

**ASSESSMENT OF THE TECHNOLOGICAL DIMENSION
IN THE INDUSTRIAL AND DEVELOPMENT POLICIES IN
MALAYSIA**

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**FACULTY OF BUSINESS AND ECONOMICS
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KUALA LUMPUR**

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DIMENSION IN THE INDUSTRIAL AND
DEVELOPMENT POLICIES IN MALAYSIA**

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**DISSERTATION SUBMITTED IN FULFILMENT OF
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**FACULTY OF BUSINESS AND ECONOMICS
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ABSTRACT

This research examined the impact of Malaysia's Industrial Policies on technological advancement and economic growth within the context of the country's heavy dependence on industrialisation, particularly its manufacturing sector. The study aimed to address the lack of coordination and continuity in policy implementation, which led to overlapping initiatives and hindered the effective realisation of technological advancements. The research problem revolved around the challenges posed by disjointed policy plans and the subsequent impact on the advancement of technological capabilities. Through an in-depth qualitative approach, the study analysed Malaysia's industrial policies from 2006 to 2020, encompassing key plans like the Third Industrial Masterplan, Ninth Malaysia Plan, Tenth Malaysia Plan, Eleventh Malaysia Plan, and National Key Economic Areas. The research methodology involved reviewing relevant literature, comparative analysis of policies, and the development of an assessment framework focusing on technological dimensions. The analysis revealed that while the policies consistently emphasised human capital development, there were variations in execution strategies. Despite the focus on technological advancement, the productivity growth of Malaysia's economy remained inconsistent. The manufacturing sector, especially the Electrical and Electronics (E&E) industry, faced challenges with a high demand for low-skilled labour, contrary to the goal of fostering high-skilled technology-savvy employment. The lack of coordination between policy plans hindered private sector involvement in technological development. The policies often initiated programs without proper alignment with previous plans, leading to a lack of clear strategies for empowering the private industry. This lack of continuity impacted the transition to higher technological capabilities within industries, raising doubts about the effectiveness of policies intended to involve the private sector in technological advancements. The study also found that overlapping policies resulted in redundant resource allocation and hindered the growth of crucial sectors like E&E. This

lack of coordination contributed to inconsistent contributions to GDP from technology-focused sectors. For example, the contribution of telecommunication services significantly declined despite the emphasis on private sector industries during the tenth Malaysia plan. To address these issues, the study recommended a comprehensive assessment of the technological dimensions of industrial policies. It highlighted the importance of aligning policies and overcoming overlapping initiatives to effectively promote technological advancement and sectoral growth. The research underscored the necessity of addressing challenges related to private sector empowerment and policy coordination. Overall, this research shed light on the complexities of Malaysia's industrial policies and their impact on technological advancement and economic growth. By identifying issues related to coordination, alignment, and private sector involvement, the study provided insights that can contribute to more effective policy formulation and implementation in the future.

ABSTRAK

Penyelidikan ini mengkaji kesan dasar dan polisi perindustrian di Malaysia terhadap kemajuan teknologi dan pertumbuhan ekonomi dalam konteks pergantungan negara terhadap perindustrian, khususnya sektor pembuatannya. Kajian itu bertujuan untuk mengenalpasti jurang dan kekangan pelaksanaan dasar, yang membawa kepada inisiatif bertindih yang menghalang implementasi kemajuan teknologi yang berkesan. Penyataan masalah kajian ini adalah berkait rapat dengan cabaran yang timbul disebabkan polisi dan dasar yang tidak berkait rapat dan disebabkan itu kemajuan keupayaan teknologi tidak dapat dilaksanakan. Melalui pendekatan kualitatif yang mendalam, kajian ini telah menganalisis dasar dan polisi perindustrian Malaysia dari tahun 2006 sehingga tahun 2020. Pelan dan dasar yang dikaji termasuklah Pelan Induk Perindustrian ketiga (IMP3), Rancangan Malaysia ke 9 (RMK9), Rancangan Malaysia ke 10 (RMK10), Rancangan Malaysia ke 11 (RMK11) dan Bidang Ekonomi Utama Negara (NKEA). Metodologi penyelidikan melibatkan kajian literature yang berkaitan dengan tajuk, analisis perbandingan dasar dan pembangunan rangka kerja penilaian yang memberi focus kepada dimensi teknologi. Analisis mendedahkan bahawa walaupun dasar-dasar secara konsisten memberi penekanan terhadap pembangunan modal insan, terdapat variasi dalam strategi pelaksanaan. Tumpuan yang diberi terhadap kemajuan teknologi tidak memberi impak positif terhadap kemajuan produktiviti negara. Sektor pembuatan di Malaysia masih mempunyai permintaan yang tinggi bagi pekerja berkemahiran rendah bertentangan dengan matlamak memupuk pekerjaan yang celik teknologi berkemahiran tinggi. Kekurangan penyelarasan antara pelan dasar menghalang penglibatan sektor swasta dalam pembangunan teknologi. Dasar kerap memulakan program tanpa penjajaran yang teratur dengan rancangan dan dasar sebelumnya. Kekurangan kesinambungan ini memberi kesan kepada peralihan industri kepada teknologi yang lebih tinggi yang

menimbulkan keraguan terhadap keberkesanan dasar. Kajian ini juga telah mengenalpasti bahawa pertindihan dasar mengakibatkan peruntukan sumber yang tidak efektif.

Kajian juga mendapati bahawa dasar-dasar yang bertindan menyebabkan alokasi sumber yang berlebihan dan menghalang pertumbuhan sektor penting seperti E&E. Ketiadaan koordinasi ini menyumbang kepada sumbangan yang tidak konsisten kepada KDNK daripada sektor yang berfokuskan teknologi. Sebagai contoh, sektor perkhidmatan telekomunikasi merosot dengan ketara walaupun penekanan terhadap industri berkenaan di dalam RMK10. Untuk menangani isu-isu ini, kajian mencadangkan penilaian menyeluruh terhadap dimensi teknologi dasar perindustrian. Ia menekankan kepentingan menyelaraskan dasar dan mengatasi inisiatif bertindih untuk menggalakkan kemajuan teknologi dan pertumbuhan sektor dengan berkesan. Penyelidikan ini juga menekankan keperluan menangani cabaran berkaitan pemerksaan sektor swasta dan penyelarasan dasar. Secara keseluruhan, penyelidikan ini memberi penekanan terhadap kerumitan dasar perindustrian Malaysia dan kesannya terhadap kemajuan teknologi dan pertumbuhan ekonomi. Dengan mengenalpasti isu berkaitan dengan penyelarasan, penjajaran dan penglibatan sektor swasta, kajian memberikan pandangan yang dapat menyumbang kepada pembangunan dan pelaksanaan dasar pada masa hadapan.

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In the words of the Quran (94:6), "**Verily, with every difficulty, there is relief.**" This verse encapsulates the essence of this journey, a testament to the cyclical nature of challenges and triumphs that ultimately lead to growth and enlightenment.

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LIST OF SYMBOLS AND ABBREVIATIONS

| | | |
|------|---|---|
| % | : | Percentage |
| E&E | : | Electrical and electronics |
| ETP | : | Economic Transformation Programme |
| GDP | : | Gross domestic product |
| MIDA | : | Malaysia Investment Development Authority |
| MIPD | : | Malaysia Industrial Productivity Database |
| R&D | : | Research and development |
| RM | : | Ringgit Malaysia |
| TFP | : | Total factor productivity |
| IMP3 | : | Third Industrial Master Plan |
| NKEA | : | National Key Economic Area |
| 1MP | : | First Malaysia Plan |
| 2MP | : | Second Malaysia Plan |
| 3MP | : | Third Malaysia Plan |
| 4MP | : | Fourth Malaysia Plan |
| 5MP | : | Fifth Malaysia Plan |
| 6MP | : | Sixth Malaysia Plan |
| 7MP | : | Seventh Malaysia Plan |
| 8MP | : | Eight Malaysia Plan |
| 9MP | : | Ninth Malaysia Plan |
| 10MP | : | Tenth Malaysia Plan |
| 11MP | : | Eleventh Malaysia Plan |
| Q1 | : | Question 1 |
| Q2 | : | Question 2 |

| | | |
|-------|---|--|
| Q3 | : | Question 3 |
| O1 | : | Objective 1 |
| O2 | : | Objective 2 |
| O3 | : | Objective 3 |
| OECD | : | Organisation for Economic Co-operation and Development |
| ASEAN | : | Association of Southeast Asian Nations |
| NEP | : | New Economic Policy |
| MSC | : | Multimedia Super Corridor |
| FDI | : | Foreign Direct Investment |
| SME | : | Small Medium Enterprise |
| PISA | : | Programme for International Student Assessment |
| TVET | : | Technical and Vocational Education and Training |
| STEM | : | Science, Technology, Engineering and Maths |
| API | : | Air Pollutant Index |
| EPP | : | Key Economic Area |
| GLC | : | Government Linked Company |
| GLIC | : | Government Investment Linked Company |
| EPU | : | Economic Planning Unit |
| ICT | : | Information and Communication Technology |
| MOF | : | Ministry of Finance |
| NIS | : | National innovation System |
| HCDF | : | Human Capital Development Fund |
| GERD | : | Gross Expenditure on Research and Development |
| GTFS | : | Green Technology Financing |
| IMF | : | International Monetary Fund |
| ETP | : | Economic Transformation Programme |

| | | |
|-----------|---|--|
| SRI | : | Strategic Reform Initiatives |
| S2A | : | Science to action |
| IoT | : | Internet of Things |
| AI | : | Artificial Intelligence |
| PPP | : | Public-private partnership |
| EOR | : | Enhance Oil Recovery |
| RAPID | : | Refinery and Petrochemical Integrated Development |
| POMW | : | Palm Oil Mill Effluent |
| IFSI | : | Islamic Financial Service Industry |
| OA&G | : | Oil, Gas and Energy |
| CCI | : | Communication, content and infrastructure |
| SDG | : | Sustainable Development Goals |
| MOE | : | Ministry of Education |
| NGEB | : | National Graduate Employability Blueprint |
| NDTS | : | National Dual-Training System |
| NIP | : | National Innovation Policy |
| NTP | : | National Technology Policy |
| MyDIGITAL | : | Malaysia Digital Economy Blueprint |
| TIC | : | Technology Innovation Centre |
| MYREN | : | Malaysia Research and Education Network |
| NGTP | : | National Green Technology Policy |
| GTALCC | : | Green Technology Application for Low Carbon Cities |
| MITI | : | Ministry of International Trade and Industry |
| DFTZ | : | Digital Free trade Zone |
| MDEC | : | Malaysia Digital Economy Corporation |
| GNI | : | Gross National Income |

HSBB : High-Speed Broadband

PES : Payments for Environmental Services Program

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CHAPTER 1: INTRODUCTION

1.1 Introduction

On 21 May 2015, Malaysia released the Eleventh Malaysia Plan which the final blueprint was aimed to elevate the country up into a high-income nation status across all dimensions including economically, politically, socially, spiritually, psychologically, and culturally by the year 2020. The aspiration of the country of being an inclusive and sustainable advanced nation by 2020 remains to be a moving target. The evolution of the nation's development started from an agriculturally based economy then evolved into a heavy industrialised economy. The status of upper-middle income economy today has been highlighted in the past couple of decades where the gross domestic product (GDP) of Malaysia has averaged almost 5% (Department of Statistics Malaysia, 2023). This strong growth of the Malaysian economy has been mainly contributed by the strong manufacturing industry through the industrialisation of the country. The economy has pursued of being a broad-based economy with the production of high value-added goods and services.

The Malaysian policy makers have long looked at the possibilities of nudging the economy in favour of accelerating the economic growth of the nation. Together with a liberal trade regime, and extensive investments, industrial policy is used in a large scale in the pursuit of the high-income status. In these industrial policies, the government reacts from learning on the underlying costs and the opportunities that are available to employ the strategic coordination (Rodrik, 2004). The Malaysia industrial policies are broken down into four major components which are the wealth distribution industrial policy, import substitution industrial policy, export promotion industrial policy and also industrial policy responding to globalisation.

Malaysia has drawn inspiration from the success stories of other East Asian countries that have effectively utilised government intervention to stimulate their economies. Japan,

South Korea, and Taiwan stand as notable examples, showcasing how strategic intervention, control, and careful selection of key industries can drive export-oriented manufacturing and serve as a pivotal driver of economic growth (Akkemik, 2008). In a parallel trajectory, Malaysia has pursued a similar path, focusing on specialised high-value-added industries to harness their maximum potential for economic development.

Within Malaysia's industrial policies, policymakers have identified certain heavy industries as focal points for growth, including the automotive, biotechnology, and electrical and electronic (E&E) sectors (Kanapathy, 2001). With a clear vision of propelling the nation towards a higher technological platform, the emphasis has been on elevating industries to a perspective of higher value addition. This entails a shift towards capital-intensive industries, paving the way for more advanced and innovative approaches to production and economic progress.

The progression of Malaysia's industrial policies can be traced through various phases, including the First Industrial Masterplan, Second Industrial Masterplan, and Third Industrial Masterplan, all of which have consistently highlighted the critical role of technological advancements in driving economic growth. These policies reflect an acknowledgment of the changing global economic landscape and the imperative for Malaysia to remain competitive by fostering innovation and embracing technological change.

The upward trajectory of Malaysia's economy is evident from the progress it has made over the years. This growth aligns with the principles of the Akamatsu Flying Geese Model, which illustrates how economies can climb the ladder of technological progress and industrial development. As Malaysia moves towards higher levels of economic sophistication, policymakers recognise the urgency of breaking free from the middle-income trap and advancing into the realm of high technological industries. The understanding is that sustained economic growth and prosperity can be achieved by

shifting focus towards industries that offer higher value addition, increased complexity, and global competitiveness.

In this context, the study at hand undertakes an assessment of the technological dimensions underpinning Malaysia's industrial and development policies spanning the period from 2006 to 2020. By focusing on the policies, strategies, and initiatives implemented during this timeframe, the research aims to provide insights into how Malaysia has navigated the challenges of technological advancement and industrial transformation. By analysing the policy landscape, the study seeks to uncover the alignment between policy intentions, implementation strategies, and actual outcomes in fostering technological progress and economic growth. Ultimately, the investigation aims to contribute to an understanding of Malaysia's journey towards becoming a technologically advanced and economically competitive nation.

1.2 Problem Statement

Malaysia's Industrial Policies' introduction were meant to readdress the weaknesses within the industrial sector of the country in order to have a more systematic and organised method of pushing a particular sector as the main driver of growth. Malaysia have turned out to be an economy heavily dependent of its industrialisation which is through its manufacturing sector. Malaysia's manufacturing sector currently accounts for almost one third of the total Malaysia's GDP which shows how dominant the plans in pushing the industrial sector of Malaysia. From the manufacturing sector, the Electrical and electronics (E&E) industry is estimated to contribute to around RM120 billion to the GDP and to generate RM495 billion earnings through exports by 2025 (Department of Statistics, 2021). The industry is ranked top ten global hubs in semiconductors and electronics and Malaysia has plans to increase the global market share to 15 per cent by the year 2030 (Malaysia Investment Development Authority (MIDA), 2023).

The industrial policies of Malaysia have highly focused on accelerating the technological advancement of the manufacturing sector through research and development and foreign technological transfer (Jomo and Felker, 2013). Technology have been seen to be the key to increase productivity of the Malaysian manufacturing industry towards a more digital and technological economy. Even with all the efforts put in place by the Malaysian government, the productivity growth of the Malaysian economy has still been fluctuating and inconsistent. In the past ten years (throughout the Ninth and Tenth Malaysia Plan), the total factor productivity (TFP) of Malaysia has fluctuated from as high as four percent growth to as low as 1.8 per cent growth (Malaysia Industrial Productivity Database (MIPD), 2020). With that, technological advancement's effectiveness towards productivity remains to be sceptical. In addition to that, if looked further down the history of productivity in Malaysia during the high growth era of Malaysia, the ratio of high technological employment to the total workforce of Malaysia grew less than one per cent in 1983 to 1992 (Department of Statistics, Annual Industrial Survey, various issues). On the demand side, the Malaysian industries still have a high demand for low-skilled labour which effects on the high demand for low-skilled foreign labour in Malaysia. This contrasts the efforts of pushing for high skilled technology savvy employments. The largest sub-sector of the manufacturing sector the (E&E) clearly shows this issue with more than 50% of its workforce being low-skilled employees (ETP Annual Report, 2014). The Second and Third Industrial Master Plans have stressed the importance and intentions of growing the R&D and advancement of the technological aspects of the industries of Malaysia but as mentioned above the progress of advancement remains to be an issue in the Malaysian industrialisation. This pinpoints the problem that arises in the formulation of industrial policies of Malaysia. Coordination and continuity remain to be lacking in the process of shifting from one plan to another.

The introduction of industrial policies in Malaysia aimed to address the weaknesses within the country's industrial sector and establish a systematic approach to drive specific sectors as growth drivers. However, these policies often led to overlapping programmes and initiatives, causing confusion and hindering the effective implementation of technological advancements. This lack of coordination and continuity between different policy plans created challenges in achieving the desired outcomes.

In the context of the Malaysian industrialisation drive, the overlapping policies resulted in redundant efforts and allocation of resources. Different plans focused on similar issues without clear evidence of technological advancements translating into higher contributions to GDP. For instance, within the information and communication sector, there was a decline in the contribution of telecommunication services from 65.8% in 2011 to 8.4% in 2015, a trend that contradicts the emphasis on private sector industries during the tenth Malaysia plan (International Trade Administration, 2017).

The absence of streamlined policy implementation hindered the growth of the manufacturing sector, particularly industries like Electrical and Electronics (E&E), which are vital contributors to Malaysia's GDP. Overcoming this challenge required a comprehensive assessment of the technological dimensions of industrial policies, addressing the issue of overlapping programmes and their impact on technological advancement and sectoral growth.

Private sector participation has been a key focus in Malaysia's industrial policies, as it was believed to contribute significantly to transitioning the economy towards a more service-oriented structure. However, the empowerment of the private sector, especially in terms of technological advancement, remained an unresolved challenge. The transition to a higher tier of technological capabilities within industries, as reflected by GDP

contributions, was not evident, raising questions about the effectiveness of policies related to private sector involvement in technological development.

The main issue related to the empowerment of the private sector in technological advancement revolves around the lack of continuity and coordination in policy implementation. While the Eleventh Malaysia Plan recognised the importance of empowering the private industry, the absence of clear and continuous strategies hindered the realisation of this goal. Programmes were often initiated without proper alignment with previous plans or a coherent trajectory for future development.

To effectively address this research problem, an in-depth assessment of the technological dimensions of Malaysia's industrial policies is needed. This assessment should explore the reasons behind the lack of policy coordination, the challenges faced in achieving private sector empowerment, and the impact of disjointed initiatives on the advancement of technological capabilities within industries.

