p
Productivity Level in Value Added per Employment (RM)	84,547	87,834	88,408	86,229	94,599	99,067
Productivity Growth (%)	1.8	3.9	0.7	-2.5	9.7	4.7

Source: Department of Statistics Malaysia (DOSM), In RM'000 per worker at constant 2015 prices

The analysis of Labour Productivity Growth in the Machinery and Equipment (M&E) Subsector from 2017 to 2022, as depicted in Figure 4, reveals significant fluctuations in Value Added per Employment. In 2017, the value stood at RM84,547, increasing to RM87,834 in 2018, RM88,408 in 2019, dipping to RM86,229 in 2020, followed by substantial growth in 2021 to RM94,599, and in 2022 to RM99,067. The corresponding productivity growth rates fluctuated, with an increase of 1.8% in 2017, a significant jump of 3.9% in 2018, a marginal rise of 0.7% in 2019, a decline of -2.5% in 2020, and remarkable growth rates of 9.7% in 2021 and 4.7% in 2022.

The period from 2017 to 2020 witnessed an overall M&E Labour Productivity growth of 2.25% Compound Annual Growth Rate (CAGR), falling short of the 11th Malaysia Plan's targeted rate of 3.7% CAGR. Challenges faced by the M&E subsector, such as the nature of low volume-high mix production and reliance on cheap foreign labour, contributed to the lower growth.

The peak in 2018, followed by a decline from 2018 to 2020, may be attributed to economic downturn, technology disruptions, investment cycles, labour market shifts, market saturation, and competitive dynamics. The negative productivity growth in 2020 was attributed to COVID-19 lockdowns affecting M&E players, especially those in engineering supporting industries. The surge in semiconductor machinery demand in 2021, driven by a global chip shortage, contributed to a 9.7% year-on-year productivity growth. However, in 2022, delays in the supply chain led to a slight drop in productivity growth.

The substantial growth in 2021 and 2022, particularly in semiconductor-related machinery, indicates a positive impact on productivity. The post-COVID surge in digitalization played a pivotal role, with remote operations becoming vital. In 2023, a drop in productivity growth is expected due to a decline in global demand for semiconductor machinery, coupled with inflation-induced labour cost increases.