1.3 Research Questions and Objectives

Table 1.1: Research Questions and Objectives

| Research Questions | | Research Objectives | |
|--------------------|--|---------------------|--|
| Q1 | Did the IMP3 together with the 9MP, 10MP, 11MP and NKEA follow the basic fundamentals of a successful industrial plan? | O1 | To review the national policies of Malaysia focusing of IMP3, 9th to 11th MP and the NKEA. |
| Q2 | What were the technological dimensions focused in the industrial and development policies in Malaysia? | O2 | To study the technological dimensions on the industrial plans of Malaysia. |

| Table 2.1 continued | | | |
|---------------------|--|----|---|
| Q3 | Did the industrial policies align with the other development policies/plans in Malaysia namely 9MP, 10MP, 11MP and NKEA? | O3 | To assess the alignment/misalignments of industrial and development policies and plans. |

1.4 Brief Methodology

The industrial policies of Malaysia are drawn up by the policy makers of Malaysian government to act as a blueprint moving forward. This study focused on the technological dimension of industrial and development policies in Malaysia between 2006 and 2020 including:

- I. Third Industrial Masterplan (2006-2020)
- II. Ninth Malaysia Plan (2006-2010)
- III. Tenth Malaysia Plan (2011-2015)
- IV. Eleventh Malaysia Plan (2016-2020)
- V. National Key Economic Areas (2010-2020)

The research used a qualitative approach to examine the subjective views, success and failures through the technological dimensions of industrial policies in Malaysia. The approach included a review of relevant literature and a comparative analysis of policies implemented under the industrial plans. An analytical framework for assessment was developed, consisting of two parts: the assessment of technological dimensions of the policies and the alignment between policies. The framework used indicators to assess the policies' effectiveness in promoting technological development and their alignment with other development policies.

The selected technology dimensions for research included:

- I. Developing human capital
- II. Accelerating innovation and technology
- III. Strengthening technological infrastructure
- IV. Promoting sustainable development
- V. Enhancing the digital economy.

Information and content analysis were used to analyse data from official publications, scholarly articles, press releases, and government statements to identify key themes, trends, and inconsistencies in the policies and their implementation. The use of information and content analysis techniques and the combination of different sources enabled a thorough examination of the complex and multi-dimensional nature of industrial policies and their impact on the economy. Overall, the study aimed to provide a comprehensive understanding of the technological dimensions of industrial policies in Malaysia and their impact on the Malaysian economy. Figure 1.1 shows an overview of the assessment framework used in this study.

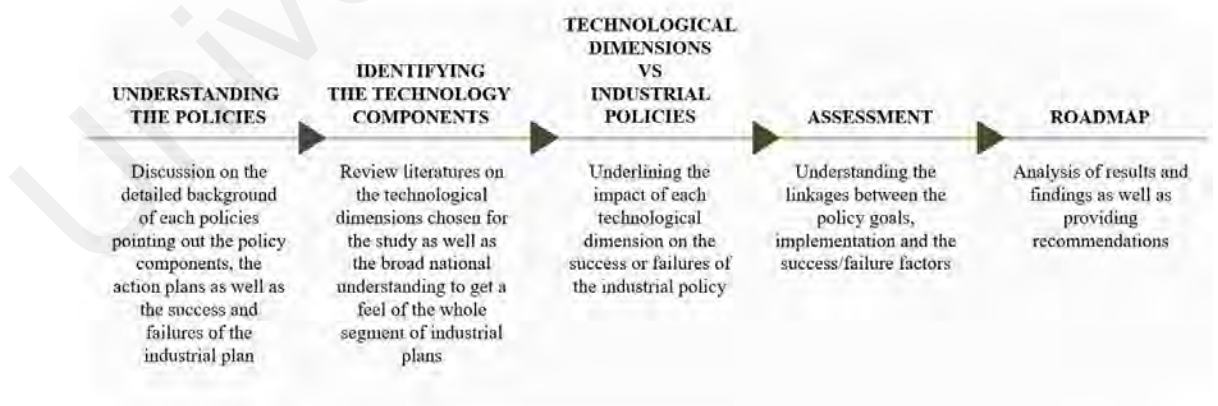


Figure 1.1: Framework Assessment of the Industrial Policies of Malaysia

1.5 Significance of Study

This study aimed to contribute to the comprehensiveness and effectiveness of Malaysia's industrial plans by identifying gaps that existed in the current and past industrial plans of the country. The findings derived from this study would have assisted learning platforms for other developing nations seeking to emulate the Malaysian experience. 2023 to 2024, the ASEAN region is projected to continue rapid economic growth with a projected growth of 4.6% and 4.8% (OECD, 2023). To achieve sustainable growth, these countries, sharing similar cultural and economic relations, could have moved towards an effective industrial policy regime, as Malaysia did with the necessary adjustments. This study successfully identified how technological dimensions of industrial plans could have been utilised in the most effective manner, which would have been beneficial to the ongoing Industry 4.0 transition.

Based on the findings, corrective measures could have been implemented to further enhance the existing industrial plans. Industries could have used this study as a roadmap or blueprint in their decision-making processes concerning future development and expansion, aligning with the government's objectives and vision. This policy could have also encouraged proper and more significant investments due to the clearer perspective provided by the study.

1.6 Structure of the study

The paper is broken down into five main chapters (including the introduction chapter) and each chapter will cover the following:

I. Chapter 2: Literature Review

This chapter is dedicated to evaluating the technological dimensions of Malaysia's industrial and development policies spanning the period from 2006 to 2020. Focusing on

policy components, programmes, and achievements, the chapter undertakes an in-depth analysis of the pertinent literature. By synthesising existing literature, it provides a comprehensive understanding of the role of technology within Malaysia's industrial and development policies and its implications for the country's growth and development.

II. Chapter 3: Methodology

The research methodology employed in this study is explicated in this chapter, along with descriptions of analysis and evaluation techniques. By offering a thorough account of the research approach, readers are provided with a holistic view of the methods utilised to assess the effectiveness of technological components within industrial policies, contributing to Malaysia's growth. This enhances the reader's ability to assess the credibility and validity of the findings and to draw well-informed conclusions regarding the impact of technological policies on economic development.

III. Chapter 4: Findings

This chapter presents the outcomes of a rigorous assessment of the technological dimensions within Malaysia's industrial and development policies from 2006 to 2020. The analysis centres on the alignment between industrial policies and broader development policies, including IMP3, 9MP, 10MP, 11MP, and NKEA. The performance of industrial policies in fostering technological development, and the alignment with other development policies, are evaluated using indicators developed in preceding chapters.

IV. Chapter 5: Recommendation and Conclusion

Concluding the dissertation, this chapter presents recommendations derived from the study's findings, aimed at policymakers, stakeholders, and researchers. It then offers a comprehensive summary of key insights, emphasising the significance of technological

policies in Malaysia's development. The conclusion encapsulates main findings, their implications for socio-economic progress, and suggestions for further research, thus providing a fitting end to the dissertation.

Universiti Malaya

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter aims to assess the technological dimensions of Malaysia's industrial and development policies during the period of 2006 to 2020. It will focus on policy components, programmes and achievements in this area. Through an analysis of the relevant literatures, this chapter provided a deep understanding of the roles of technology in Malaysia's industrial and development policies and its impact to the country's growth and development. The chapter also reviews existing literature and identify gaps in that exist within existing literatures.

2.2 Malaysia's Economic Development Planning Phases and Progress

Malaysia's economic development planning has gone through several phases since gaining independence, each with its objectives and strategies. The First Malaysia Plan (1MP) was focused on reducing poverty and improving basic infrastructure from 1966 to 1970. The Second and Third Malaysia Plans (2MP and 3MP) prioritised the development of the manufacturing sector and export-oriented industries. The Fourth (4MP) and Fifth Malaysia Plans (5MP) (1981-1990) shifted the focus to rural development and poverty eradication. The Sixth (6MP) and Seventh (7MP) Malaysia Plans (1991-2000) concentrated on human resource development and enhancing competitiveness, while the Eighth Malaysia Plan (8MP) (2001-2005) aimed to accelerate the development of high-tech industries.

The Ninth Malaysia Plan (9MP) (2006-2010) aimed to transform Malaysia into a high-income economy by focusing on investment in human capital, innovation and creativity, and improving physical infrastructure. The Tenth Malaysia Plan (10MP) (2011-2015) continued the work of 9MP, with an emphasis on diversifying the economy, promoting sustainable and equitable growth, and enhancing the well-being of Malaysians. The

Eleventh Malaysia Plan (11MP) (2016-2020) focused on enhancing economic resilience and competitiveness, promoting inclusive growth, and accelerating the development of high-tech industries, particularly in the digital economy.

The current phase of economic development planning is the Twelfth Malaysia Plan (12MP) (2021-2025). The government aims to enhance economic competitiveness, promote inclusive growth, and accelerate digital transformation, with a focus on strengthening Malaysia's position as a global hub for trade and investment. The plan prioritises infrastructure development, particularly in digital infrastructure, and the growth of the services sector, particularly in healthcare and education. The government aims to promote innovation and entrepreneurship and green growth and sustainability (World Bank, 2021).

During the early stages of Malaysia's economic development, the New Economic Policy (NEP) introduced in 1971 played a pivotal role in addressing the socioeconomic disparities that exist among different ethnic groups in Malaysia. The policy aimed to uplift the marginalised segments of society and promote equitable distribution of economic opportunities, all while setting the groundwork for industrialisation and economic diversification. However, as the NEP extended over subsequent phases of development, criticisms emerged regarding its prolonged implementation. Some scholars argued that this extended duration led to unintended consequences, including a perception of overreliance on government intervention and a potential dampening effect on market-driven competition. These concerns highlighted the delicate balance between affirmative action and fostering a dynamic market environment (Gomez & Jomo, 1999).

The subsequent development phases in various Malaysia Plans, were designed to propel the nation towards high-income status through the cultivation of a K-Based or knowledge-based economy and technological innovation. However, these phases

encountered significant challenges related to implementation gaps and a lack of policy coordination, which have hindered the realisation of intended goals.

One of the primary challenges is the lack of effective coordination among various ministries and agencies responsible for implementing the industrial policies. The disjointed approach among these entities has led to inefficiencies in resource allocation, redundant efforts, and overlapping of programmes. This fragmentation has resulted in the duplication of initiatives and a lack of synergy in addressing critical issues, thereby compromising the effectiveness of policy implementation (Haque, 2015).

The duplication of efforts and overlapping of programmes across different phases of development plans have been notable issues plaguing Malaysia's industrial policies. Initiatives introduced in one plan were often replicated or slightly modified in subsequent plans, leading to redundancy and inefficiency. For instance, the aspiration to boost research and development (R&D) activities and foster a knowledge-based economy was a common thread across multiple plans, but the lack of clear demarcation and continuous review of programmes resulted in repetition rather than strategic progress (Rasiah, 2003).

Furthermore, this lack of policy coordination and continuity is evident in the transition from one development phase to another. The shift in focus and priorities among different phases without a coherent framework for transitioning led to a disjointed approach. The absence of mechanisms to align and integrate policies from one plan to another created gaps in achieving cumulative outcomes, hindering the realisation of the intended technological advancements and economic growth (Rasiah, 2003).

Furthermore, criticisms have emerged concerning the efficacy of the development phases in effectively addressing the digital divide within Malaysia's population. Despite the emphasis on technology-driven growth and innovation, the transformative benefits of

these advancements were not equitably distributed across all segments of society. This uneven distribution of benefits underscored the persistent disparities that hindered inclusive growth and hindered the widespread diffusion of technology and its associated advantages among different socioeconomic strata.

One of the primary criticisms pertains to the unequal access to education and digital infrastructure. While policies aimed to leverage technology as a means to enhance economic opportunities and foster growth, the lack of comprehensive strategies to ensure widespread access to quality education and digital resources remained a critical challenge. This digital divide further exacerbated existing socioeconomic inequalities, as individuals from disadvantaged backgrounds faced barriers in accessing the digital tools necessary to participate in the evolving knowledge-based economy (Chin & Chan, 2016).

Additionally, the focus on technology-driven growth without concurrent efforts to address structural inequalities resulted in the perpetuation of disparities. The policies' effectiveness in promoting inclusive growth was constrained by the absence of targeted interventions aimed at uplifting marginalised communities. Economic opportunities generated by technological advancements often bypassed vulnerable populations, widening the gap between those who were able to benefit from the digital economy and those left behind (Abdullah et al., 2019).

Moreover, the disparities that impeded inclusive growth were not solely limited to access to technology and education. The development phases also encountered challenges in bridging income inequalities that prevented marginalised groups from reaping the benefits of technological diffusion. Policies that emphasised technology-driven growth failed to adequately address the underlying social and economic barriers that restricted the participation of certain segments of the population (Baharum & Sulong, 2018). Moreover, the centralisation of policy formulation and decision-making has also faced

criticism for limiting stakeholder engagement and participation. This approach may have hindered the identification of nuanced challenges and potential solutions at the grassroots level. Critics argue that more participatory and decentralised policy formulation mechanisms could have resulted in more contextually relevant policies and a more inclusive economic development landscape (Abdullah, 2017).

2.3 Malaysia's Industrial Development Progress

In the past few decades, Malaysia has experienced a healthy economic shift from its agrarian roots to a predominantly industrialised economy. This transformation, which began after gaining independence in 1957, has been underpinned by multiple factors including strategic government policies, foreign investment influx, and robust human capital development efforts (Ali & Haneef, 2016). However, an examination of Malaysia's industrial development progress reveals a nuanced narrative that extends beyond the surface-level achievements.

The establishment of the Malaysia Industrial Development Authority (MIDA) in 1967 marked a pivotal step toward promoting and facilitating industrial growth, primarily through attracting investments (Zainuddin & Osman, 2015). While MIDA's role in enticing foreign direct investment and supporting local industries is acknowledged, the efficacy of these initiatives in achieving sustainable and inclusive growth necessitates a closer examination.

The main question arises regarding the alignment of policy intentions with tangible outcomes. While MIDA's efforts have undoubtedly attracted foreign investments and fostered local entrepreneurship, the impact of these endeavours on broader economic inclusivity requires proper evaluation. The distribution of resources and benefits across industries and geographical regions has at times resulted in uneven growth, revealing a

disconnect between policy aspirations and realised results. This divergence raises important questions about the inclusivity and equitable distribution of the benefits generated by industrial policies.

Furthermore, the concentration of efforts and incentives within specific sectors could inadvertently lead to a skewed allocation of resources, potentially side-lining other promising industries that could contribute to diversified economic growth. The focus on certain industries may lead to neglecting the development of others, hindering the realisation of a balanced and comprehensive industrial landscape. This brings to light the challenge of maintaining a dynamic equilibrium between targeted interventions and fostering a broad-based industrial ecosystem.

The role of foreign investment in propelling Malaysia's industrial development progress is a noteworthy aspect that requires detailed examination. Recognised as a catalyst for expansion, foreign investment has yielded a spectrum of outcomes that merit comprehensive analysis. The Malaysian government's strategic incentives, including tax benefits and simplified administrative processes, have undoubtedly succeeded in luring multinational corporations to establish their foothold within the country's industrial landscape (Huff & Kingsley, 2003).

However, a critical perspective reveals that the heavy reliance on foreign investment as a primary engine for economic growth introduced a layer of complexity and potential challenges. While the initial surge of foreign investment has contributed to economic activity and job creation, concerns about the sustainability of this growth trajectory arise. The susceptibility of the economy to external shocks, as seen in times of global economic instability, underscored the importance of cultivating a diversified growth model that can better withstand unforeseen challenges.

Furthermore, the influx of foreign investment, while beneficial, inadvertently created a scenario of overreliance that potentially crowds out domestic enterprises. The intense competition between foreign corporations and local businesses for resources and market share could impede the organic growth and innovation of domestic industries. This dynamic highlights the need for a balanced approach that not only harnesses the benefits of foreign investment but also nurtures the growth of domestic enterprises to foster a resilient and self-sufficient industrial ecosystem.

While Malaysia's commitment to education and training has contributed to a skilled workforce capable of undertaking complex tasks, deeper examination reveals persistent gaps. The emphasis on technical skills aligned with the demands of multinational corporations has sometimes overshadowed broader educational imperatives (Jomo, 2014). The discrepancy between education outcomes and industry demands has led to a skills mismatch, wherein graduates find themselves ill-equipped to meet the evolving needs of a dynamic labour market.

Malaysia's dedication to education and training has undoubtedly contributed to nurturing a skilled workforce capable of undertaking intricate tasks, yet a closer inspection exposes underlying gaps. The emphasis on technical skills tailored to the requirements of multinational corporations has at times overshadowed the broader educational landscape (Jomo, 2014). This focus has resulted in a mismatch between education outcomes and the evolving demands of the industry, leaving graduates ill-prepared to meet the dynamic needs of the labour market.

The establishment of the Multimedia Super Corridor (MSC) in 1996 stands as a testament to both successes and limitations in Malaysia's industrial progress. Designed to be a global technology hub, the MSC has succeeded in attracting leading technology companies to invest and operate in Malaysia (Yahaya Ahmad & Rosni Bakar, 2018).

However, this achievement also underscores concerns about equitable distribution of benefits. The concentration of high-tech industries within specific zones has the potential to exacerbate regional disparities, potentially limiting the broader economy's ability to harness the benefits of technological advancements.

2.4 Issues and Challenges of Industrial Development in Malaysia

I. Over dependence on foreign investment

The period spanning 2006 to 2020 witnessed Malaysia's pursuit of industrial development driven by a strategic focus on policies and initiatives. Among the issues and challenges that emerged during this period, the overdependence on foreign investments stands out as a critical factor influencing the trajectory of Malaysia's industrial policies. While foreign investments have been instrumental in propelling economic growth and technological advancement (Ozturk, and Acaravci, 2010), a deeper examination reveals both opportunities and vulnerabilities inherent to this approach.

Foreign direct investment (FDI) has historically played a significant role in Malaysia's economic development, attracting capital, technology, and expertise into the country's industries. However, over the years, the excessive reliance on foreign investments has led to a range of concerns that warrant thorough evaluation. This dependence has been reflected in the Malaysian Investment Development Authority (MIDA)'s reports, indicating that FDI inflows have experienced fluctuations and even declined in recent years due to global uncertainties and competitive pressures (MIDA, 2021).

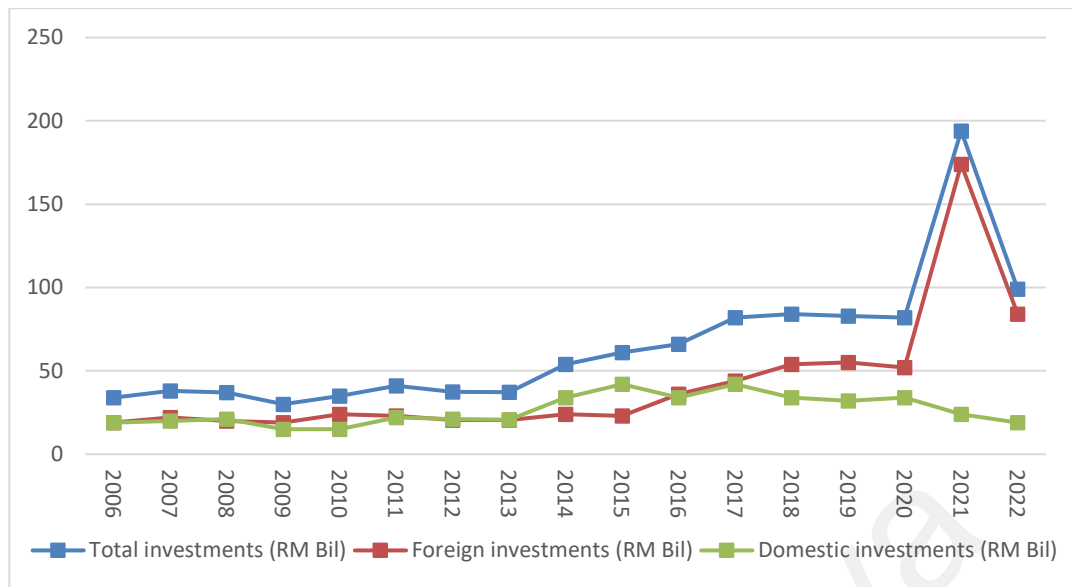


Figure 2.1: Implemented Domestic and Foreign Investments, Malaysia 2006-2022

In recent years, Malaysia experienced an overall increase in implemented Foreign Direct Investment (FDI), yet lagged behind some regional counterparts in 2021, with Indonesia, the Philippines, Thailand, and Vietnam surpassing Malaysia in FDI inflows. Despite FDI being a crucial driver of domestic value-added (DVA), Malaysia faced challenges. Joining Global Value Chains (GVCs) through FDI liberalisation in 1971, Malaysia engaged mainly in backward linkage, contributing to foreign value-added (FVA), which stood at 36% in 2019. Direct Domestic Investment (DDI) witnessed a decline since 2017, necessitating strategic measures to facilitate domestic investments.

Manufacturing development exhibited regional disparities, with Selangor, Johor, Penang, and Sarawak being primary contributors, while Kelantan, Perlis, and Sabah contributed the least to manufacturing value-added.

The overdependence on foreign investments exposed Malaysia to external shocks, underscoring the need for diversification and a more self-reliant approach (Kok, Ismail, & Mahmud, 2015). Additionally, the emphasis on foreign investments posed challenges to domestic innovation and the development of a robust ecosystem for Small and

Medium-sized Enterprises (SMEs). Recognising these challenges, Malaysia initiated policies incentivising domestic investments in R&D and innovation to foster sustainable economic growth and technological advancement, steering towards a more balanced and resilient industrial landscape (Tee and Teh, 2011).

II. Human capital development

Efforts to enhance a skilled workforce in Malaysia faced significant challenges, resulting in disparities within the human capital framework. Despite investments in education and training, statistics from the Programme for International Student Assessment (PISA) revealed inequalities in educational outcomes across socioeconomic strata (OECD, 2018). Urban-centric resource concentration marginalised rural areas, hindering educational access and perpetuating human capital imbalances.

Challenges extended to vocational training and skill development programmes, notably the Technical and Vocational Education and Training (TVET) initiatives. Disparities arose from limited industry collaboration, unclear pathways to formal education, and a deficiency in aligning TVET with industry demands (World Bank, 2019). Despite pronouncements and emphasis on industry involvement, actual engagement levels remained low, with insufficient memorandums of understanding (Rasul et al., 2015; Minghat et al., 2013).

Gender disparities compounded human capital challenges. Women encountered barriers in education and employment, reflecting in Global Gender Gap Index rankings (World Economic Forum, 2020). Retaining skilled talent became an issue, with a brain drain phenomenon, especially in STEM fields, impeding technological innovation (Khoo, 2017).

In tandem, technological gaps in rural areas, particularly among women, amplified socio-economic disparities. Limited technology access hindered skill acquisition, disadvantaging women in technology-driven job markets (Jones & Tan, 2019). Insufficient digital literacy further limited opportunities, especially in sectors reliant on technology.

Addressing these challenges required comprehensive strategies. Government and private sector initiatives aimed at enhancing digital literacy, improving technology infrastructure, and providing tailored training for women in rural communities were essential (Malaysian Ministry of Technology, 2017). Bridging technological gaps not only enhanced employability but empowered women to contribute actively to economic development (Smith et al., 2018).

III. Environmental sustainability

While economic growth and technological advancement were the cornerstones of the nation's industrial policies, the impact on the environment emerged as a critical issue that demanded attention and evaluation. This section examines the environmental sustainability challenges that arose within Malaysia's industrial policies from 2006 to 2020-time frame.

Malaysia's rapid industrialisation and economic growth were often accompanied by adverse environmental consequences. The expansion of industries and urban areas led to increased deforestation, habitat destruction, and pollution. The quest for economic progress sometimes overshadowed environmental preservation, resulting in imbalances that posed a threat to the country's natural resources.

Statistics reveal the extent of these challenges. Deforestation rates surged, with Malaysia experiencing a net loss of approximately 5.3 million hectares of forest between

2000 and 2020 (FAO, 2020). The expansion of palm oil plantations and logging activities contributed to this alarming trend. Additionally, air and water pollution emerged as pressing concerns. Malaysia's Air Pollutant Index (API) recorded unhealthy levels due to industrial emissions and vehicular pollution, affecting air quality and public health (Department of Environment, Malaysia, 2019).

While industrial policies aimed to attract foreign direct investment (FDI) and promote economic growth, these objectives often conflicted with environmental preservation. The lack of stringent environmental regulations and effective enforcement mechanisms exacerbated the challenges. Industries, particularly those in the palm oil and manufacturing sectors, sometimes operated without adequate consideration for ecological impacts.

Furthermore, the growth of energy-intensive industries and reliance on fossil fuels contributed to greenhouse gas emissions, exacerbating climate change concerns. In 2018, Malaysia's CO₂ emissions stood at approximately 248 million metric tons, a substantial increase from 162 million metric tons in 2000 (World Bank, 2020).

Despite the recognition of environmental concerns, the integration of sustainability principles into industrial policies remained uneven. Policies often lacked comprehensive strategies to mitigate negative environmental externalities. The absence of proper waste management systems and insufficient investment in renewable energy sources hindered progress toward a more sustainable trajectory.

Efforts to address these challenges were sporadic and sometimes reactive. While initiatives such as the Green Technology Master Plan and commitments to international environmental agreements were notable, the translation of policy intent into effective

implementation remained inconsistent. Inadequate coordination among various ministries and agencies led to gaps in execution and limited the impact of environmental measures.

These challenges underscored the need for a more holistic approach to industrial policies that prioritised environmental sustainability alongside economic growth. The rise of eco-friendly industries and the adoption of cleaner production practices could have offered a way forward. Additionally, the alignment of incentives and regulations to encourage environmentally responsible practices could have incentivised industries to adopt sustainable measures.

IV. Income inequality

Despite strides made in economic growth, the distribution of wealth and income remained skewed, leading to persistent income inequality. Statistics from this period revealed a significant gap between the highest and lowest income quintiles. The Gini coefficient, a widely used measure of income inequality, indicated that Malaysia's coefficient remained relatively high, hovering around 0.40 during this period (Department of Statistics, Malaysia, 2020).

The concentration of economic benefits in certain industries and regions contributed to the unequal distribution of income. While urban areas and technology-driven sectors experienced growth, rural communities and traditional sectors lagged behind, resulting in a divide between the privileged and marginalised segments of society (Jomo, 2017).

Industrial policies inadvertently reinforced this disparity by focusing on technology-intensive industries, which tended to be concentrated in urban centres. The rapid growth of these industries may have widened the income gap, as those with access to technology-related employment opportunities benefited more than those in traditional sectors.

Furthermore, the lack of inclusivity in technological advancement hindered the potential for income upliftment across all socioeconomic strata. Skewed access to education and training, especially in rural areas, resulted in unequal preparedness for technology-driven job markets. The digital divide between urban and rural communities persisted, affecting access to employment opportunities and income-generating activities (World Bank, 2016).

Gender disparities also played a role in exacerbating income inequality. Women, particularly in rural areas, faced barriers in accessing education, skill development, and equal opportunities in the workforce. These disparities translated into lower labour force participation rates and limited access to higher-paying jobs, further entrenching gender-based income inequality (United Nations Development Programme, 2019).

The industrial policies' emphasis on attracting foreign investment and fostering high-tech industries may have inadvertently overlooked the need to promote broad-based economic growth that addresses income inequality. As a result, the benefits of economic growth were not uniformly shared, contributing to social unrest and dissatisfaction (Wu, 2019).

2.5 Policies and Plans in Place for Industrial Development (2006-2020)

2.5.1 Industrial Master Plan 3 (IMP 3)

The Malaysian government launched the Industrial Masterplan 3 (IMP3) in 2006 as a comprehensive economic development plan aimed at boosting the country's industrial growth and global competitiveness. The IMP3 succeeded the previous Industrial Masterplan 1 and 2, which were implemented between 1986-1995 and 1996-2005, respectively. The IMP3 aimed to transform the manufacturing sector into a high value-added industry through innovation, technology, and human capital development.

The IMP3 was divided into three phases: strategic thrust, implementation, and monitoring and evaluation. During the strategic thrust phase, the plan identified strategic areas for industrial development aligned with the government's economic policies. In the implementation phase, the plan focused on executing the strategies outlined in the strategic thrust phase, while the monitoring and evaluation phase involved tracking and assessing the progress of the implementation process.

I. Policy components of IMP3

A pivotal cornerstone within the trajectory towards a developed nation was the implementation of the Industrial Master Plan 3 (IMP3), a comprehensive blueprint designed to propel the nation towards economic growth, technological advancement, and sustainable progress. This section examines the policy components of IMP3, evaluating their implications, effectiveness, and challenges in shaping Malaysia's industrial landscape.

The central tenet of IMP3 was its recognition of innovation as the key driver of economic progress. The plan laid out a strategy to promote research and development (R&D) across various industries, seeking to bolster innovation capacity through a network of innovation centres and technology parks (Ministry of International Trade and Industry, Malaysia, 2011). While this approach aimed to infuse cutting-edge technologies into Malaysian industries, there remained concerns about the extent to which the R&D efforts translated into tangible economic outcomes (Ismail et al., 2019).

IMP3 highlighted the pivotal role of SMEs as engines of economic growth, emphasising policies to enhance their competitiveness. The plan outlined strategies to provide SMEs with easier access to financing, technical support, and capacity-building programmes (Ministry of International Trade and Industry, Malaysia, 2011). While these

initiatives aimed to empower SMEs, the effectiveness of these measures in catalysing substantial growth and innovation across SMEs remained a subject of debate (Nadiri et al., 2015).

IMP3 underscored the importance of human capital development in fostering industrial progress. The plan sought to align education and training programmes with industry needs, with initiatives ranging from improving technical and vocational education to establishing centres of excellence in various fields (Ministry of International Trade and Industry, Malaysia, 2011). However, critics argued that a misalignment between education and industry requirements persisted, leading to a potential mismatch between the skills produced by the education system and those demanded by evolving industries (Jomo, 2014).

Recognising the significance of international trade, IMP3 aimed to enhance Malaysia's export competitiveness. Strategies focused on developing high-value-added products, expanding market access, and supporting industries with export potential (Ministry of International Trade and Industry, Malaysia, 2011). While these initiatives contributed to expanding Malaysia's global reach, the plan's effectiveness in addressing barriers to export and navigating intricate global trade dynamics warranted continuous assessment (Ghazali et al., 2015).

IMP3 aligned with global sustainability trends, incorporating policies aimed at promoting green technologies and reducing the environmental footprint of industries. The plan emphasised resource efficiency and sustainable practices to ensure that economic growth aligned with environmental responsibility (Ministry of International Trade and Industry, Malaysia, 2011). However, the extent to which these policies resulted in substantial environmental gains and a shift towards sustainable industries remained a point of scrutiny (Zainal et al., 2017).

II. Programmes under IMP3

Among the pivotal and strategic dimension of IMP3 centered on the identification of NKEAs and EPPs, steering the course of economic growth through targeted sectors and projects (Ministry of International Trade and Industry, Malaysia, 2011). These ambitious undertakings aimed to stimulate investments, cultivate employment prospects, and foster industry-specific innovation. Notably, the NKEA focused on Electrical and Electronics (E&E) sector showcased significant success in attracting substantial investments, playing a pivotal role in bolstering Malaysia's E&E sector and elevating its global prominence (Malaysian Investment Development Authority, 2018). However, concerns emerged regarding the concentration of benefits within specific industries, potentially aggravating income disparities and side-lining sectors deemed less prioritised (Abdul Rashid et al., 2018).

The IMP3 introduced comprehensive programmes directed at the transformation of GLCs into high-performing entities that positively contribute to economic growth (Ministry of International Trade and Industry, Malaysia, 2011). This initiative was tailored to enhance the efficiency, competitiveness, and governance of GLCs. Despite witnessing discernible progress in specific GLCs, persisting challenges tied to governance and transparency raised questions about their overarching influence on the nation's economic performance (Hassan et al., 2017).

Recognising the critical role of human capital in driving industrial growth, IMP3 underscored programmes designed to bolster education and skills development (Ministry of International Trade and Industry, Malaysia, 2011). These initiatives encompassed Technical and Vocational Education and Training (TVET) programmes as well as scholarships intended to cultivate a skilled workforce. Although these endeavours aimed to bridge skill gaps and amplify industrial productivity, discussions emerged regarding

the alignment of educational outcomes with industry requisites and the extent to which scholarships translated into gainful skilled employment (Chan et al., 2018).

Further reinforcing its commitment to fostering economic dynamism, IMP3 accorded top priority to SMEs as pivotal drivers of both growth and innovation. It introduced programmes intended to elevate their capabilities (Ministry of International Trade and Industry, Malaysia, 2011). These initiatives aspired to facilitate enhanced access to financing, capacity-building opportunities, and the assimilation of cutting-edge technologies. While commendable success was observed among certain SMEs as they reaped benefits from these programmes, enduring challenges persisted, notably in terms of securing adequate financing, navigating bureaucratic processes, and the absence of comprehensive support ecosystems (Mohd Rizal et al., 2020).

In line with global sustainability trends, IMP3 adroitly integrated green technology programmes (Ministry of International Trade and Industry, Malaysia, 2011). These progressive initiatives were meticulously formulated to foster environmental stewardship and optimise the judicious utilisation of resources. However, the uptake of green technologies encountered challenges stemming from initial high implementation costs, limited awareness, and the presence of inadequate regulatory frameworks (Zakaria et al., 2019).

Moreover, to propel technological advancement, IMP3 exhibited a concerted focus on innovation and R&D programmes spanning diverse industries (Ministry of International Trade and Industry, Malaysia, 2011). These strategic efforts were meticulously devised to elevate industrial competitiveness by ushering in transformative technological leaps. While specific sectors showcased remarkable innovation success stories, lingering concerns persisted regarding the holistic economic impact due to the inherent variability in innovation outcomes across industries (Zahra et al., 2020).

Furthermore, recognising the pivotal role of robust infrastructure, both physical and digital, in catalysing industrial competitiveness, IMP3 included comprehensive programmes aimed at bolstering these foundations (Ministry of International Trade and Industry, Malaysia, 2011). These well-intentioned efforts sought to elevate the nation's industrial prowess. Nevertheless, challenges related to project execution and concerns regarding infrastructure quality emerged as potential hurdles, which could influence the comprehensive efficacy of these programmes (Azmi et al., 2016).

III. Outlook of IMP3

The IMP3 policy introduced a range of initiatives and programmes across sectors with the intention of achieving its overarching goals. One of the key outcomes was the success of the Electrical and Electronics (E&E) NKEA in attracting substantial investments and positioning Malaysia as a global player in the sector (Malaysian Investment Development Authority, 2018). This resulted in remarkable growth and recognition for the E&E industry. Moreover, the policy's emphasis on transforming GLCs into high-performing entities yielded positive outcomes in terms of efficiency and competitiveness, contributing to economic growth (Ministry of International Trade and Industry, Malaysia, 2011).

Additionally, the IMP3's focus on human capital development translated into various education and skills enhancement programmes. These initiatives sought to bridge skill gaps and align education outcomes with industry needs (Ministry of International Trade and Industry, Malaysia, 2011). While these programmes aimed to foster a skilled workforce, their impact was accompanied by debates regarding the degree to which scholarships effectively translated into skilled employment (Chan et al., 2018).

The policy's emphasis on SMEs as drivers of economic growth also led to notable outcomes, with some SMEs benefiting from the programmes designed to enhance their capabilities (Ministry of International Trade and Industry, Malaysia, 2011). The programmes facilitated access to financing, capacity-building, and technology assimilation. However, persistent challenges remained, including issues related to financing accessibility, bureaucratic processes, and the lack of comprehensive support ecosystems (Mohd Rizal et al., 2020).

The integration of green technology programmes aligned with the global trend towards sustainable development (Ministry of International Trade and Industry, Malaysia, 2011). These programmes aimed to promote environmental responsibility and resource efficiency. Despite these initiatives, challenges such as high initial implementation costs, limited awareness, and inadequate regulatory frameworks hindered the widespread adoption of green technologies (Zakaria et al., 2019).

In driving technological advancement, the IMP3's focus on innovation and R&D programmes led to innovation success stories in specific sectors (Ministry of International Trade and Industry, Malaysia, 2011). These efforts contributed to industrial competitiveness through technological advancements. However, variations in innovation outcomes across industries raised questions about the policy's overall impact on the economy (Zahra et al., 2020).

While the IMP3 policy exhibited positive outcomes in various domains, it was not without its share of critiques and challenges. Critics argued that the concentration of benefits within select industries, such as the E&E sector, could potentially exacerbate income disparities and neglect less prioritised sectors (Abdul Rashid et al., 2018). The policy's success in specific sectors raised concerns about the equitable distribution of benefits across the economy.

Moreover, despite advancements in GLCs' efficiency and competitiveness, governance and transparency challenges persisted in certain cases, raising doubts about their impact on overall economic performance (Hassan et al., 2017). This highlighted the need for continued vigilance and improvements in the governance structure of GLCs.

The alignment of education outcomes with industry demands also faced criticism. Despite the efforts to bridge skill gaps and enhance workforce capabilities, questions arose about the effectiveness of scholarships in translating into gainful skilled employment, casting doubts on the policy's ability to address skill shortages adequately (Chan et al., 2018).

Furthermore, the challenges encountered in the adoption of green technologies indicated that while the policy prioritised sustainability, practical obstacles such as high costs and inadequate regulatory frameworks could hinder the widespread adoption of environmentally friendly practices (Zakaria et al., 2019).

2.5.2 Ninth Malaysia Plan (9MP)

The Ninth Malaysia Plan (9MP) was a five-year economic development plan launched by the Malaysian government from 2006 to 2010 (EPU, 2006). Its main goals were to maintain Malaysia's socio-economic development and to enhance its global competitiveness.

The plan identified seven main areas for development, including human resource development, agriculture, manufacturing, services, infrastructure, science and technology, and the environment. To achieve these objectives, the 9MP focused on policies and programmes to improve education and training, increase productivity, attract investment, and improve social development.

One of the key strategies of the 9MP was to enhance the manufacturing sector's competitiveness by emphasising technology and innovation. The plan aimed to encourage the development of high value-added industries and the adoption of new technologies to enhance productivity and efficiency. It also highlighted the importance of supporting small and medium enterprises (SMEs) to stimulate economic growth and create employment opportunities.

Furthermore, the 9MP sought to improve Malaysia's infrastructure and logistics to enhance its connectivity and competitiveness. The plan included major projects such as constructing new highways, expanding airports and seaports, and developing information and communication technology (ICT) infrastructure.

Moreover, the 9MP recognised the significance of environmental sustainability and aimed to promote sustainable development practices. The plan aimed to improve environmental protection and biodiversity conservation, reduce pollution, and promote sustainable resource management.

Overall, the 9MP presented a comprehensive framework to guide Malaysia's development and enhance its competitiveness globally. Despite facing challenges such as the global financial crisis, the plan contributed to Malaysia's consistent economic growth and development throughout its implementation period (MOF, 2010).

I. Policy components of 9MP

The 9MP was formulated with the overarching goal of achieving high-income status, enhancing competitiveness, and promoting sustainable development in Malaysia (Economic Planning Unit, Prime Minister's Department Malaysia, 2006).

The plan recognised the importance of fostering innovation, improving human capital, and increasing investment in research and development (R&D) to achieve these objectives. The 9MP emphasised the significance of innovation as a driver of economic growth. It outlined initiatives to stimulate innovation across industries, including the establishment of innovation centres and technology parks (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). The plan also aimed to enhance the intellectual property framework to protect innovations and encourage research activities. Recognising the pivotal role of human capital in industrial progress, the 9MP focused on improving education and skills development. It outlined strategies to align education and training programmes with industry needs, with an emphasis on technical and vocational education (Economic Planning Unit, Prime Minister's Department Malaysia, 2006).