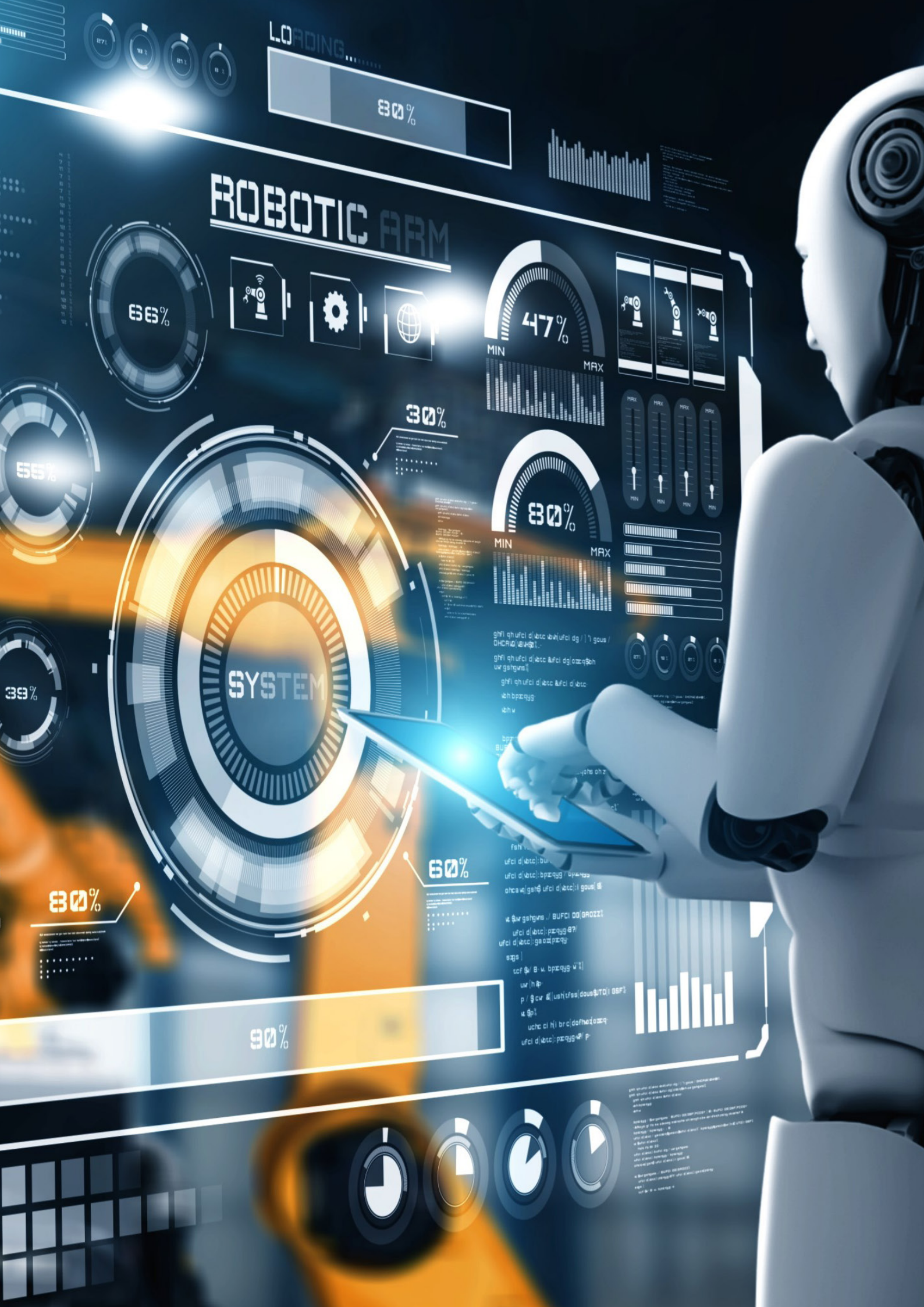
The persistent challenge of low productivity growth in the M&E Subsector, remaining below 3% per year, is attributed to factors such as company demographics, short-term focus, reluctance to invest in long-term activities, structural issues, and low adoption of automation. Structural transformation, as envisaged in the New Industrial Master Plan (NIMP), is crucial for raising productivity and competitiveness in the M&E Subsector.

Figure 5 : Labour Productivity Level and Growth of the Machinery and Equipment Subsector: Value Added per Hour Worked, 2017-2022

	2017	2018	2019	2020e	2021e	2022p
Productivity Level in Value Added per Hour Worked (RM)	33.3	35.4	36.3	38.8	40.8	41.0
Productivity Growth (%)	-1.1	6.3	2.6	6.7	5.2	0.4

Source: Department of Statistics Malaysia (DOSM), In RM'000 per worker at constant 2015 prices

Figure 5 provides a comprehensive overview of the Labour Productivity Growth in the Machinery and Equipment (M&E) Subsector from 2017 to 2022. This figure reflects the productivity levels in terms of Value Added per Hour Worked for the Machinery and Equipment Subsector, with values in 2017 at RM33.30, followed by increases to RM35.40 in 2018, RM36.30 in 2019, RM38.80 in 2020, RM40.80 in 2021, and RM41.00 in 2022. The productivity growth performance during this period showcases dynamic fluctuations: a decrease of -1.1% in 2017, followed by a substantial rise of 6.3% in 2018, a further increase of 2.6% in 2019, a notable surge of 6.7% in 2020, a steady growth of 5.2% in 2021, and a marginal increase of 0.4% in 2022. These figures illustrate the intricate labour productivity dynamics within the Machinery and Equipment subsector, emphasising its potential for growth and economic contribution to Malaysia's industrial landscape.