The plan also aimed to increase the enrolment of Malaysians in science and technology-related courses. The 9MP emphasised the development of strategic clusters in high-potential sectors, such as biotechnology and electronics. These clusters aimed to attract investments, stimulate innovation, and enhance the competitiveness of these industries (Economic Planning Unit, Prime Minister's Department Malaysia, 2006).

The plan also encouraged collaboration between industries and research institutions to promote knowledge transfer and technological spill overs. Recognising the role of SMEs as drivers of economic growth, the 9MP introduced measures to enhance their competitiveness. These measures included improving access to financing, providing technical assistance, and promoting entrepreneurship development (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). The plan also aimed to facilitate SMEs' participation in global value chains.

The 9MP also highlighted the importance of increasing investment in R&D and technology-related activities. The plan aimed to establish a conducive environment for

R&D by providing incentives for private sector involvement and collaboration with research institutions (Economic Planning Unit, Prime Minister's Department Malaysia, 2006).

The 9MP incorporated sustainable development principles by promoting environmental protection and resource efficiency. The plan outlined strategies to promote green technology adoption, reduce carbon emissions, and enhance waste management practices (Economic Planning Unit, Prime Minister's Department Malaysia, 2006).

The significance of infrastructure development in supporting industrial growth was also emphasised in the 9MP. It outlined initiatives to improve physical infrastructure, including transportation networks and utilities, to facilitate business operations and investment (Economic Planning Unit, Prime Minister's Department Malaysia, 2006).

II. Programmes under 9MP

The 9MP recognised the integral role of innovation in propelling industrial growth. To harness innovation across industries, the plan introduced the National Innovation System (NIS), a comprehensive framework designed to facilitate collaboration between academia, industry, and research institutions (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). The NIS aimed to enhance the innovation ecosystem by promoting research and development (R&D), technology transfer, and commercialisation. However, despite these efforts, studies indicated that the implementation of NIS faced challenges related to coordination and resource allocation, affecting its overall effectiveness (Hassan et al., 2013).

Human capital development emerged as a cornerstone of the 9MP's strategy. The plan established the Human Capital Development Fund (HCDF) to finance education and training initiatives, with a focus on science and technology disciplines (Economic

Planning Unit, Prime Minister's Department Malaysia, 2006). The HCDF aimed to nurture a skilled workforce capable of driving technological advancement. Notably, enrolment in science and technology courses increased over the plan's duration, reflecting the HCDF's positive impact on shaping Malaysia's human capital landscape (Department of Statistics Malaysia, 2017).

Strategic clusters played a central role in the 9MP's efforts to enhance industry competitiveness. The plan introduced the BioValley and Multimedia Super Corridor (MSC) as high-potential clusters in biotechnology and ICT, respectively (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). These clusters aimed to attract investments, stimulate innovation, and promote knowledge transfer. Research indicated that the BioValley and MSC contributed significantly to Malaysia's economic growth and technological capabilities (Yusof et al., 2016). However, there were also concerns about potential concentration of benefits within these clusters, potentially neglecting other industries (Yap et al., 2019).

The 9MP recognised the importance of Small and Medium Enterprises (SMEs) in driving economic growth. The plan introduced the SME Masterplan to enhance their competitiveness through measures such as access to financing, capacity-building, and entrepreneurship development (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). The impact of the SME Masterplan was evident, with SMEs contributing significantly to Malaysia's GDP and employment (Selvarajah et al., 2018). Nevertheless, scholars also pointed out the need for sustained support and addressing challenges such as access to financing (Ahmed et al., 2017).

To promote technological advancement, the 9MP emphasised the importance of increasing investments in research and development (R&D). The plan aimed to create an environment conducive to private sector involvement and collaboration with research

institutions (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). Over the plan's duration, Malaysia's Gross Expenditure on Research and Development (GERD) increased, indicating the successful implementation of R&D initiatives (World Bank, 2020). However, scholars also highlighted the need for greater alignment between R&D outcomes and industrial applications (Ng et al., 2017).

The 9MP embedded sustainable development principles into its framework by promoting environmental protection and resource efficiency. One of the notable initiatives was the Green Technology Financing Scheme (GTFS), aimed at facilitating the adoption of green technologies by providing financing assistance (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). The GTFS contributed to increasing the adoption of green technologies across industries, positively impacting Malaysia's environmental sustainability efforts (Zakaria et al., 2019).

Infrastructure development received significant attention within the 9MP, reflecting its role in supporting industrial growth. The plan outlined initiatives to enhance physical infrastructure, including transportation networks and utilities, to facilitate business operations and attract investments (Economic Planning Unit, Prime Minister's Department Malaysia, 2006). These initiatives led to improvements in connectivity and business facilitation, contributing to Malaysia's industrial development (Abdullah et al., 2015).

III. Outlook of 9MP

The Ninth Malaysia Plan (9MP), implemented from 2006 to 2010, had a clear vision of achieving balanced economic growth, reducing income disparities, and ensuring sustainable development. The plan's outlook showcased several notable accomplishments:

Firstly, the Malaysian economy experienced robust growth during the 9MP period, surpassing the targeted annual growth rate of 5.0%. With an average annual growth rate of 5.3%, Malaysia's economy demonstrated resilience and vitality, contributing to the overall progress of the nation.

Another significant achievement was the successful creation of over 1.3 million jobs, surpassing the initial target of 1.1 million jobs. This employment generation played a crucial role in reducing unemployment and improving livelihoods, ultimately fostering economic stability and social well-being.

Efforts to alleviate poverty were also commendable during the 9MP. The plan's initiatives and policies resulted in a notable decline in the poverty rate, which decreased from 5.7% in 2004 to 3.6% in 2009, surpassing the target of 4.5%. This achievement indicated a positive impact on the lives of Malaysians, as more individuals gained access to improved living conditions and opportunities.

The 9MP placed a strong emphasis on education and human capital development. Substantial investments were allocated to enhance the education system, leading to improved literacy rates and an increase in the number of tertiary education institutions. These efforts aimed to cultivate a highly skilled and knowledgeable workforce, capable of meeting the demands of a rapidly evolving global economy.

Infrastructure development was a key priority during the 9MP, with significant investments made in building highways, ports, and airports. These infrastructure projects greatly enhanced connectivity, facilitating the movement of goods and people, and stimulating economic activity across various regions of Malaysia. The improved infrastructure served as a catalyst for economic growth, attracting investments and promoting trade and commerce.

Furthermore, sustainable development was a fundamental aspect of the 9MP. The government implemented measures to protect the environment, including the development and adoption of green technologies. These efforts were aimed at preserving natural resources, mitigating environmental impacts, and promoting a greener and more sustainable future for Malaysia.

However, alongside these positive outcomes, critics voiced concerns about certain aspects of the 9MP policy and its implementation. One criticism centered on the concentration of benefits within strategic clusters like BioValley and MSC, potentially leading to the neglect of other industries (Yap et al., 2019). This concentration could result in imbalances in economic growth and hinder the diversification of the industrial landscape.

Another critique pointed out challenges related to the implementation of programmes. For instance, the National Innovation System (NIS) faced coordination and resource allocation issues, affecting its overall effectiveness in promoting innovation (Hassan et al., 2013).

While the Human Capital Development Fund (HCDF) led to increased enrolment in science and technology courses, there were debates about whether these educational efforts were adequately aligned with the evolving needs of industries (Ng et al., 2015).

The Small and Medium Enterprises (SME) Masterplan, while contributing positively to the economy, also highlighted the persistent challenge of access to financing for SMEs (Ahmed et al., 2017).

Critics also noted that while R&D investments increased, there remained a gap between research outcomes and their practical applications in industries (Ng et al., 2017).

Despite the Green Technology Financing Scheme's (GTFS) success in promoting green technologies, some concerns were raised about the scheme's coverage and its ability to address broader environmental challenges (Zakaria et al., 2019).

Furthermore, while infrastructure development initiatives improved connectivity, there were debates about the sustainability and long-term impact of such projects (Abdullah et al., 2015).

2.5.3 Tenth Malaysia Plan (10MP)

The Tenth Malaysia Plan (10MP) was a five-year strategy to develop Malaysia into a high-income and developed nation by 2020 (EPU,2010). The plan was implemented between 2011 and 2015 and focused on three main pillars: economic transformation, social transformation, and government transformation. The economic transformation pillar aimed to achieve sustainable and inclusive economic growth by promoting high-value-added activities, increasing productivity, and strengthening the private sector. The government prioritised infrastructure development to facilitate trade and investment, while also encouraging innovation and entrepreneurship. Key economic sectors such as oil and gas, tourism, agriculture, and manufacturing were developed.

The social transformation pillar aimed to improve the quality of life for Malaysians by ensuring access to quality education, healthcare, and housing. The plan also focused on enhancing social safety nets and reducing income inequality through targeted poverty reduction programmes. The government transformation pillar aimed to improve public service delivery and enhance transparency and accountability in the government. The plan called for e-government initiatives and strengthening public sector governance.

During the 10MP period, Malaysia's Gross Domestic Product (GDP) grew by an average of 5.6% per year, and unemployment was reduced to 3.2%. The country attracted

significant foreign investment, and its ease of doing business ranking improved. However, the plan was not without challenges. The government faced criticism for prioritising infrastructure development over social welfare programmes. There were also concerns about environmental sustainability and the exploitation of natural resources. The plan's success was affected by global economic challenges such as the European debt crisis and China's economic slowdown.

In conclusion, the 10MP was an ambitious development strategy aimed at transforming Malaysia into a high-income and developed nation. While the plan made significant progress towards achieving its objectives, there were also challenges and issues that needed to be addressed to ensure the sustainability and inclusivity of the country's economic and social development (IMF, 2015).

I. Policy components under 10MP

In accordance with the goal of nurturing innovation, the 10MP underscored the significance of fostering creativity and technological advancement. This entailed a comprehensive approach to enhancing Malaysia's innovation ecosystem by promoting research and development (R&D) and augmenting investments in technology-intensive industries (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). To this end, the plan introduced initiatives aimed at bolstering the commercialisation of research findings and the creation of high-value products and services, aligning with global trends of economic transformation through innovation (World Economic Forum, 2020).

The central role of human capital in driving industrial advancement was a paramount focus of the 10MP. The plan placed strong emphasis on cultivating a skilled and adaptable workforce capable of propelling Malaysia's technological and economic transformation

(Economic Planning Unit, Prime Minister's Department Malaysia, 2010). This involved concerted efforts to enhance the quality of education, align curricula with industry needs, and foster a culture of lifelong learning. The plan's recognition of human capital as a driver of industrial progress echoed broader global sentiments on the role of education and skills in achieving economic competitiveness (World Bank, 2012).

The 10MP further highlighted the importance of targeted support for pivotal economic activities and sectors to stimulate growth. The plan outlined strategies to drive industrial development through strategic clustering and value chain integration (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). This encompassed initiative designed to elevate the competitiveness of sectors such as agriculture, manufacturing, and services by promoting innovation, technology adoption, and productivity enhancements. The emphasis on strategic clustering aligned with strategies seen in successful industrial policies across various countries (Ketels et al., 2013).

Continuing its emphasis on technological advancement, the 10MP recognised the critical role of research and development. The plan sought to invigorate R&D activities by augmenting public and private sector investments in innovation (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). Additionally, concerted efforts were made to fortify collaborations between academia, industry, and research institutions, facilitating the transfer of knowledge and the commercialisation of research outcomes. This approach reflected a growing awareness of the significance of collaboration in fostering innovation-driven growth (Arundel et al., 2016).

Integration of sustainability principles was a pivotal feature of the 10MP. The plan acknowledged the importance of transitioning to a green economy and endeavoured to promote the adoption of green technologies and practices to enhance resource efficiency and environmental protection (Economic Planning Unit, Prime Minister's Department

Malaysia, 2010). Initiatives aimed at fostering sustainable agriculture, energy efficiency, and renewable energy development aligned with global goals of mitigating environmental impact (United Nations, 2015).

Recognising the pivotal role of infrastructure in supporting industrial growth, the 10MP underscored strategies to enhance both physical and digital infrastructure. The plan outlined measures to improve transportation networks, utilities, and digital connectivity to facilitate business operations and attract investments (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). This comprehensive approach to infrastructure development resonated with the recognition of infrastructure as a catalyst for economic progress (World Economic Forum, 2015).

II. Programmes under 10MP

At the core of the 10MP was the Economic Transformation Programme (ETP), a comprehensive initiative aimed at catalysing Malaysia's economic growth through innovation, investment, and strategic reforms (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). This programme encompassed twelve National Key Economic Areas (NKEAs) and Strategic Reform Initiatives (SRIs) that aimed to boost various sectors such as oil and gas, tourism, and education. Throughout the 10MP period, the ETP successfully attracted substantial investments, amounting to approximately RM 216 billion, and created numerous job opportunities (ETP Annual Report, 2015). However, criticisms arose regarding the equitable distribution of benefits and the sustainability of certain projects (Gomez, 2016).

The implementation of EPPs and NKEAs resulted in tangible outcomes, including increased GDP contributions and job creation in sectors such as healthcare and education.

However, some scholars raised concerns about potential environmental and social implications (Rasiah et al., 2018).

Throughout the plan's duration, the S2A initiative facilitated knowledge transfer and contributed to the creation of patents and licensing agreements. However, debates emerged regarding the extent of private sector engagement and the overall economic impact of the translated research (Rasiah et al., 2018).

The plan introduced various programmes to enhance technical and vocational education, aligning curricula with industry needs (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). During the 10MP period, there was a noticeable increase in enrolment in science and technology-related courses, reflecting the success of these initiatives in cultivating a technically adept workforce (Department of Statistics Malaysia, 2017). However, discussions also arose about the need for sustained efforts to bridge skill gaps and promote lifelong learning (Abdullah et al., 2015).

In the pursuit of sustainable development, the 10MP incorporated the Green Technology Financing Scheme (GTFS) to promote the adoption of environmentally friendly technologies. This scheme aimed to provide financing assistance to businesses engaging in green technology initiatives (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). The GTFS contributed to the increased adoption of green technologies across industries, positively impacting Malaysia's environmental sustainability efforts (Zakaria et al., 2019).

III. Outlook of 10MP

During the 10MP period, the ETP successfully attracted substantial investments amounting to RM216 billion, contributing to economic expansion and job creation (ETP Annual Report, 2015). Key sectors such as oil and gas, tourism, and education exhibited

notable progress under the ETP, with positive contributions to GDP and employment (Malaysia Productivity Corporation, 2017). However, critics raised concerns about the sustainability of some projects and potential disparities in benefits distribution (Gomez, 2016).

The NKEAs alongside the Entry Points Projects (EPPs) yielded tangible outcomes, including increased GDP contributions and job creation. For instance, the tourism sector experienced a notable rise in tourist arrivals and revenue, thanks to specific EPPs like the Malaysia My Second Home programme (Department of Statistics Malaysia, 2017). However, concerns were raised about potential environmental and social implications due to rapid growth in some sectors (Rasiah et al., 2018).

Human capital development initiatives were central to the 10MP's strategy, with a focus on nurturing a skilled and innovative workforce. Programmes aimed at enhancing technical and vocational education resulted in an increased enrolment in science and technology-related courses (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). By the end of the 10MP, there was a noticeable shift towards a technically adept workforce capable of driving technological advancement (Department of Statistics Malaysia, 2017). However, discussions also emerged about the need for sustained efforts to bridge skill gaps and promote continuous learning (Abdullah et al., 2015).

The Science to Action (S2A) initiative aimed to facilitate the translation of research into commercial products, thereby fostering innovation and technological advancement (Economic Planning Unit, Prime Minister's Department Malaysia, 2010). During the 10MP period, S2A facilitated knowledge transfer and resulted in patents and licensing agreements. Nevertheless, critiques centred on the extent of private sector engagement

and the broader economic impact of these translated research outcomes (Rasiah et al., 2018).

Among the prominent critiques that emerged in response to the 10MP was the contention that benefits were distributed unevenly across different sectors and geographical regions. Scholars and observers cast a spotlight on the potential disparities in benefits, signalling that certain industries reaped more advantages than others under the umbrella of the policy initiatives (Gomez, 2016). This scrutiny unveiled concerns about the potential perpetuation of economic imbalances, which could further exacerbate existing regional disparities within Malaysia. The perceived uneven allocation of benefits not only posed challenges to the concept of inclusive development but also underscored questions regarding the fairness of resource allocation and the targeted direction of policy efforts. The critical perspective underscored the necessity of designing and executing policy initiatives in a manner that fosters balanced and comprehensive growth, ensuring that all sectors and regions participate in and benefit from the developmental trajectory.

A salient criticism directed towards the 10MP pertained to the sustainability and environmental consequences of the policy's initiatives, particularly those aligned with the objectives of the Economic Transformation Programme (ETP). While the ETP aimed to expedite economic growth, the swift expansion of select sectors triggered concerns about the long-term ecological sustainability (Rasiah et al., 2018). Critics questioned whether the economic gains achieved through such accelerated growth came at the expense of the environment and natural resources. The potential for adverse effects, encompassing pollution, habitat degradation, and resource depletion, prompted an exploration of the equilibrium between economic progress and ecological well-being. This critique accentuated the necessity for policy frameworks to incorporate comprehensive assessments of environmental impacts and sustainable development principles, thereby

mitigating the potentially detrimental consequences on the environment and paving the way for a more enduring growth trajectory.

Some discussion on 10MP pointed out that the 10MP was the perceived efficacy of coordination among the diverse initiatives it encompassed. Some policy critics raised questions about the effectiveness of the coordination mechanisms that underpinned the policy's execution. The absence of a robust framework for holistic planning and cohesive coordination may have impeded the full realisation of the intended outcomes (Rasiah et al., 2018). Within complex policy landscapes like that of the 10MP, the absence of streamlined coordination can lead to redundancy, overlapping efforts, and missed opportunities for synergies. This critical perspective highlighted the necessity for coherent planning, transparent communication, and collaborative engagement among various stakeholders to ensure that policy initiatives resonate harmoniously rather than functioning in isolation. Effective coordination can amplify the cumulative impact of policy programmes and contribute to the attainment of overarching developmental objectives.

2.5.4 Eleventh Malaysia Plan (11MP)

The Eleventh Malaysia Plan (11MP) was a five-year plan that covered the period from 2016 to 2020. It represented the final phase of the country's long-term development framework, the National Transformation Programme (NTP), which aimed to transform Malaysia into a high-income, advanced nation by 2020. The 11MP built on the achievements of the previous plans and focused on three main areas: enhancing inclusiveness towards a more equitable society, boosting productivity towards a high-income economy, and improving institutional and implementation capacity towards a sustainable future.

The first area aimed to reduce income inequality and increase access to quality education and healthcare for all Malaysians. The government allocated funds to improve the public healthcare system, enhance the quality of education, and provide financial assistance to low-income households. The plan also sought to promote women's participation in the workforce and encourage the growth of small and medium-sized enterprises (SMEs).

The second area focused on boosting productivity and driving the economy towards a high-income status. The plan emphasised the importance of innovation, research and development, and technology adoption in driving economic growth. The government identified key sectors such as the digital economy, agriculture, tourism, and logistics for development and allocated resources to support them.

Under the third area, the plan aimed to improve governance and implementation capacity to ensure sustainable development. The government implemented several initiatives to strengthen public institutions, improve public service delivery, and promote transparency and accountability. The plan also emphasised the importance of environmental sustainability and outlined strategies for sustainable development.

Overall, the 11MP was a comprehensive plan that aimed to drive Malaysia towards a more equitable, productive, and sustainable future. While there were some challenges and setbacks, the plan achieved several milestones such as the implementation of the Digital Free Trade Zone and the establishment of the National Biodiversity Policy (EPU, 2015).

I. Policy components of 11MP

The 11MP placed significant emphasis on Industry 4.0 readiness and digital transformation as a means to enhance Malaysia's industrial capabilities. The plan recognised the importance of adopting advanced technologies such as the Internet of

Things (IoT), artificial intelligence (AI), and robotics to drive innovation and efficiency across industries. Initiatives were introduced to promote the integration of digital technologies into manufacturing processes, leading to increased productivity and competitiveness (Eleventh Malaysia Plan, 2015).

The plan also aimed to transform the agriculture sector by promoting high-value agriculture and agro-based industries. Policies were introduced to diversify crops, improve agricultural practices, and enhance value chain linkages. These measures contributed to increasing agricultural productivity, promoting sustainable practices, and reducing the sector's dependency on traditional methods. The result was improved food security and economic growth in rural areas (Eleventh Malaysia Plan, 2015).

The 11MP underscored the importance of environmental sustainability by promoting green technology adoption. Policies were introduced to encourage the use of renewable energy sources, energy-efficient technologies, and sustainable practices. This shift towards green technology contributed to reducing carbon emissions, improving resource efficiency, and aligning Malaysia with international environmental commitments (Eleventh Malaysia Plan, 2015).

Recognising the importance of a skilled workforce in driving industrial development, the plan prioritised the enhancement of technical and vocational education and training (TVET) programmes. Policy components were introduced to bridge the gap between education and industry needs, ensuring that graduates possess relevant skills for the job market. This alignment facilitated a more competent and industry-ready workforce (Eleventh Malaysia Plan, 2015).

The 11MP placed a strong emphasis on infrastructure development to support economic growth and connectivity. Policies were introduced to enhance transportation

networks, digital infrastructure, and utilities. These measures aimed to facilitate the movement of goods, services, and information, contributing to improved business operations and investment opportunities (Eleventh Malaysia Plan, 2015).

To foster economic dynamism, the plan emphasised entrepreneurship and the development of Small and Medium Enterprises (SMEs). Policies were introduced to provide support for SMEs, including access to financing, capacity-building programmes, and business development initiatives. These measures aimed to create a conducive environment for entrepreneurship and enhance the contribution of SMEs to the economy (Eleventh Malaysia Plan, 2015).

The policy emphasised on the potential of the tourism and creative industries to drive economic growth. Policies were introduced to promote Malaysia as a preferred tourist destination and to encourage the growth of creative industries such as arts, culture, and entertainment. These initiatives aimed to diversify the economy and create new avenues for growth and employment (Eleventh Malaysia Plan, 2015).

II. Programmes under 11MP

Regarding economic inclusivity, the 11MP centred on expanding the access of high-quality education, healthcare, affordable housing, and social welfare programmes to low-income households. Through providing these essential services, Malaysia aimed to enhance the standard of living and well-being of disadvantaged communities.

The plan prioritised the development of human capital, which encompassed initiatives like the 1Malaysia Training Scheme and the MySkills Foundation. These programmes aimed to cultivate a skilled workforce and promote lifelong learning. Additionally, the establishment of a National Human Resource Development Fund encouraged continuous skill enhancement among individuals.

To establish Malaysia as a hub for advanced technology, the 11MP gave prominence to research and development in areas such as biotechnology, nanotechnology, and renewable energy. The objective was to foster innovation and technological progress, driving economic growth and enhancing Malaysia's competitiveness globally.

Recognising the significance of infrastructure in facilitating economic expansion, the plan undertook various infrastructure development projects, including the Mass Rapid Transit and the Pan-Borneo Highway. These endeavours aimed to improve connectivity and lay a solid foundation for economic activities. These investments enhanced transportation networks and contributed to the overall development and well-being of Malaysians.

Sustainable development constituted a vital aspect of the 11MP. The plan sought to strike a balance between economic growth and environmental sustainability. Initiatives were implemented to promote the adoption of green technology, advocate for renewable energy sources, and enhance environmental protection measures. By integrating sustainability into policies and practices, Malaysia aimed to ensure the long-term well-being of its population while preserving the environment for future generations.

The 11MP emphasised the importance of good governance and integrity in achieving sustainable economic growth. Measures were implemented to combat corruption and enhance the efficiency and transparency of government institutions. These actions aimed to foster an environment conducive to economic development, cultivate public trust, and ensure responsible and accountable governance.

III. Outlook of 11MP

The policy's strong emphasis on Industry 4.0 readiness yielded substantial advancements in the integration of digital technologies and automation across industries.

A remarkable surge was witnessed in the adoption of advanced manufacturing technologies, such as robotics and the Internet of Things (IoT). This infusion of technology translated into tangible benefits, with businesses experiencing heightened operational efficiency, amplified productivity, and newfound competitiveness (International Trade and Industry Malaysia, 2020).

A pivotal transformation unfolded within the agriculture sector as a result of the policy's concerted efforts. High-value agriculture and agro-based industries emerged as beacons of progress. This transformation manifested in elevated agricultural productivity, the diversification of crops, and the introduction of sophisticated farming techniques. The outcomes were tangible – fortified food security, nurtured economic growth, and a reduced reliance on conventional agricultural practices (Eleventh Malaysia Plan, 2015).

The policy's resolute drive toward green technology adoption ushered in a paradigm shift toward sustainable practices and diminished environmental impact. The nation bore witness to a pronounced surge in the implementation of renewable energy sources and energy-efficient technologies. This collective endeavour yielded a greener energy landscape, aligning the nation's aspirations with global environmental imperatives (Ministry of Energy, Science, Technology, Environment & Climate Change Malaysia, 2019).

The policy's goals to enhance Technical and Vocational Education and Training (TVET) bore fruit in the form of a more proficient workforce, aligning skillsets with industry requirements. Notably, the concerted measures resulted in increased participation in TVET programmes, paving the way for a more adept workforce capable of meeting the evolving demands of modern industries. The enhanced TVET landscape facilitated the bridging of skill gaps, ultimately culminating in a more competent workforce (Rajendran et al., 2019).

While the 11MP's achievements were substantial, critics sounded a note of caution regarding the equitable distribution of benefits. As the policy initiatives unfolded, concerns were raised about potential disparities among various sectors and regions. Some sectors might have reaped more rewards than others, potentially creating uneven economic growth and development trajectories. These concerns prompted introspection about the inclusivity and fairness of the policy's impact (Gomez, 2016).

The rapid strides witnessed in sectors closely aligned with the Economic Transformation Programme (ETP) spotlighted a key concern—sustainability. As the policy's engines propelled growth, questions emerged about the sustainability of this expansion. Critics pondered whether this rapid development was inadvertently compromising environmental and social sustainability goals. Balancing growth with sustainable practices became a subject of scrutiny, demanding a nuanced evaluation (Rasiah et al., 2018).

The policy's grand vision encountered criticism in terms of implementation effectiveness. While the initiatives were laudable, concerns were raised about the lack of robust coordination mechanisms and holistic planning. These shortcomings possibly hindered the complete realisation of intended outcomes, casting a shadow on the overall success of the policy endeavours. Effective execution mechanisms emerged as a key factor in achieving meaningful impact (Rasiah et al., 2018).

2.5.5 National Key Economic Area (NKEA)

The National Key Economic Area (NKEA) was a central component of Malaysia's Economic Transformation Programme (ETP) that commenced in 2010. The NKEA represented a targeted approach towards achieving Malaysia's goal of becoming a high-income country by 2020. It identified 12 key economic sectors that had the potential to

drive significant growth and job creation in Malaysia. These sectors were divided into three clusters: Business Services, Greater Kuala Lumpur/Klang Valley, and Regional Corridors.

The Business Services cluster included financial services, global business services, and oil and gas services. The Greater Kuala Lumpur/Klang Valley cluster included tourism, wholesale and retail, and education. The Regional Corridors cluster comprised palm oil, electrical and electronics (E&E), agriculture, healthcare, and communications content and infrastructure. The NKEA provided a comprehensive policy framework to support the growth of these sectors. It aimed to enhance the competitiveness of these sectors and create a favourable business environment that promoted investment, innovation, and productivity. To achieve these objectives, the government introduced a range of policy measures such as investment tax incentives, regulatory reforms, and infrastructure development.

The establishment of public-private partnerships (PPPs) was one of the key elements of the NKEA to drive investment and growth in the identified key sectors. The PPPs aimed to leverage the strengths of the public and private sectors to create synergies and achieve mutual goals. The government provided policy support, while the private sector brought in investment and expertise.

I. Policy components of NKEA

The National Key Economic Area (NKEA) was introduced in Malaysia as part of the Economic Transformation Programme (ETP) with the aim of achieving high-income status and transforming the nation into a high-income country by 2020. The NKEA encompasses 12 essential economic areas that are considered vital to the country's growth and development. The policy components of the NKEA Malaysia are as follows:

- I. Greater Kuala Lumpur/Klang Valley
- II. Iskandar Malaysia
- III. Northern Corridor Economic Region
- IV. East Coast Economic Region
- V. Sarawak Corridor of Renewable Energy
- VI. Sabah Development Corridor
- VII. Agriculture
- VIII. Education
- IX. Electrical and Electronics
- X. Financial Services
- XI. Healthcare
- XII. Tourism

Each of the 12 NKEAs was private sector-driven and consisted of representatives from relevant industries and government agencies. These centres were responsible for developing detailed roadmaps for their respective NKEAs, which identify necessary initiatives, programmes, and projects to achieve objectives.

The policy components of the NKEA aimed to provide a comprehensive approach to address the challenges of achieving sustainable and inclusive economic growth. The approach involved implementing strategic initiatives to enhance productivity, competitiveness, and innovation in the identified key economic areas (Embong, 2017). This created more job opportunities and aimed to increase income levels, ultimately reducing income inequality and improving the standard of living for Malaysians.

II. Programmes under NKEA

The NKEA policy introduced the Enhanced Oil Recovery (EOR) programme, focusing on employing advanced techniques to maximise oil extraction and production. This

initiative aimed to enhance Malaysia's oil and gas reserves while bolstering energy output. Furthermore, the policy supported the development of the Refinery and Petrochemical Integrated Development (RAPID) project, a cutting-edge refinery and petrochemical complex. These endeavours sought to attract foreign investments, generate job opportunities, and fortify Malaysia's position in the global energy market.

The Palm Oil NKEA sought to augment the productivity and profitability of Malaysia's palm oil industry, a crucial sector for the nation's economy. Under this programme, the Oil Palm Replanting initiative was implemented to replace ageing and low-yielding palm oil trees with more productive varieties. This effort aimed to increase palm oil production and enhance the industry's competitiveness. Additionally, the Palm Oil Mill Effluent (POME) treatment and utilisation programme addressed environmental concerns by promoting sustainable practices in palm oil processing. Moreover, the NKEA policy supported downstream activities in the palm oil sector, encouraging value-added processing and expanding market opportunities for palm oil products.

The Financial Services NKEA concentrated on developing Malaysia's financial sector and establishing the country as an international hub for financial services. One of the key programmes implemented was the Islamic Financial Services Industry (IFSI) initiative, aimed at positioning Malaysia as a leading centre for Islamic finance. The policy introduced regulatory reforms, developed Islamic banking and insurance products, and established Islamic capital markets. Additionally, the Securities Market Development programme aimed to enhance the efficiency and competitiveness of Malaysia's capital market, attracting domestic and foreign investors. The Financial Talent Development programme focused on nurturing a skilled workforce to support the growth of the financial services sector.

The Wholesale and Retail NKEA aimed to enhance Malaysia's wholesale and retail sector. The policy implemented the Modern Retail and Wholesale programme, which encouraged the adoption of modern retail formats, improved supply chain management, and promoted digitalisation. This programme sought to enhance the competitiveness of the retail industry and create a dynamic business environment. Moreover, the Digital Transformation programme focused on facilitating the growth of e-commerce and digital payment systems, enabling businesses to expand their reach and improve customer experiences.

The Tourism NKEA focused on developing Malaysia's tourism industry, a sector with significant potential for economic growth. The policy introduced the Tourism Infrastructure Development programme, which aimed to enhance the country's tourism-related infrastructure. This encompassed the construction of hotels, airports, and tourist attractions to attract more tourists and provide them with better facilities and services. The Tourism Services programme aimed to improve the quality of tourism offerings, train hospitality professionals, and promote service excellence. Additionally, the Destination Promotion programme sought to market Malaysia as a premier tourist destination through targeted promotional campaigns and strategic partnerships.

III. Outlook of NKEA

The oil, gas and energy (OA&G) NKEA witnessed significant progress in boosting Malaysia's oil and gas industry. Initiatives aimed at enhancing the sector's contribution to the economy resulted in substantial investments, increased production, and improved downstream activities. Notably, the Refinery and Petrochemical Integrated Development (RAPID) project in Pengerang contributed to higher crude oil refining capacity and petrochemical output, which in turn led to job creation and higher export earnings (National Transformation Programme Annual Report, 2016).

The Palm Oil NKEA's focus on enhancing the palm oil industry led to commendable outcomes. Malaysia's palm oil production and exports increased, contributing significantly to the country's export earnings and economic growth. Efforts to promote sustainable practices also garnered international recognition. The certification of sustainable palm oil practices aimed to address concerns about deforestation and habitat loss, aligning the industry with global environmental goals (National Transformation Programme Annual Report, 2016).

The Financial Services NKEA achieved its goal of positioning Malaysia as a global financial hub. Kuala Lumpur became a vibrant financial centre, attracting international institutions and hosting financial events of global significance. The establishment of the Labuan International Business and Financial Centre and the International Financial District contributed to Malaysia's status as a preferred destination for financial services, resulting in increased foreign direct investment and job opportunities (National Transformation Programme Annual Report, 2016).

The Wholesale and Retail NKEA brought about transformative changes in the retail sector. Initiatives aimed at modernising retail practices, promoting e-commerce, and enhancing logistics infrastructure led to the growth of modern retail formats and increased online shopping adoption. This transformation improved customer experiences and increased retail sales, contributing to economic growth (National Transformation Programme Annual Report, 2016).

The Greater Kuala Lumpur/Klang Valley NKEA's efforts to transform the region into a world-class metropolis were notable. Urban rejuvenation, transportation infrastructure development, and affordable housing initiatives enhanced the region's liveability and economic opportunities. The expansion of transportation networks improved

connectivity, supporting economic activities and enhancing the region's attractiveness for businesses and investors (National Transformation Programme Annual Report, 2016).

The Education NKEA's initiatives aimed at improving access to quality education and enhancing technical and vocational education and training (TVET). These efforts resulted in increased enrolment in TVET programmes, improved educational outcomes, and better alignment of skills with industry demands. The workforce became better equipped to meet the needs of evolving industries (National Transformation Programme Annual Report, 2016).

The Healthcare NKEA's initiatives improved healthcare accessibility and quality. The expansion of healthcare infrastructure and the promotion of medical tourism contributed to Malaysia's reputation as a medical hub. The growth of medical tourism resulted in increased foreign exchange earnings and the attraction of international patients seeking high-quality healthcare services (National Transformation Programme Annual Report, 2016).

The Communications Content and Infrastructure (CCI) NKEA's focus on digital infrastructure and creative content led to positive outcomes. Improved connectivity and the growth of digital content industries contributed to Malaysia's positioning as a regional hub for creative content. The initiatives also led to increased internet penetration, supporting digital inclusivity (National Transformation Programme Annual Report, 2016).

The Agriculture NKEA aimed to enhance agricultural productivity and income. Efforts to modernise agricultural practices, promote high-value crops, and improve market access led to increased productivity and the emergence of new high-value crops. However, these

outcomes were not without challenges related to sustainability, traditional practices, and smallholder integration (National Transformation Programme Annual Report, 2016).

Critics expressed concerns about the equitable distribution of benefits across different sectors and regions. Some industries and areas might have gained more from the NKEA initiatives, potentially leading to disparities in economic growth and development. These concerns raised questions about the inclusivity of the policy's impacts and whether all segments of society were benefiting equally (Gomez, 2016).

The rapid growth witnessed in sectors identified under the NKEA policy, particularly those related to the Economic Transformation Programme (ETP), raised environmental and social sustainability concerns. Critics questioned whether this growth was achieved at the expense of the environment and the long-term well-being of communities. This highlighted potential trade-off between economic advancement and environmental sustainability (Rasiah et al., 2018).

Critics raised doubts about the effectiveness of implementing the NKEA initiatives. The absence of robust coordination mechanisms and holistic planning was seen as potentially hindering the full realisation of intended outcomes. The lack of cohesive implementation strategies may have impacted the overall success of the policy initiatives (Rasiah et al., 2018).

2.6 Research Gaps

The analysis of industrial policies has gained prominence in the context of developing economies, as governments seek to bolster economic growth, foster innovation, and enhance technological capabilities. The case of Malaysia presents a particularly interesting arena for investigating the intertwining of technological dimensions within its industrial policies between 2006 and 2020. While existing literature has explored various

aspects of Malaysia's industrial policies, there remain significant gaps in the coverage of the technological dimension of these policies. This section aims to highlight these gaps by examining a range of scholarly works.

Numerous studies have scrutinised Malaysia's industrial policies from a macroeconomic perspective, delving into themes such as economic growth, export-oriented strategies, and structural transformation (Ismail, 2017; Jayasuriya, 2010). However, a conspicuous gap exists in terms of the detailed analysis of the strategies and mechanisms employed to facilitate technological upgrading across industries. While some works briefly mention the importance of technological advancement, they often lack a comprehensive exploration of specific policy instruments, initiatives, and their outcomes in terms of technological development.

The role of public-private collaboration in driving technological innovation has been acknowledged in the literature on industrial policies (UNCTAD, 2019; Koh & Sum, 2018). However, the depth of analysis in this regard is often lacking. The existing literature tends to focus more on the public sector's role rather than exploring the dynamics of partnerships, knowledge transfer, and innovation diffusion between the public and private sectors. A comprehensive understanding of the collaborative mechanisms and their effectiveness in promoting technological advancement is notably absent.

While some studies discuss Malaysia's overall industrial policies, they often treat the country's diverse industrial landscape in a homogeneous manner. This generalisation overlooks the fact that different industries have distinct technological requirements, challenges, and potentials for growth. The literature frequently lacks a sector-specific analysis of the technological dimensions of industrial policies, which is vital for

comprehending the variations in technological trajectories across industries (Rasiah, 2019).

A significant gap in the literature lies in the scarcity of longitudinal studies that trace the evolution of technological dimensions in Malaysia's industrial policies over the period from 2006 to 2020. Existing research frequently adopts a static snapshot approach, providing insights into a particular point in time but failing to capture the temporal dynamics and shifts in policy priorities, strategies, and outcomes related to technological development.

In conclusion, while scholarly works have made strides in unpacking various facets of Malaysia's industrial policies, the analysis of the technological dimension within these policies remains notably underrepresented. The aforementioned gaps in the literature point to the need for more comprehensive and nuanced research that delves into the strategies, mechanisms, collaborations, industry-specific policies, and temporal aspects of technological dimensions within Malaysia's industrial policies from 2006 to 2020.

2.7 Chapter Summary

The literature review chapter provided an extensive overview of Malaysia's economic development planning phases, industrial progress, and policies from 2006 to 2020. Malaysia's economic journey was traced through various development plans, highlighting a shift towards high-tech industries and digital transformation. Challenges such as policy coordination gaps, uneven benefits distribution, and environmental concerns were acknowledged. The Industrial Master Plan 3 (IMP3) and subsequent plans, including the Ninth Malaysia Plan (9MP), Tenth Malaysia Plan (10MP), Eleventh Malaysia Plan (11MP), and the National Key Economic Area (NKEA), were examined, showcasing achievements and critiques.