LOADING
80%
ROBOTIC ARM
66%
47%
MIN
MAX
30%
55%
80%
MIN
MAX
SYSTEM
39%
60%
80%
90%

PART II

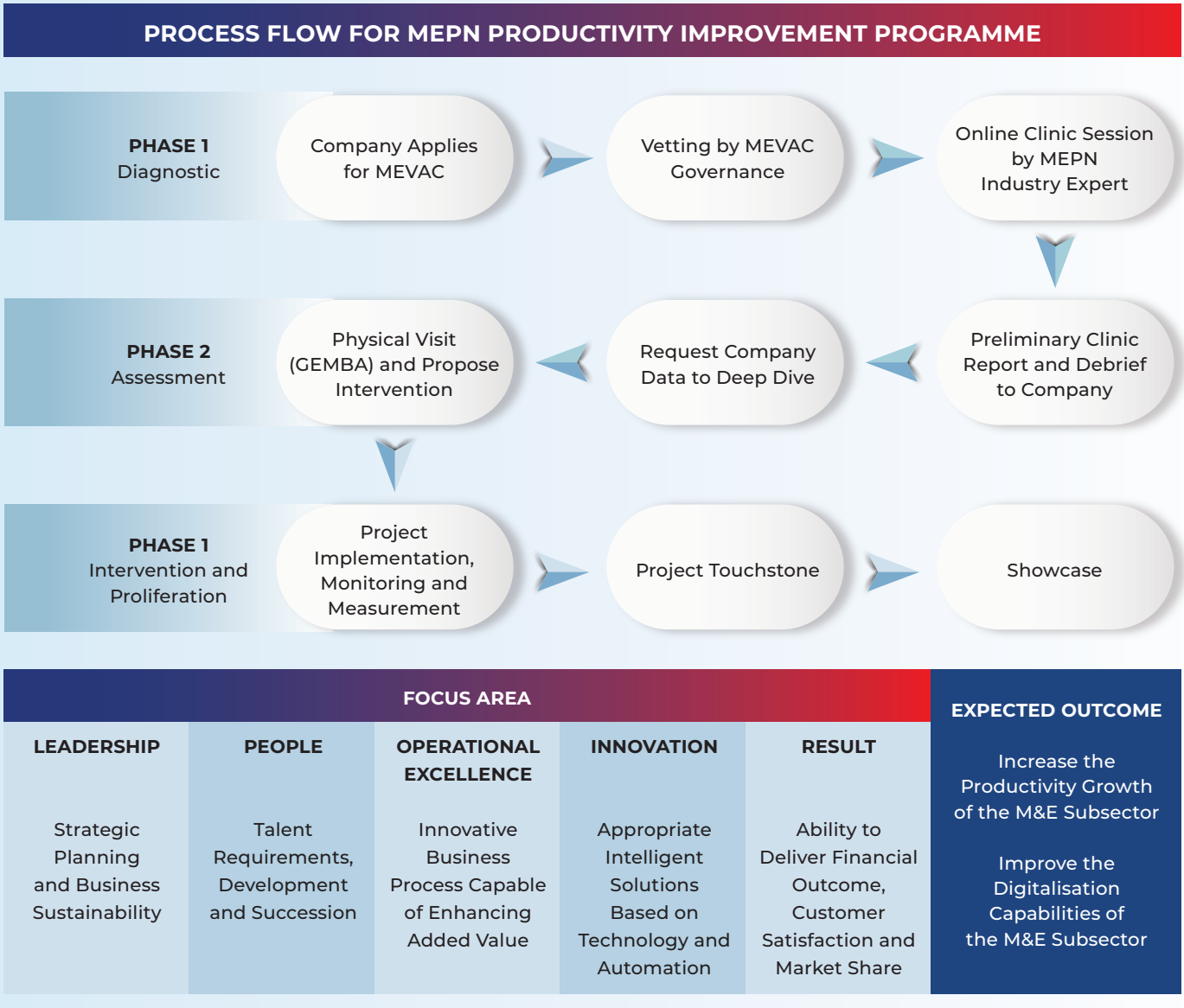
CHALLENGES, INITIATIVES AND RECOMMENDATIONS