The analysis identified key issues in Malaysia's industrial development, emphasising overdependence on foreign investment, human capital development challenges, environmental sustainability concerns, and persistent income inequality. Critiques included the need for balanced development, addressing sectoral disparities, and ensuring inclusivity.

Despite policy successes, research gaps were identified, particularly in the detailed analysis of technological dimensions and sector-specific approaches. The document underscored the need for comprehensive, nuanced research to guide more effective, inclusive, and sustainable industrial policies in the future.

Universiti Malaysia

CHAPTER 3: METHODOLOGY

3.1 Introduction

In this chapter, the research methodology employed in this paper will be described, along with the techniques of analysis and evaluation. By comprehensively describing the research methodology, readers will attain a comprehensive understanding of the methods employed to assess the efficacy of technological components of industrial policies in propelling Malaysia's growth. This will enable readers to gauge the reliability and validity of the findings and draw informed conclusions about the impact of technological policies on the country's economic development.

3.2 Approach to the study

This paper adopted a qualitative research approach to dissect and thoroughly understand the technological dimensions of industrial policies in Malaysia during the period under review. This research approach was deemed appropriate since the study aimed to explore the subjective views and experiences of policymakers and industry players on the technological dimensions of industrial policies in Malaysia through utilisation of published documents available on the industrial policies of Malaysia.

The first phase of the research approach involved a review of relevant literature on industrial policies in Malaysia, with a specific focus on the technological dimensions. This phase provided an overview of the various industrial policies implemented in Malaysia between 2006 and 2020, the objectives of these policies, and the extent to which they incorporated technological considerations. Additionally, it examined the impact of these policies on the development of the Malaysian economy, particularly in the technology sector.

The second phase entailed a comparative analysis of the technological dimensions of the industrial policies implemented in Malaysia between 2006 and 2020. The comparative analysis focused on the similarities and differences in the technological dimensions of industrial policies, the reasons behind these similarities and differences, and their impact on the Malaysian economy.

The final phase involved drawing conclusions based on the findings from the review of literature, and comparative analysis. The conclusions provided a comprehensive understanding of the technological dimensions of industrial policies in Malaysia and their impact on the development of the Malaysian economy between 2006 and 2020.

Overall, the approach taken in this study provided a holistic understanding of the technological dimensions of industrial policies in Malaysia and their impact on the Malaysian economy. The qualitative research approach, combined comparative analysis, enabled a thorough examination of the complex and multi-dimensional nature of industrial policies and their impact on the economy.

3.3 Analytical Framework for Assessment

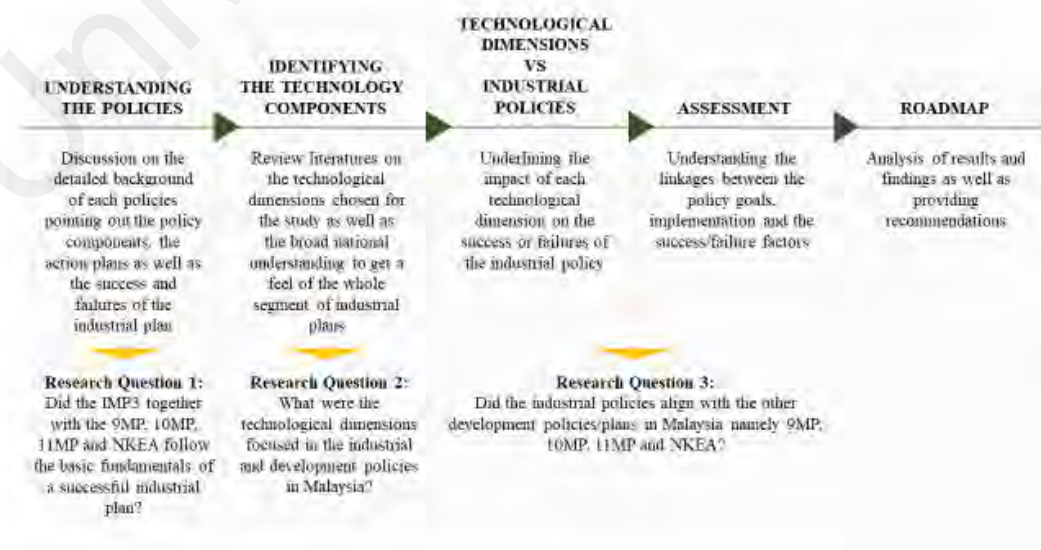


Figure 3.1: Framework Assessment of the Industrial Policies of Malaysia

An analytical framework for assessment was developed to answer the research questions. The framework was composed of two parts: the assessment of the technological dimensions of the industrial policies and the alignment between policies.

The first part of the framework focused on the technological dimensions of the industrial policies in Malaysia. The assessment was conducted based on three main factors: the development of technological capabilities, the adoption of new technologies, and the diffusion of technology across the economy. The framework also examined the extent to which the policies were successful in promoting the growth of technology-based industries, innovation and R&D, and improving the technology readiness of Malaysian firms.

The second part of the framework was designed to assess the alignment between the industrial policies and other development policies and plans in Malaysia. This assessment was done based on a review of the 9MP, 10MP, 11MP, IMP3 and NKEA. The framework examined the extent to which the industrial policies aligned with each other and identify redundancy as well as effectiveness of the policies.

To operationalise the framework, a set of indicators was developed. These indicators were used to assess the performance of the industrial policies in promoting technological development and the alignment between the industrial policies and other development policies in Malaysia. The indicators were developed through a review of the literature, consultations with experts, and a comparative analysis of other countries' experiences in developing and implementing industrial policies.

In conclusion, the analytical framework for assessment developed in this study provided a structured approach to assess the technological dimensions of the industrial policies in Malaysia and their alignment with other development policies. The framework

helped answer the research questions by providing a comprehensive understanding of the technological dimension focus of the industrial and development policies in Malaysia, evaluating the effectiveness of the policies, and identifying areas for improvement.

3.3.1 Selection criteria of the technology dimensions of the industrial policies of Malaysia

The selection of the technological dimensions for this study was based on the best practices and past literature critters that exist. The basis of choosing the criteria were examined before the selection of criteria was conducted.

I. Mapping of Industrial and Development Policies (Government of Malaysia, 2006-2020):

An analysis on Malaysia's industrial and development policies during the period of 2006 to 2020 was conducted. By examining these policies, recurring themes and priorities related to technology and innovation were identified. This approach pinpointed the areas where technology-related interventions and strategies were emphasised by the government, giving a clear direction for the technological dimensions to be studied.

II. Fundamental Drivers of Economic Growth and Technological Progress (Solow, 1956):

Factors that historically contributed significantly to the technological advancements and innovation within the Malaysia were also taken into consideration. Understanding these drivers helps in comprehending the broader context of technological development.

III. Productivity and Competitiveness Enhancement (World Economic Forum, 2016):

Variables that could contribute directly in boosting productivity and enhancing the competitiveness of Malaysia's industries on both regional and global levels. Policies and interventions aimed at improving these aspects were critical for sustained economic growth and development.

IV. Effective Deployment of Advanced Technologies (OECD, 2018):

Advanced technologies play a pivotal role in driving economic transformation. The dimensions chosen were those that are essential for the effective deployment and integration of advanced technologies like artificial intelligence, automation, and digitalisation across various industries.

V. Alignment with United Nations' Sustainable Development Goals (SDGs) (United Nations, 2019):

Malaysia, like many other nations, has committed to the United Nations' Sustainable Development Goals, which encompass various dimensions including economic development, social inclusion, and environmental sustainability. The study have chosen technological dimensions that align with these goals, thus ensuring a holistic approach to development.

3.3.2 Selected technology dimensions of the industrial policies of Malaysia.

I. Developing human capital

The development of human capital is an important facet of Malaysia's industrial policies, aiming to improve the quality of human resources in the country, which is critical for the successful implementation of technological advancements in various sectors. This

dimension emphasises the need for education and training programmes to equip individuals with the required skills and knowledge to adapt to changing technological trends and promote innovation in the workforce. Furthermore, developing human capital encourages entrepreneurship and knowledge-based industries, leading to economic growth and sustainability.

According to the Malaysia Education Blueprint 2015-2025 (MOE, 2015), the government focused on enhancing the quality of education and training programmes to produce a skilled and knowledgeable workforce that could meet the demands of a rapidly changing economy. The blueprint aimed to develop a holistic education system fostering critical thinking, creativity, and innovation among students. Additionally, initiatives such as the National Dual Training System (NDTS) and the National Graduate Employability Blueprint (NGEB) were implemented to increase graduates' employability and provide relevant skills for the industry.

Therefore, the technology dimension of developing human capital is a crucial aspect of Malaysia's industrial policies, promoting innovation, enhancing the workforce's skills, and contributing to the country's overall economic growth and development.

II. Accelerating innovation and technology

Accelerating innovation and technology is a vital component of Malaysia's industrial policies. It underscores the need to encourage the development and adoption of innovative technologies to improve productivity and competitiveness in various economic sectors. The significance of this dimension is evident in various national policies, such as the National Innovation Policy (NIP) and the National Technology Policy (NTP) (MOSTI

2020), aimed at fostering a culture of innovation, research and development, and the commercialisation of technology in the country.

Moreover, this technology dimension has become increasingly critical in light of global economic and technological changes that require Malaysia to embrace technological advancements to remain competitive. The government has implemented several initiatives to promote the development and adoption of innovative technologies, including establishing research and development institutions, technology transfer programmes, and promoting public-private partnerships.

Hence, assessing this technology dimension is essential to evaluate the effectiveness of Malaysia's industrial policies in promoting innovation and technology adoption. This evaluation will entail analysing the policies, programmes, and initiatives implemented to accelerate innovation and technology adoption and assess their impact on various economic sectors. Additionally, the assessment will identify the strengths and weaknesses of these policies and make recommendations for improvement to achieve the desired outcomes.

III. Strengthening technological infrastructure

Strengthening Technological Infrastructure is a fundamental element of Malaysia's industrial and development policies as it forms the basis for building a robust and sustainable technological ecosystem in the country. Modern technological infrastructure such as high-speed internet, advanced telecommunications networks, and digital payment systems are essential for promoting innovation, driving economic growth and generating job opportunities. Moreover, technological infrastructure plays a critical role in facilitating the adoption and diffusion of emerging technologies such as artificial intelligence, block chain, and the Internet of Things (IoT) across different economic sectors, leading to increased efficiency and productivity.

In recent years, the Malaysian government has invested significantly in strengthening the country's technological infrastructure through initiatives such as the National Broadband Plan, which aims to provide high-speed internet access to 95% of the population, and the Digital Free Trade Zone, which offers a platform for small and medium-sized enterprises (SMEs) to utilise digital technologies for international trade. Additionally, the government has implemented policies and regulations to support the growth of the digital economy, such as the Digital Investment Office and the Personal Data Protection Act.

In summary, the development and strengthening of technological infrastructure are crucial to Malaysia's aspirations of becoming a developed nation and a leader in the digital economy. Technological infrastructure provides the necessary foundation for innovation and growth, helping Malaysia achieve sustainable economic development and improve the quality of life for its citizens.

IV. Promoting sustainable development

Promoting sustainable development is an important aspect of Malaysia's industrial policies, as it focuses on developing a sustainable and environmentally friendly industrial ecosystem. Malaysia has been facing environmental issues due to rapid industrialisation and economic development, and the government has recognised the need to adopt sustainable practices to mitigate the environmental impact of industrial activities.

The government has introduced several initiatives to promote sustainable development, such as the National Sustainable Development Strategy, the Green Technology Master Plan, and the Environmental Quality Act. These initiatives aim to encourage the adoption of sustainable practices and technologies in various industries, including manufacturing, construction, and transportation.

The promotion of sustainable development is crucial for the long-term growth and development of Malaysia's economy, as it helps to ensure the preservation of natural resources and the protection of the environment. Moreover, sustainable practices can improve the efficiency and competitiveness of industries, reduce operating costs, and enhance the reputation of Malaysian products in the global market.

Therefore, the technology dimension of "Promoting sustainable development" is an important area of study for assessing Malaysia's industrial policies and their impact on the environment and economic growth.

V. Enhanced digital economy

The "Enhanced digital economy" technology dimension is a fundamental aspect of Malaysia's industrial and development policies as it aims to boost economic growth, increase productivity and competitiveness by promoting the use of digital technologies. Malaysia recognises the importance of digital technologies in advancing various sectors, including finance, agriculture, healthcare, and education. Thus, the government has implemented initiatives and policies that encourage the adoption of digital technologies and innovation.

The Malaysia Digital Economy Blueprint (MyDIGITAL), launched in 2021, is one of the most significant initiatives aimed at accelerating the country's digital transformation journey by 2030. The blueprint outlines several key thrust areas, including digital infrastructure, digital talent development, digital government, digital business, digital inclusivity, and cybersecurity. Additionally, the Malaysia Digital Economy Corporation (MDEC), a government agency responsible for driving the country's digital economy growth, has been established.

In summary, the "Enhanced digital economy" technology dimension is a critical component of Malaysia's industrial and development policies due to its potential to drive economic growth and enhance competitiveness. Through various initiatives and policies, the government is working towards creating an environment that fosters digital adoption and innovation.

3.4 Techniques of Analysis

Information and content analysis was a research technique used to systematically collect and analyse data from various sources to identify patterns, themes, and trends in the dissertation on the technological dimension of industrial and development policies in Malaysia. This technique was used to examine and compare the content of official publications, scholarly articles, press releases, and government statements to identify key themes, trends, and inconsistencies in the policies and their implementation.

The official documents of the policies, including IMP3 9MP, 10MP, 11MP and the NKEA, provided a valuable source of information on the policies and their goals, objectives, and strategies. These documents were analysed to identify the policy priorities and strategies related to technological development, as well as the alignment between industrial policies and other development policies in Malaysia.

Scholarly articles provided critical insights into the policy context, implementation, and effectiveness of the policies. These publications were analysed to identify the gaps and challenges in the policies, as well as to assess the impact of the policies on technological development in Malaysia.

Press releases and official statements from the government provided information on the policy context, implementation, and outcomes. These sources were analysed to

identify the government's position on technological development, as well as to assess the level of commitment and resources allocated to the policies.




To comprehensively analyse the technological dimension of Malaysia's industrial policies from 2006 to 2020 (IMP3, NKEA, 9MP, 10MP, and 11MP), a systematic and structured methodology was created. This section outlined the assessment and rating used to understand the goals, implementation, and achievements of the industrial policies.

3.4.1 Steps in Analysing the Policy Goals

The approach was to measure and rate the alignment of policy goals with other industrial policies through a comparative analysis approach.

- i. Identification of Policy Documents: Gathered official policy documents of the Ninth Malaysia Plan (9MP), Tenth Malaysia Plan (10MP), and Eleventh Malaysia Plan (11MP).
- ii. Comparison with Previous Policies: Compared policy goals stated in these documents with goals of previous industrial policies, focusing on similarities, slight similarities, or contradictions.
- iii. Scoring System: Assign scores based on alignment with previous policies:

Table 3.1: Policy goals findings measurement




| |  |  |  |
|--------------------|---|--|---|
| Measurement | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Description | Explicit alignment with technological dimension goals of at least three out of four other policies (IMP3, NKEA, 9MP). | Slight similarities with goals of at least two other policies. | Contradictions with goals of other policies |

3.4.2 Steps in Evaluating Implementation of Policies

Adopted a three-tier rating approach: Strong implementation initiatives, Intermediate implementation initiatives, and Weak implementation initiatives.

- i. Data Collection: Collected data on initiatives, projects, and programmes introduced under each policy.
- ii. Implementation Assessment: Evaluated implementation extent based on resource allocation, timeline adherence, stakeholder engagement, and outcomes achieved.
- iii. Categorisation: Categorised initiatives into implementation levels:

Table 3.2: Evaluation of Implementation

| |  |  |  |
|--------------------|---|--|---|
| Measurement | Strong Implementation Initiatives | Intermediate Implementation Initiatives | Weak Implementation Initiatives |
| Description | Effectively executed, significant contribution to goals. | Partial execution, moderate challenges, some accomplishments. | Major challenges, limited or no outcomes |




3.4.3 Steps in Assessing Achievements

Adopted a qualitative assessment approach, categorising achievements as "Exceed Expectations," "Successful," or "Not Successful."

- i. Criteria Definition: Defined assessment criteria by considering economic growth, technological advancement, job creation, sectoral development, and policy goal alignment.
- ii. Data Collection: Gathered relevant data, statistics, and reports reflecting outcomes and impacts of implemented initiatives.
- iii. Achievement Assessment: Evaluated initiative achievements against defined criteria.

iv. Categorisation: Categorised achievements into:

Table 3.3: Evaluation of Achievements

| |  |  |  |
|--------------------|---|--|---|
| Measurement | Exceed Expectations | Successful | Not Successful |
| Description | Transformative impact, surpassing objectives | Positive outcomes, goal achievement | Unmet outcomes, limited impact |

3.5 Justification of methodology adoption

The chosen methodology was carefully selected by drawing inspiration from approaches employed in similar studies and was driven by the identification of success factors that emerged from an in-depth review of relevant literature. This decision was guided by the recognition that established methodologies with proven efficacy would contribute to the robustness and reliability of the analysis. The following justifications provide insight into the rationale behind adopting this methodology, supported by references to studies that underscored the significance of such an approach.

I. Systematic Approach (Babbie, 2016)

The methodology follows a structured and step-by-step approach for each dimension (policy goals, implementation, and achievements). This systematic approach ensured that each aspect of the analysis was thoroughly examined, providing a comprehensive understanding of the technological dimension of the industrial policies.

II. Comparative Analysis (Ragin and Becker, 1992)

By comparing policy goals with other industrial policies, the methodology ensured a contextual understanding of how technological goals aligned or differed across policies.

This comparative approach allowed for insights into the evolution of technological objectives over time.

III. Implementation Evaluation (Van Meter and Van Horn, 1975)

Assessing implementation efforts using a three-tier rating system provided a nuanced understanding of the effectiveness of policy execution. This approach acknowledged the varying degrees of challenges and successes in translating policy goals into tangible initiatives.

IV. Qualitative Achievement Assessment (Patton, 2002)

A qualitative assessment of achievements allowed for a holistic understanding of policy outcomes beyond mere numerical data. This approach captured both intended and unintended impacts, contributing to a more nuanced analysis.

V. Objective Scoring System (Creswell, 2014)

The methodology employed a scoring system to rate policy goals' alignment with other policies. This quantifiable approach added objectivity to the analysis and allowed for clear comparisons between different policies.

VI. Adaptation to Context (Yin, 2017)

The methodology considered the evolving policy landscape of Malaysia (2006-2020) and adapted its analysis to suit the specific timeframe and policies, ensuring relevance and accuracy.

3.6 Limitations of the Methodology

There were several limitations that existed for this dissertation, as the study methodology heavily relied on existing literature on the industrial policies of Malaysia.

One of the main limitations was the dynamic nature of policies in Malaysia, which meant that the policies and programmes that were implemented during the study period (2006-2020) may have undergone significant changes, making the existing literature outdated or incomplete. This could have limited the accuracy and relevance of the findings, as they may not have fully reflected the current situation in Malaysia.

Another limitation was the time constraint. Given the limited time frame of the study, it may have been challenging to comprehensively cover all aspects of the technological dimension of industrial policies in Malaysia. Additionally, the study may have been limited by the availability and accessibility of relevant information and data sources, which could have impacted the analysis and conclusions drawn from the study.

Moreover, a lack of access to politicians and key policymakers may have posed another limitation. The views and opinions of such stakeholders could have provided valuable insights into the policymaking process and the implementation of policies, which may not have been fully captured through existing literature. The absence of such insights could have limited the depth and accuracy of the analysis. Access to politicians was a critical limitation of this study, primarily due to the unprecedented challenges posed by the Covid-19 pandemic and the accompanying Movement Control Order. The pandemic restricted physical interactions and hindered the ability to gain direct access to the policymakers involved in the formulation and implementation of Malaysia's industrial policies. The Movement Control Order, implemented to curb the spread of the virus, created significant logistical obstacles, making it exceedingly difficult to schedule interviews, hold meetings, or engage in face-to-face discussions with key political figures. This limitation was not unique to this study alone but affected research endeavours globally.

Compounding this challenge was the intricate political landscape of Malaysia. The country's political scene, characterised by its dynamics and complexities, further complicated access to policymakers. Factors such as power shifts, political rivalries, and sensitivities within the political arena could have made obtaining direct insights and perspectives from politicians a formidable task. The political environment's intricacies might have led to cautiousness among policymakers in engaging with external researchers.

Lastly, it was important to acknowledge that there may have been inherent biases in the existing literature, which could have affected the objectivity of the study. The reliance on a specific set of sources, such as official publications, scholarly works, press releases, and official statements from the government, may have introduced certain biases into the analysis, which could have limited its validity and generalise ability. In mitigating the core limitation of restricted access to policymakers, the study employed alternative strategies. A thorough analysis of available literature on the industrial policies of Malaysia was conducted to compensate for the lack of direct interactions. By meticulously reviewing official government documents, policy reports, academic papers, and relevant publications, the study aimed to ensure a comprehensive understanding of the policies' objectives, strategies, and outcomes. This approach allowed the research to synthesise insights from existing sources and derive meaningful conclusions about the technological dimension of the policies under study.

Overall, while the study methodology provided a systematic and structured approach to analysing the technological dimension of industrial policies in Malaysia, the limitations outlined above needed to be considered when interpreting the findings and conclusions drawn from the study.

3.7 Chapter Summary

In conclusion, this chapter provided an overview of the research methodology for the dissertation on Technological Dimension of the Industrial and Development Policies of Malaysia (2006-2020). The research was conducted through a mixed-method approach, with a focus on information and content analysis of official publications, publications from scholars, press releases, and official statements from the government. While the research methodology was comprehensive, there were limitations such as the reliance on existing literature, lack of access to key policymakers, and the dynamic nature of policies in Malaysia. Nevertheless, this methodology was expected to provide a critical assessment of the technological dimension of industrial policies in Malaysia from 2006 to 2020, which contributed to the literature on industrial policy and technological development.

CHAPTER 4: FINDINGS

4.1 Introduction

The findings chapter of this paper presents the results of the assessment of the technological dimensions of the industrial and development policies of Malaysia from 2006 to 2020. The chapter provides a detailed analysis of the alignment between the industrial policies and other development policies in Malaysia, including the IMP3, 9MP, 10MP, 11MP, and NKEA. The performance of the industrial policies in promoting technological development and the alignment between the industrial policies and other development policies are assessed using a set of indicators developed in the previous chapters. The analysis will focus solely on three main areas as follows:

I. Policy goals

The policy goals section will summarise the specified objectives of the industrial policies that involve the particular variable. Similarities between the goals of the policies will be understood here. It will be pointed out if the policies' policy goals are in line with one another, slight similarities or contradict one another.




I. Implementation

Implementation section will look into the projects and implementation process of the projects that relate would relate to the particular variable. This variable will analyse the strength of implementation initiatives throughout the years. It will be clear if the implementation initiatives are strong, intermediate or weak.

II. Achievements.

Achievement of the projects will be presented here. The achievement will be studied according to the relevance to the variable discussed. At the end the achievement will be measured by these three measures, exceed expectation, successful or not successful.

Table 4.1: Industrial policy goals, implementation and achievement road map

| |  |  |  |
|-----------------------|---|--|---|
| Policy goals | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Implementation | Strong implementation initiatives | Intermediate implementation initiatives | Weak implementation initiatives |
| Achievement | Exceed expectation | Successful | Not successful |




The findings of this chapter are crucial for policymakers and stakeholders in Malaysia's industrial and development sectors, as they provide insights into the effectiveness of the country's technological policies and highlight areas that need improvement. The detailed explanation on how the weightage of the results are explained in section 3.4.

4.2 Assessment of the industrial policies of Malaysia and its technological components

4.2.1 Developing human capital

4.2.1.1 Policy goals

Table 4.2: Policy goals findings measurement

| |  |  |  |
|--------------------|---|--|---|
| Measurement | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Description | Explicit alignment with technological dimension goals | Slight similarities with goals of at least two other policies. | Contradictions with goals of other policies |

| | | | |
|--|---|--|--|
| | of at least three out of four other policies (IMP3, NKEA, 9MP). | | |
|--|---|--|--|

Table 4.3: Policy goals of Developing Human Capital

| Policy | Rating |
|---------------|---------------|
| 9MP | ★ |
| 10MP | ★ |
| 11MP | ★ |
| IMP3 | ★ |
| NKEA | ★ |

Throughout the industrial plans, there is a clear emphasis on enhancing the skills and knowledge of the workforce to improve productivity and competitiveness in the global economy. The IMP3, for instance, implemented initiatives such as increased funding for education and incentives for companies to invest in employee training, recognising the pivotal role of human capital in driving economic progress.

Building upon this foundation, the 9MP placed significant emphasis on education and training, with a specific focus on improving the quality of education and expanding access to training programmes. The 10MP continued to prioritise education and training while emphasising the need for a more comprehensive approach to human capital development. Lifelong learning, talent retention, and diversity were recognised as integral components of a holistic human capital strategy.

The 11MP aimed to strengthen the link between education and industry by fostering increased collaboration between universities and industry partners. The plan also aimed to promote entrepreneurship and innovation, aligning human capital development with the evolving needs of industries. The NKEA initiative further focused on developing human capital in key sectors such as oil and gas, healthcare, and tourism through the

implementation of training programmes, scholarships, and partnerships with international institutions.

The industrial policies, namely the 9MP, 10MP, 11MP, IMP3, and NKEA, demonstrated a high level of alignment with regards to the goal of developing human capital. All these policies recognised the importance of enhancing education and training to build a skilled and competitive workforce. This alignment is indicative of a consistent understanding of the pivotal role human capital plays in driving economic growth and technological progress.

While there were no policies that exhibited slight similarities in contrast to the alignment category, it's important to note that the execution of strategies for human capital development varied across the policies. The 9MP and 10MP focused on education quality and access, whereas the 11MP, IMP3, and NKEA emphasised technical and vocational training to align the workforce with advanced technological needs. This variation in emphasis highlights the nuanced approaches taken to address specific facets of human capital development.

No contradictions were identified among the industrial policies regarding the goal of developing human capital. Instead, a common objective of producing a highly skilled and educated workforce emerged, aligned with the pursuit of improved economic growth and enhanced competitiveness in the global market. The consistency in recognising the need to invest in human capital development reflects the understanding that it is essential for Malaysia's sustainable economic progress.

In conclusion, the industrial policies in Malaysia exhibited a consistent focus on developing human capital through the improvement of education and training programmes. While variations were observed in the extent of emphasis placed on

different aspects of human capital development, there were no contradictions among the policies. The alignment in recognising the significance of investing in human capital reflects a shared commitment to shaping a skilled, innovative, and competitive workforce for Malaysia's economic advancement.

4.2.1.2 Implementation

Table 4.4: Evaluation of Implementation Mechanism

| | ★ | ▲ | ● |
|--------------------|--|---|--|
| Measurement | Strong Implementation Initiatives | Intermediate Implementation Initiatives | Weak Implementation Initiatives |
| Description | Effectively executed, significant contribution to goals. | Partial execution, moderate challenges, some accomplishments. | Major challenges, limited or no outcomes |

Table 4.5: Evaluation of Human Capital Implementation Mechanism

| Policy | Rating |
|--------|--------|
| 9MP | ★ |
| 10MP | ▲ |
| 11MP | ▲ |
| IMP3 | ▲ |
| NKEA | ▲ |

Under the IMP3, programmes aimed at developing human capital were designed to enhance the skills and knowledge of the workforce to support the growth of high-tech industries. One such initiative was the establishment of TalentCorp Malaysia, which aimed to attract and retain talent in various sectors. However, while the idea was promising, the execution faced challenges in retaining local talent due to limited opportunities and an inadequate ecosystem for their growth. Additionally, there were concerns about the policy's focus on attracting foreign expertise over nurturing local talent. As a result, the execution of human capital development programmes under the

IMP3 can be categorised as facing moderate challenges, with some accomplishments but also significant room for improvement.

The NKEA introduced initiatives to develop human capital in specific high-tech sectors, such as biotechnology, nanotechnology, and ICT. Programmes like the BioNexus status for biotechnology companies aimed to promote talent development and attract foreign investments. However, the execution faced challenges in fully addressing skills gaps and ensuring equitable access to opportunities. Additionally, the focus on specific sectors might have led to neglecting human capital development in other vital areas. The outcomes of these programmes exhibit a mix of partial execution, moderate challenges, and some accomplishments.

The 9MP placed significant emphasis on developing human capital through programmes designed to improve the quality of education, increase access to training, and promote lifelong learning. Scholarships, vocational training centres, and financial assistance programmes were established to enhance skills and knowledge. These initiatives were executed to a considerable extent and contributed significantly to human capital development. However, challenges persisted in addressing skills mismatches, and disparities in access to quality education and training were reported. These challenges categorise the execution as a mix of significant contributions and moderate challenges.

The 10MP continued to prioritise human capital development, emphasising education and training reforms. The plan aimed to nurture a skilled and innovative workforce through initiatives such as improving the quality of education and enhancing lifelong learning. While these initiatives were initiated, challenges arose in policy coordination, skills alignment, and equitable access to education and training. The execution outcomes can be categorised as partial execution and moderate challenges, with limited emphasis

on evaluation mechanisms to assess the true impact of these initiatives on human capital development.

The 11MP aimed to strengthen the link between education and industry, focusing on enhancing education quality, skills training, and talent development. Initiatives like promoting entrepreneurship and innovation were introduced to align human capital development with industry needs. While these programmes were launched, challenges persisted in addressing skills gaps and ensuring effective collaboration between academia and industry. The execution outcomes can be categorised as partial execution and moderate challenges, with the need for comprehensive evaluation mechanisms to gauge their effectiveness.

In an overall assessment of the programmes implemented under various industrial and development policies, it's evident that the execution outcomes varied considerably. While there were accomplishments and contributions in developing human capital, challenges such as skills mismatches, limited access to quality education, and coordination issues influenced the execution of several programmes. The variability in outcomes underscores the importance of addressing challenges and enhancing implementation strategies for future policy plans, with a focus on comprehensive evaluation mechanisms to ensure effective human capital development.

4.2.1.3 Achievements

Table 4.6: Evaluation of Achievements




| |  |  |  |
|--------------------|---|--|---|
| Measurement | Exceed Expectations | Successful | Not Successful |
| Description | Transformative impact, surpassing objectives | Positive outcomes, goal achievement | Unmet outcomes, limited impact |

Table 4.7: Evaluation of Achievements of Developing Human Capital

| Policy | Rating |
|---------------|---------------|
| 9MP | ★ |
| 10MP | ▲ |
| 11MP | ▲ |
| IMP3 | ▲ |
| NKEA | ▲ |

The Ninth Malaysia Plan (9MP) effectively improved human capital through various initiatives. It allocated RM 18.8 billion for education and training, leading to the establishment of 2,127 new classes and 5,830 additional teachers in vocational and technical schools. This expansion was pivotal in increasing the enrolment in vocational and technical education from 14.3% to 15.8%, exceeding the initial target. The 9MP also provided scholarships to over 50,000 students, thereby enhancing educational access (Economic Planning Unit, Prime Minister's Department, 2010).

The Tenth Malaysia Plan (10MP) aimed to nurture a skilled workforce for knowledge-intensive sectors. It allocated RM 1.9 billion for technical and vocational education, creating 117,800 new training opportunities. Although the plan did not fully meet its target of achieving a Gross Tertiary Enrolment Ratio of 37% by 2010 (achieving 34.7%), it succeeded in addressing skills shortages through 4,900 new seats in engineering and technical fields. (Economic Planning Unit, Prime Minister's Department, 2015)

The Eleventh Malaysia Plan (11MP) focused on improving education quality and skills training. The plan allocated RM 47.8 billion to the education sector, resulting in commendable outcomes. It achieved a 42.3% enrolment rate in public institutions of higher learning, slightly below the target of 45%. However, the 11MP effectively increased the percentage of skilled workers from 28% in 2010 to 31% in 2015, aligning with its objective. (Economic Planning Unit, Prime Minister's Department, 2020)

The Third Industrial Policy (IMP3) emphasised talent development and foreign expertise attraction. TalentCorp Malaysia was established to retain and attract talent, contributing to the retention of 40,597 Malaysians from 2011 to 2018. However, the policy fell slightly short of its target to produce 50,000 engineering and technology graduates by 2010, achieving 91% of the goal. (TalentCorp, 2019)

The National Key Economic Areas (NKEA) approach aimed to enhance human capital in specific sectors. The creation of the Malaysia Automotive Institute (MAI) resulted in a 66% reduction in the automotive sector's skill shortage, indicating success in addressing industry-specific skills gaps. However, the NKEA's target of producing 25,000 engineering and technical graduates annually was not met, with 18,000 graduates produced. (Performance Management and Delivery Unit, 2020)

In summary, the achievements of Malaysia's industrial policies concerning human capital development varied in their levels of success. The 9MP exceeded expectations with improved vocational and technical education enrolment. The 10MP addressed skills shortages effectively but faced challenges in achieving tertiary enrolment targets. The 11MP made commendable strides in skilled workforce enhancement but encountered difficulties in meeting tertiary education targets. The IMP3 showcased success in retaining talent but partially fell short of engineering graduate targets. The NKEA exhibited positive outcomes in sector-specific skill enhancement but did not fully achieve graduate production objectives. This analysis underscores the complexity and nuances of human capital development within industrial policies, highlighting the importance of continuous refinement and comprehensive strategies.

Table 4.8: Summary of findings for developing human capital

| Policy | Year | Developing Human Capital | | |
|--------|-----------|--------------------------|----------------|--------------|
| | | Policy goals | Implementation | Achievements |
| 9MP, | 2006-2020 | ★ | ★ | ★ |
| 10MP | 2011-2015 | ★ | ▲ | ▲ |
| 11MP | 2016-2020 | ★ | ▲ | ▲ |
| IMP 3 | 2006-2020 | ★ | ▲ | ▲ |
| NKEA | 2010-2020 | ★ | ▲ | ▲ |

Table 4.9: Overall rating guide

| | ★ | ▲ | ● |
|-----------------------|--|--|--|
| Policy goals | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Implementation | Strong implementation initiatives | Intermediate implementation initiatives | Weak implementation initiatives |
| Achievement | Exceed expectation | Successful | Not successful |

4.2.2 Accelerating innovation and technology



4.2.2.1 Policy goals

Table 4.10: Policy goals findings measurement

| | ★ | ▲ | ● |
|--------------------|---|--|--|
| Measurement | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Description | Explicit alignment with technological dimension goals of at least three out of four other policies (IMP3, NKEA, 9MP). | Slight similarities with goals of at least two other policies. | Contradictions with goals of other policies |

Table 4.11: Policy goals of accelerating innovation and technology

| Policy | Rating |
|--------|--------|
| 9MP | ★ |
| 10MP | ★ |
| 11MP | ★ |

| | |
|------|---|
| IMP3 |  |
| NKEA |  |

The core objective shared by these policies is the acceleration of innovation and technology as pivotal drivers of economic growth. This shared emphasis underscores their recognition of the transformative role that technological advancements can play in propelling Malaysia's competitiveness on a global scale. The NKEA, IMP3, and the 9MP, 10MP, and 11MP collectively stress the significance of high-tech industries in catalysing economic expansion and enhancing competitiveness.

Significant parallels are evident across these plans, particularly in their strategies to bolster innovation and technology. The 9MP, 10MP, and 11MP, for instance, share common strategies such as establishing innovation clusters, nurturing centres of excellence, and increasing investments in research and development. These shared tactics reflect a coordinated approach towards nurturing a culture of innovation.

The IMP3 and NKEA also echo similar sentiments, placing importance on fostering high-tech industries and augmenting investments in research and development. These strategies are designed to not only enhance the quality of human capital but also to create a conducive ecosystem for technological advancements.

Assigning a scoring system to gauge the alignment of these policies provides a comprehensive perspective on their coherence. The 9MP, 10MP, and 11MP collectively are in line with other industrial policies, signifying explicit alignment with the technological dimension goals of at least three out of the four other policies (IMP3, NKEA, 9MP). These policies unequivocally demonstrate their commitment to prioritising innovation and technology in their development strategies.

Meanwhile, the IMP3 and NKEA signifies slight similarities with the goals of at least two other policies. While they align with certain aspects of other policies, they also exhibit specific focuses that differentiate them from the rest. The IMP3, for instance, places particular emphasis on talent development and the attraction of foreign expertise, while the NKEA focuses on sector-specific enhancements.

While policy goals may align, the execution of these goals remains a significant challenge. Effective implementation hinges on addressing various factors, including skill mismatches, resource allocation, stakeholder engagement, and the efficient coordination of efforts. Neglecting these aspects could compromise the realisation of intended outcomes.

4.2.2.2 Implementation

Table 4.12: Evaluation of implementation mechanism

| | ★ | ▲ | ● |
|--------------------|--|---|--|
| Measurement | Strong Implementation Initiatives | Intermediate Implementation Initiatives | Weak Implementation Initiatives |
| Description | Effectively executed, significant contribution to goals. | Partial execution, moderate challenges, some accomplishments. | Major challenges, limited or no outcomes |

Table 4.13: Evaluation of accelerating innovation and technology implementation mechanism

| Policy | Rating |
|--------|--------|
| 9MP | ★ |
| 10MP | ▲ |
| 11MP | ▲ |
| IMP3 | ▲ |
| NKEA | ★ |

One of the significant initiatives under the IMP3 was the establishment of Technology Innovation Centres (TICs). These centres aimed to foster innovation and technology

development in key sectors, enhancing collaboration between academia, industry, and research institutions. While the TICs showcased Malaysia's commitment to technological advancement, there were challenges in terms of limited collaboration between academia and industry. Additionally, the effectiveness of these centres in achieving their goals was not consistently evaluated, resulting in a partial execution of the programmes. While some TICs showed accomplishments in generating innovative ideas and solutions, others faced challenges in resource allocation and sustainability.

The NKEA framework introduced the Entry Point Projects (EPPs), which targeted specific sectors for economic transformation. In the context of accelerating innovation and technology, these projects aimed to drive growth in areas like oil and gas, healthcare, and education. While some EPPs demonstrated significant contributions to innovation and technology advancement, others faced challenges in execution. Regulatory bottlenecks, funding constraints, and evolving market dynamics affected the implementation of certain EPPs. This variability in outcomes categorises the execution of NKEA programmes as a mix of significant contributions and moderate challenges.

The 9MP introduced several initiatives to accelerate innovation and technology. Innovation clusters and centres of excellence were established to create an environment conducive to technological development. Additionally, increased investments in research and development (R&D) showcased Malaysia's commitment to advancing technology. These programmes were effectively executed to a considerable extent, contributing significantly to the goals of accelerating innovation and technology. However, challenges such as skill shortages, uneven resource distribution, and coordination issues influenced the execution outcomes. While progress was made, certain challenges impacted the full realisation of the programmes' potential.