CHALLENGES, INITIATIVES AND RECOMMENDATIONS

OVERVIEW OF MACHINERY AND EQUIPMENT PRODUCTIVITY NEXUS (MEPN)

MEPN, a productivity nexus established under the Malaysia Productivity Blueprint and fully supported by the Malaysia Productivity Corporation, collaborates with the Machinery and Engineering Industries Federation (MEIF) to implement various productivity enhancement initiatives. MEPN has established four workgroups to plan, execute, and monitor projects in a seamless manner. Each workgroup has appointed leaders and subject matter experts who advise and support the MEPN Champion to ensure swift project implementation based on their domain expertise. Figure 6 illustrates the process flow of MEPN's productivity improvement programmes.

Figure 6 : Process Flow for MEPN Productivity Improvement Programme



CHALLENGES WITHIN THE MACHINERY AND EQUIPMENT SUBSECTOR

The M&E Subsector faces significant challenges in adapting to the digital age due to a reluctance to change and a preference for traditional business practices. This mindset, coupled with a lack of skilled talent to meet industry demands, hinders productivity growth and progress in the industry. Small and medium-sized enterprises (SMEs) are particularly affected due to their short-term profit mindset and limited adoption of productivity systems. Additionally, the high cost of digital transformation presents a financial barrier to entry. A gradual transition to digitalisation with proper planning and resource distribution is necessary for a successful win-win strategy.

Talent and manpower pose additional challenges to the M&E Subsector with the ongoing Fourth Industrial Revolution constantly challenging business operations. To keep up with the latest technology and perform tasks in new ways, human capital development must be proactive and provide continuous training. Institutions of higher learning and technical vocational education and training (TVET) institutions must be equipped with up-to-date knowledge and technology application to meet industry demands. A sufficient supply of talent from these institutions can alleviate the industry's burden of upskilling or reskilling employees.

IN PROGRESS INITIATIVES TO ADDRESS THE CURRENT INDUSTRY CONCERNS

Process Improvement Programme through Technology

The Machinery and Equipment (M&E) industry is a crucial sector for dynamic economic growth. However, mismatches between the industry's workforce demand and talent's qualifications, skills, and knowledge have been identified as significant barriers to productivity improvement and Industry 4.0 transformation. To bridge the gap between the supply of talent and the demand from the labour market, the Machinery and Equipment Productivity Nexus (MEPN) has conducted a series of engagements with 60 M&E companies, which revealed a high demand for Technical and Vocational Education and Training (TVET) students and graduates.

One approach to addressing talent mismatches is prioritising work-based education, apprenticeships, and vocational training focusing on specific skills and competencies that are in demand by employers. To this end, MEPN initiated the Productivity Improvement Programme (PIP) through Technology to build talent with high productivity awareness and technical knowledge required by the M&E industry. The programme matched TVET institutions and M&E companies to enable placements of TVET students at their companies and aimed to increase TVET students' competencies to match the M&E industry's needs while facilitating the M&E companies to access quality talents. As a result, the programme has helped the participating companies to increase productivity by at least 5% while strengthening the M&E workforce and increasing TVET students' employability.

Recognising the critical role of talent in digital transformation and Industry 4.0, MEPN launched the Process Improvement Project through technology (PIP) in early 2022. PIP is a series of activities that involve LEAN training modules, upskilling and reskilling training for students and TVET trainers, technology adoption, and lean manufacturing processes, among others. The main objective of PIP is to build a talent pool with high productivity awareness and technical knowledge required by the industry to accelerate industry 4.0 transformation of M&E companies.

To achieve the objective of PIP, it is divided into four small wins, including building a strong talent pipeline with high productivity awareness and relevant technical knowledge among industry players, future workforce, and TVET trainers. Additionally, MEIF's TVET strategic partners apply the elements of

From left: Mr. Mohd Yusuri Yusof (KISMEC), Prof. Ir. Dr. Azmi Hassan (GMI), Mr. Tan Beng Teong (SHRDC), YBhg. Dato' Mohd Razali Hussain (MPC), YBhg. Dato' Abdul Latif Hj. Abu Seman (MPC), Mr. Mac Ngan Boon (MEIF), Mr. Alias Mohd Nadzri (NSSDC), and Mr. Tiong Khe Hock (MEIF).

this course to their existing LEAN-related training programmes, accelerating technology adoption in M&E industry (High-Mix Low-Volume (HMLV) Manufacturing), and consolidating the practice of continuous improvement as the company's culture. PIP has already received support from TVET-related government agencies and CIAST (Pusat Latihan Pengajar dan Kemahiran Lanjutan).

MEIF has signed MoU with several TVET institutions, including Universiti Teknikal Malaysia Melaka (UTeM), Negeri Sembilan Skills Development Centre (NSSDC), Institut Latihan Perindustrian (ILP) Pedas (ILP Pedas), Selangor Human Resource Development Centre (SHRDC), Kedah Industrial Skills and Management Development Centre (KISMEC), Universiti Kuala Lumpur - Malaysia France Institute (UniKL MFI), and German-Malaysian Institute (GMI).

Three companies from the M&E industry participated in the programme in 2022, including TT Vision Technologies Sdn. Bhd, Packaging Sales and Services (M) Sdn.Bhd. and Master Shanghai Forging Sdn. Bhd.

The PIP through Technology is a vital step towards addressing talent mismatches and accelerating the Industry 4.0 transformation in the M&E industry. By building a strong talent pipeline with high productivity awareness and relevant technical knowledge, the M&E industry can achieve sustainable growth and contribute to the overall economic development of the country. With the support of TVET institutions and the government, the PIP programme can become a model for talent development and education attainment initiatives for a productive future workforce.

TT Vision Technologies Sdn Bhd Project Leader Mr. Lee Boon Hooi briefed ILP Pedas internship student Mr. Maximiliano Brian (left) on the usage of the Pin Counter Machine. The machine is able to dispense the pin automatically by input the number of pins.

Smart Factory Transformation Programme

The Smart Factory Transformation Programme (SFTP) is a game-changing initiative aimed at boosting the productivity and competitiveness of the Machinery and Equipment (M&E) Subsector by leveraging cutting-edge smart manufacturing technologies. With a laser focus on the Industry 4.0 transformation journey, the SFTP is designed to help Malaysian manufacturing companies adopt innovative digitalisation, automation, robotics, artificial intelligence, and mechanisation strategies to enhance their processes and optimise production. Over the course of one year, the SFTP will enable a select group of 10 companies to transform their factories into smart factories, improving their productivity, reducing costs, and elevating the quality of their products.

The SFTP is being led by the Machinery and Equipment Productivity Nexus (MEPN) with the full support of the Malaysia Productivity Corporation (MPC), DSC Consulting Sdn. Bhd. (DSCC), and the Malaysia Automation Technology Association (MATA).

To ensure the success of the programme, five main activities have been planned: Enterprise Learning Experience, factory visit and consultation, implementation and assessment of progress, post-implementation follow-up and production of successful case studies, and roadshow and showcase of best practices.

These activities will provide companies with a comprehensive understanding of strategies implemented in accelerating productivity growth through technology and digitalisation, as well as consultation, assessment, and implementation of solutions to improve operations.

The SFTP is a strategic move to position Malaysia as the hub of the high-tech industry, a strategic partner for smart manufacturing and related service sectors in the Asia Pacific region, and a total solution provider for advanced technology.

With the rapid pace of technological advancement, automation and digitalisation have become essential elements for business growth and sustainability, particularly in the manufacturing sector. By adopting Industry 4.0 technologies and practices, M&E Subsector companies can unlock their full potential, respond to changing market demands, and stay ahead of the competition.

MEPN delegates at the best practices sharing session on digitising shop-floor management by Rui Chen Ltd. Co. (which specializes in CNC turning-milling).

MEPN delegates visited DigiwinSoft 5GAIoT Facility which demonstrates the total solution from the warehouse management to the operation activities

Smart Factory Transformation Programme : Taiwan Enterprise Learning Experience

The Taiwan Enterprise Learning Experience, a pivotal component of the Smart Factory Transformation Programme organised by the Machinery and Equipment Productivity Nexus (MEPN), took place from June 12th to June 16th, 2023. This initiative brought together 38 delegates, comprising representatives from government agencies, Machinery and Equipment (M&E) associations, and M&E industry players. The objective was to provide participating companies with a blueprint for achieving smart factory status by benchmarking their strategies against Taiwan's expertise in technology and digitalisation. The primary goals of this Enterprise Learning Experience were:

Knowledge Transfer: To facilitate knowledge exchange by learning from Taiwan's successful strategies in accelerating productivity growth through technology and digitalisation within the manufacturing sector.

Immersive Learning: To immerse participating companies in the real-life experiences of Taiwanese factory decision-makers, gaining insights into the challenges faced during pre-transformation, the transformation process itself, and the resulting outcomes.

Technology Adoption: To assist participating companies in adopting advanced manufacturing technologies, thereby enabling the digital transformation of their factories.

Business Opportunities: To provide a platform for participating companies to explore potential business collaborations and partnerships with manufacturers in Taiwan, particularly within trading and supply-chain-related domains.

The anticipated outcomes of this programme encompassed the extraction of best practices from Taiwan's smart manufacturing landscape that can be adapted and adopted by the participating companies, and empowering participating companies to adopt advanced manufacturing technologies, subsequently improving their productivity and competitiveness on a global scale.

This Enterprise Learning Experience was an instrumental step towards realising the vision of smart factories. The insights and best practices gleaned from this experience serve as invaluable resources that will guide participating companies in their digital transformation journey. By driving innovation and enhancing competitiveness, these companies are poised to lead in an ever-evolving manufacturing landscape. Moreover, the program has successfully laid the groundwork for future collaboration and partnerships among the participating companies, forging stronger ties within the global network of smart factories committed to shaping the future of manufacturing excellence.

FORWARD LOOKING RECOMMENDATIONS TO INCREASE THE MACHINERY AND EQUIPMENT SUBSECTOR PRODUCTIVITY

In order to improve Malaysia's Machinery and Equipment Subsector productivity, it is recommended to address the fragmented supporting industries by:

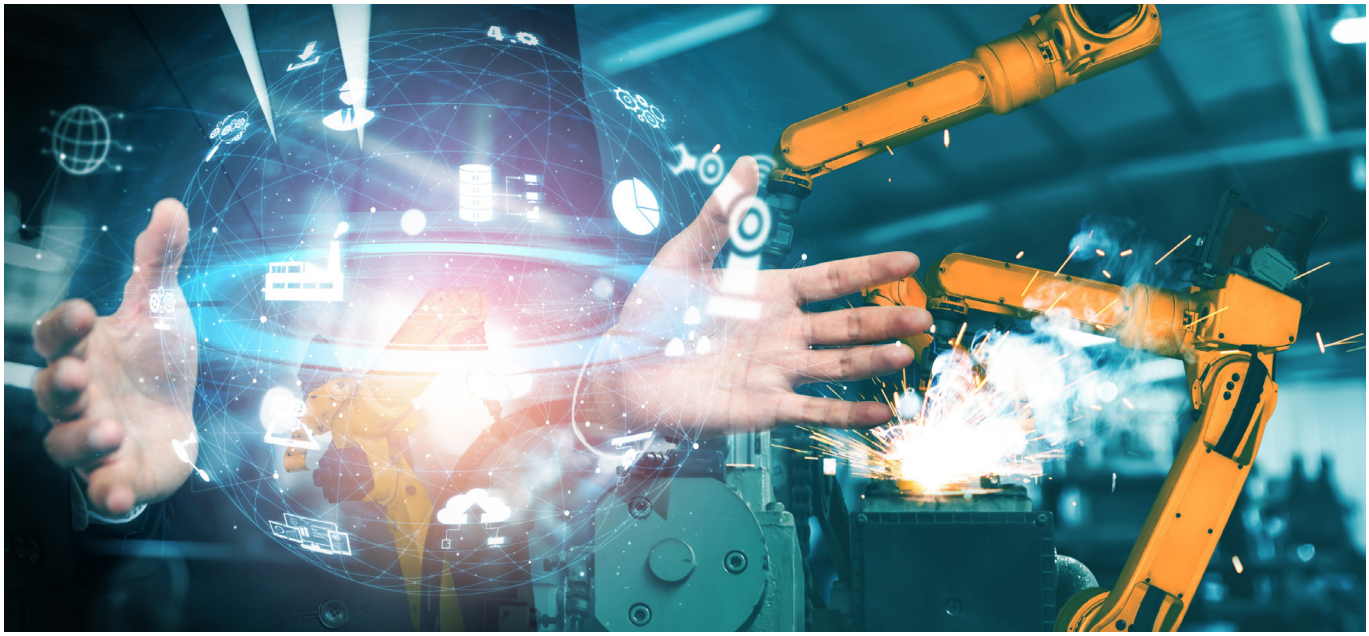
1) Encouraging collaboration between M&E players and supporting industries to strengthen the supply chain: The government can promote partnerships and collaborations between M&E players and supporting industries to improve the supply chain's efficiency and reduce fragmentation. This could involve developing platforms to facilitate communication and collaboration between different players in the industry, as well as offering incentives and grants to encourage joint initiatives.

2) Expanding export markets for M&E Subsector: To ensure sustainability of the M&E Subsector, there needs to be an expansion of export markets. The government can support this by providing market research and intelligence to identify new markets for M&E products, as well as offering incentives to encourage M&E players to expand into these markets.

3) Encouraging the adoption of digital technologies: The government can provide grants and incentives to encourage M&E players to adopt digital technologies such as automation, IoT, and data analytics. This will help enhance their technologies and specialties, making them strong niche market players. Additionally, the government can provide support in the form of training and upskilling to help workers adapt to the new digital environment.

4) Enhancing productivity improvement intervention programmes: To enhance productivity in the M&E Subsector, intervention programmes can be introduced to improve field management, digital mastery, process automation, and IoT. The government can provide support in the form of grants and incentives to encourage M&E players to participate in these programmes.

5) Upskilling the existing workforce: There is a shortage of skilled production workers in the M&E Subsector, and there is a mismatch between the industry's needs and the current curriculum. A partnership between relevant government bodies and industry associations is necessary to upskill the existing workforce. The government can support this by providing funding and support for vocational training and education programmes, as well as working with industry associations to develop targeted training programmes that meet the needs of the industry.



THE WAY FORWARD FOR THE MACHINERY AND EQUIPMENT SUBSECTOR

Moving forward, the Machinery and Equipment Subsector in Malaysia must continue to enhance its productivity and competitiveness through the adoption of technology and digitalisation. As a critical link to all subsectors, including engineering supporting services and E&E, the growth performance of the M&E Subsector will provide significant spillover effects to other industries.

The Machinery and Equipment Productivity Nexus (MEPN) must strengthen its role at the sectoral and enterprise levels to hasten productivity growth in the M&E Subsector, as aligned with the government's goals for Industry4WD. To achieve this, industry players in the manufacturing sector must leverage digitalisation and technology adoption to boost productivity growth and revive the economy.

The government should provide support in the form of grants and incentives to enhance the technologies and specialties of M&E players, particularly towards becoming strong niche market players. Moreover, productivity improvement intervention programmes for the M&E players in field management, digital mastery, process automation, and the Internet of Things can be implemented. Lastly, upskilling the existing workforce through a partnership between the relevant government bodies and industry associations can help address the shortage of skilled production workers and the mismatch between curriculum and industry needs. This can include collaborations with organisations such as MEIF and its associations, TVET Institutions, and related government agencies.

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