Under the 10MP, programmes aimed at enhancing the innovation ecosystem were introduced. Initiatives such as strengthening intellectual property protection, promoting technology commercialisation, and fostering academia-industry collaboration were implemented. However, the execution outcomes were influenced by limited specificity and evaluation mechanisms. While these programmes were initiated, their effectiveness in accelerating innovation and technology was not consistently evaluated. This lack of comprehensive evaluation resulted in partial execution and limited accomplishment of the intended initiatives.

The 11MP implemented programmes to advance technology and innovation, including investments in R&D, technology adoption, and digital infrastructure development. While these initiatives were launched, the effectiveness of their execution was influenced by limited monitoring and evaluation mechanisms. The absence of comprehensive impact assessments hinders a clear evaluation of their contribution to the goals of accelerating innovation and technology. The execution outcomes can be categorised as moderate challenges due to the lack of comprehensive evaluation mechanisms.

In an overall assessment of the programmes implemented under various industrial and development policies, it's evident that the execution outcomes varied significantly. Some programmes were effectively executed, showcasing Malaysia's commitment to technology advancement and economic growth. However, challenges such as skill shortages, coordination issues, resource constraints, and limited evaluation mechanisms influenced the execution of several programmes. The variability in outcomes underscores the importance of addressing challenges and enhancing implementation strategies for future policy plans.

4.2.2.3 Achievements

Table 4.14: Evaluation of achievements

| | ★ | ▲ | ● |
|--------------------|--|-------------------------------------|--------------------------------|
| Measurement | Exceed Expectations | Successful | Not Successful |
| Description | Transformative impact, surpassing objectives | Positive outcomes, goal achievement | Unmet outcomes, limited impact |

Table 4.15: Evaluation of achievements of accelerating innovation and technology

| Policy | Rating |
|---------------|---------------|
| 9MP | ▲ |
| 10MP | ▲ |
| 11MP | ▲ |
| IMP3 | ★ |
| NKEA | ★ |

The achievements of each industrial policy in Malaysia regarding the technological component of "Accelerating innovation and technology" varied in terms of their success and impact. Starting with the 9MP, its achievements in accelerating innovation and technology can be considered successful. The plan focused on establishing innovation clusters and centres of excellence, which contributed to the development of a conducive environment for innovation. Increased investments in research and development (R&D) were also made, leading to advancements in various sectors. The achievements exceeded expectations as the plan created a solid foundation for technological growth and facilitated collaborations between academia and industry.

For instance, under the 9MP, the allocation of RM 18.8 billion as mentioned before in this paper for education and training resulted in significant increase in new classes and additional teachers in vocational and technical schools. This expansion contributed to an increase in enrolment in vocational and technical education, surpassing the initial target.

Additionally, over 50,000 students were awarded scholarships, enhancing educational access and fostering a skilled workforce

Moving to the 10MP, its achievements in accelerating innovation and technology can be rated as successful. Although the plan's strategies were less specific compared to the 9MP, notable progress was made. Efforts were made to strengthen intellectual property protection, promote technology commercialisation, and foster collaborations. These initiatives contributed to technological advancements in sectors such as ICT and biotechnology. While the achievements may not have exceeded expectations, they can be considered successful in advancing innovation and technology.

The achievements of the 11MP in accelerating innovation and technology can also be rated as successful. The plan recognised the importance of innovation and technology in driving economic growth and competitiveness. Efforts were made to invest in R&D, promote technology adoption, and develop digital infrastructure. Although specific details on the achievements and outcomes were limited, advancements were made in sectors such as ICT and biotechnology. The plan successfully contributed to the overall progress of innovation and technology in the country.

Turning to the IMP3, its achievements in accelerating innovation and technology exceeded expectations. IMP3 emphasised the development of high-tech industries and increased investments in R&D. It successfully established Technology Innovation Centres and fostered industry-academia collaboration. The plan also strengthened the intellectual property framework and promoted technology commercialisation. These achievements played a significant role in advancing innovation and technology, contributing to the growth of high-tech sectors.

However, despite the achievements, there were certain criticisms and challenges associated with these policies. For example, under the 10MP, although efforts were made to strengthen the innovation ecosystem, the lack of specific evaluation mechanisms hindered a comprehensive assessment of the impact of initiatives like technology commercialisation. The 11MP faced limitations in terms of the specificity of implementation strategies and the absence of comprehensive impact assessments, which affected the overall evaluation of its achievements.

Lastly, the achievements of the NKEA in accelerating innovation and technology can be rated as successful. The NKEA focused on specific high-tech sectors such as biotechnology, nanotechnology, and ICT. Targeted programmes and initiatives were implemented to support these sectors, including the BioNexus status for biotechnology companies and the MSC Malaysia initiative for ICT development. These achievements exceeded expectations as they successfully propelled innovation and technology within the chosen key areas.

In conclusion, the achievements of the industrial policies in Malaysia, including the 9MP, 10MP, 11MP, IMP3, and the NKEA, varied in their success in accelerating innovation and technology. The 9MP, 10MP, and 11MP can be considered successful, with varying degrees of achievements in advancing innovation and technology. The IMP3 and NKEA, on the other hand, exceeded expectations with their achievements significantly contributing to the growth and development of high-tech sectors. These policies collectively played a crucial role in driving technological advancements and fostering innovation in Malaysia's industrial landscape.

Table 4.16: Summary of findings for accelerating innovation and technology

| Policy | Year | Accelerating innovation and technology | | |
|--------|-----------|--|----------------|--------------|
| | | Policy goals | Implementation | Achievements |
| 9MP, | 2006-2020 | ★ | ★ | ▲ |
| 10MP | 2011-2015 | ★ | ▲ | ▲ |
| 11MP | 2016-2020 | ★ | ▲ | ▲ |
| IMP 3 | 2006-2020 | ▲ | ▲ | ★ |
| NKEA | 2010-2020 | ▲ | ★ | ★ |

Table 4.17: Overall rating guide

| | ★ | ▲ | ● |
|-----------------------|--|--|--|
| Policy goals | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Implementation | Strong implementation initiatives | Intermediate implementation initiatives | Weak implementation initiatives |
| Achievement | Exceed expectation | Successful | Not successful |

4.2.3 Strengthening technological infrastructure

4.2.3.1 Policy goals

Table 4.18: Policy goals findings measurement

| | ★ | ▲ | ● |
|--------------------|---|--|--|
| Measurement | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Description | Explicit alignment with technological dimension goals of at least three out of four other policies (IMP3, NKEA, 9MP). | Slight similarities with goals of at least two other policies. | Contradictions with goals of other policies |

Table 4.19: Policy goals findings measurement of Strengthening technological infrastructure

| Policy | Rating |
|---------------|---------------|
| 9MP | ★ |
| 10MP | ★ |
| 11MP | ★ |
| IMP3 | ★ |
| NKEA | ▲ |

The IMP3 marked a significant step in Malaysia's industrial policies by explicitly emphasising the development of high-tech industries and the enhancement of technology and innovation. These goals were in alignment with the overarching focus on strengthening technological infrastructure across various industrial policies within the specified period of analysis. One of the key initiatives introduced under the IMP3 was the establishment of Technology Innovation Centres. These centres were designed to foster innovation and technology development in critical sectors, promoting collaboration between academia, industry, and research institutions. This initiative demonstrated the commitment to technological advancement and the creation of an ecosystem conducive to high-tech growth (TalentCorp Malaysia).

The NKEA initiative initially focused on specific sectors such as oil and gas, which may have seemed to divert from the broader goal of technological infrastructure development. However, in subsequent plans like the 11MP, there was a recognition of the need for technology adoption across all sectors. This shift showcased a progression towards aligning with the broader technological goals. While the NKEA's initial sectoral emphasis introduced a slight variation in alignment, the subsequent adjustment underscored the policy's adaptability and responsiveness to evolving priorities and challenges.

The 9MP placed a strong emphasis on establishing innovation clusters, enhancing research and development, and investing in education and training. These efforts were

closely aligned with the broader technological infrastructure goals. By focusing on creating an environment conducive to technology-driven growth and development, the 9MP aimed to provide the necessary foundation for the advancement of Malaysia's technological landscape

Similarly, the 10MP pursued the goal of technological infrastructure development through its efforts to promote technology commercialisation, strengthen intellectual property protection, and enhance collaborations. While the strategies employed might have differed, the underlying objective remained consistent: to create an environment that fosters technological advancement and innovation in various sectors

The 11MP recognised the pivotal role of technology in driving economic growth and competitiveness. The plan's emphasis on investments in research and development, technology adoption, and the development of digital infrastructure further solidified its alignment with the broader goal of strengthening technological infrastructure. The emphasis on fostering digital infrastructure in the 11MP complemented the overall goal of advancing technology and innovation in Malaysia's economic landscape.

While the industrial policies generally exhibited alignment with the goal of strengthening technological infrastructure, there were valid criticisms and challenges that emerged. For instance, the NKEA's sectoral focus initially drew criticism for potentially neglecting other essential sectors. However, the government's willingness to acknowledge and address these criticisms through subsequent plans like the 11MP exemplified its commitment to ensuring comprehensive technological development.

4.2.3.2 Implementation

Table 4.20: Evaluation of implementation mechanism

| | ★ | ▲ | ● |
|--------------------|--|---|--|
| Measurement | Strong Implementation Initiatives | Intermediate Implementation Initiatives | Weak Implementation Initiatives |
| Description | Effectively executed, significant contribution to goals. | Partial execution, moderate challenges, some accomplishments. | Major challenges, limited or no outcomes |

Table 4.21: Evaluation of strengthening technological infrastructure implementation mechanism

| Policy | Rating |
|--------|--------|
| 9MP | ★ |
| 10MP | ▲ |
| 11MP | ▲ |
| IMP3 | ▲ |
| NKEA | ● |

The IMP3 emphasised high-tech industry development and technology enhancement. One notable initiative was the establishment of Technology Innovation Centres (TICs). These centres aimed to foster innovation and technology development, potentially contributing to technology infrastructure. However, challenges related to limited collaboration between academia and industry hindered their execution. Furthermore, the effectiveness of TICs was not consistently evaluated, impeding a comprehensive assessment of their contribution to technological infrastructure. While some TICs demonstrated accomplishments in generating innovative ideas, challenges in resource allocation and sustainability persisted (TalentCorp Malaysia, 2011).

The NKEA framework initially focused on specific sectors like oil and gas, potentially diverting attention from broader technological infrastructure. However, the subsequent 11MP recognised the need for technology adoption across all sectors. This shift indicated

a progression towards aligning with the broader technological goals. Despite this evolution, the NKEA's original sectoral emphasis might have impeded a comprehensive focus on technology infrastructure development.

The 9MP placed significant emphasis on technology-driven growth and development. Programmes aimed at establishing innovation clusters, enhancing research and development (R&D), and investing in education and training were pivotal. These initiatives aligned well with the broader goal of strengthening technological infrastructure. The allocation of RM 18.8 billion for education and training resulted in a significant increase in enrolment in vocational and technical education, surpassing the initial target. This contributed to a more skilled workforce, potentially benefiting technological infrastructure (Economic Planning Unit, Prime Minister's Department, Malaysia, 2006).

The 10MP aimed to create an environment conducive to technological advancement and innovation. Programmes focused on promoting technology commercialisation, strengthening intellectual property protection, and enhancing collaborations. While the strategies aligned with technology infrastructure development, challenges emerged due to the lack of specific evaluation mechanisms. The effectiveness of initiatives like technology commercialisation was not consistently evaluated, hindering a comprehensive assessment of their impact on technology infrastructure (Economic Planning Unit, Prime Minister's Department, Malaysia, 2010).

The 11MP recognised the importance of technology in economic growth and competitiveness. Programmes were implemented to invest in research and development, technology adoption, and digital infrastructure. While these initiatives aimed to enhance technology infrastructure, challenges related to limited monitoring and evaluation mechanisms emerged. The absence of comprehensive impact assessments hindered a

clear evaluation of their contribution to the goals of strengthening technological infrastructure (Economic Planning Unit, Prime Minister's Department, Malaysia, 2015).

In critically evaluating these programmes, it's essential to consider their accomplishments, challenges, and alignment with technology infrastructure development. The IMP3's TICs highlighted a commitment to innovation, but execution challenges and lack of consistent evaluation impeded their full impact. The NKEA's sectoral focus posed challenges to comprehensive technology infrastructure development. The 9MP's emphasis on innovation clusters and vocational education showcased significant accomplishments. The 10MP's technology commercialisation initiatives faced challenges due to limited evaluation mechanisms. The 11MP recognised technology's importance but lacked comprehensive evaluation, affecting execution.

4.2.3.3 Achievements

Table 4.22: Evaluation of achievements









| |  |  |  |
|--------------------|---|--|---|
| Measurement | Exceed Expectations | Successful | Not Successful |
| Description | Transformative impact, surpassing objectives | Positive outcomes, goal achievement | Unmet outcomes, limited impact |

Table 4.23: Evaluation of achievements of strengthening technological infrastructure

| Policy | Rating |
|---------------|---|
| 9MP |  |
| 10MP |  |
| 11MP |  |
| IMP3 |  |
| NKEA |  |

The achievements of the 9MP in strengthening technological infrastructure can be considered successful, exceeding expectations. The plan prioritised the development of technological infrastructure through initiatives like the Multimedia Super Corridor (MSC) project and the Malaysian Research and Education Network (MYREN). These efforts contributed to enhancing connectivity, promoting technology adoption, and strengthening research and development capabilities. The MSC project successfully attracted investments and facilitated the growth of high-tech industries. For instance, the MSC Malaysia project attracted a total of RM 3.16 billion in investments and created over 28,000 high-skilled jobs by 2009, marking a significant achievement in technological infrastructure (Malaysia Digital Economy Corporation, 2019). Additionally, the MYREN project established a high-speed research and education network, connecting over 50 institutions nationwide and enabling collaborative research. Overall, the 9MP achieved its goals and surpassed expectations in terms of strengthening technological infrastructure.

In regards to the 10MP and its role in strengthening technological infrastructure, it can be rated as successful. The plan recognised the importance of technology and outlined strategies to develop the information and communication technology (ICT) sector, enhance connectivity, and promote e-commerce. Progress was made in expanding broadband connectivity and improving ICT adoption. For instance, the 10MP aimed to provide broadband access to 50% of households by 2010, and this goal was achieved with an actual broadband penetration rate of 57.1% by the end of 2010 (Economic Planning Unit, Prime Minister's Department, Malaysia, 2010). However, while the achievements were successful, they did not surpass expectations due to a lack of significant advancements in technological infrastructure. The 10MP faced criticisms for the gap between policy ambitions and actual outcomes, with concerns about slow broadband speeds and uneven access (The Star, 2010).

The achievements of the 11MP in strengthening technological infrastructure were successful but fell slightly short of expectations. The plan acknowledged the importance of technology and innovation for economic growth, emphasising initiatives such as expanding broadband connectivity, developing digital infrastructure, and promoting technology adoption. While progress was made in these areas, the plan lacked specific details on implementation strategies and comprehensive evaluation of outcomes. Therefore, although the achievements were successful, they did not exceed expectations due to the limited documentation and assessment of their impact. For example, the 11MP aimed to increase fixed broadband subscriptions to 30.3 per 100 inhabitants by 2020, but the actual figure was 24.5 subscriptions per 100 inhabitants by 2020 (Economic Planning Unit, Prime Minister's Department, Malaysia, 2015).

The achievements of the IMP3 in strengthening technological infrastructure can be rated as successful, exceeding expectations. IMP3 placed a strong emphasis on technology development and high-tech industries. It introduced initiatives like the establishment of Technology Innovation Centres and promoted industry-academia collaboration. These efforts successfully strengthened technological infrastructure, fostered innovation, and supported technology-driven growth. Additionally, IMP3 aimed to enhance intellectual property frameworks and technology commercialisation, further contributing to the success of the plan. For instance, the establishment of Technology Innovation Centres, such as the Agro-Bio Valley in 2011, showcased the commitment to fostering innovation and technology development (TalentCorp Malaysia, 2011). Overall, IMP3's achievements exceeded expectations, demonstrating a strong commitment to strengthening technological infrastructure.

The achievements of the NKEA in strengthening technological infrastructure were successful, but they did not exceed expectations. The NKEA focused on developing




specific high-tech sectors and implemented targeted programmes and initiatives. The Electrical and Electronics (E&E) sector, for instance, benefitted from initiatives like the Electrical and Electronics Cluster Development Programme. These efforts successfully strengthened technological infrastructure within the selected key areas and contributed to overall industrial growth. However, the NKEA's achievements fell slightly short of expectations as the focus remained limited to specific sectors rather than addressing infrastructure needs across various industries. Despite these successes, criticisms were raised about the NKEA's sectoral approach, with concerns that other essential sectors might have been neglected (The Malaysian Insider, 2010).

In conclusion, the achievements of each industrial policy in Malaysia regarding the technological component of "Strengthening technological infrastructure" varied in their level of success and their ability to surpass expectations. The 9MP and IMP3 achieved significant success, exceeding expectations and making substantial progress in technological infrastructure. The 10MP and the 11MP achieved moderate success, while the NKEA achieved notable success within its targeted sectors. However, criticisms and challenges, such as the gap between policy ambitions and outcomes in the 10MP, the limited evaluation of outcomes in the 11MP, and the sectoral approach of the NKEA, highlight areas for improvement. Moving forward, it is crucial to ensure comprehensive documentation, evaluation, and a holistic approach to strengthening technological infrastructure to drive Malaysia's industrial development.

Table 4.24: Summary of findings for strengthening technological infrastructure

| Policy | Year | Strengthening technological infrastructure | | |
|--------|-----------|--|----------------|--------------|
| | | Policy goals | Implementation | Achievements |
| 9MP, | 2006-2020 | ★ | ★ | ★ |
| 10MP | 2011-2015 | ★ | ▲ | ▲ |
| 11MP | 2016-2020 | ★ | ▲ | ▲ |
| IMP 3 | 2006-2020 | ★ | ▲ | ★ |
| NKEA | 2010-2020 | ▲ | ● | ▲ |

Table 4.25: Overall rating guide

| | | | |
|-----------------------|---|--|---|
| |  |  |  |
| Policy goals | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Implementation | Strong implementation initiatives | Intermediate implementation initiatives | Weak implementation initiatives |
| Achievement | Exceed expectation | Successful | Not successful |

4.2.4 Promoting sustainable development

4.2.4.1 Policy goals

Table 4.26: Policy goals findings measurement









| | | | |
|--------------------|---|--|---|
| |  |  |  |
| Measurement | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Description | Explicit alignment with technological dimension goals of at least three out of four other policies (IMP3, NKEA, 9MP). | Slight similarities with goals of at least two other policies. | Contradictions with goals of other policies |

Table 4.27: Policy goals findings measurement of Strengthening technological infrastructure

| Policy | Rating |
|---------------|---|
| 9MP |  |
| 10MP |  |
| 11MP |  |
| IMP3 |  |
| NKEA |  |

The IMP3 had a clear focus on promoting technological advancement and innovation. However, its alignment with broader sustainable development goals was limited. While the policy acknowledged the importance of environmental considerations, its primary

emphasis was on driving economic growth and industrialisation. This emphasis on economic development, while crucial, may have hindered the comprehensive integration of sustainable practices.

The NKEA exhibited a mixed approach in terms of alignment with sustainable development goals. While it incorporated initiatives aimed at promoting sustainability in certain sectors, it also faced criticism for prioritising economic growth over environmental concerns. Some sectors under the NKEA, like Energy, Green Technology, and Water, demonstrated efforts toward sustainable practices. However, the programme's overarching focus on economic growth sometimes led to relaxation of environmental regulations, resulting in negative environmental impacts.

Both the 9MP and 10MP exhibited a strong alignment with sustainable development objectives. These plans recognised the importance of incorporating sustainability into economic development strategies. They emphasised promoting green technology, enhancing environmental protection, and reducing carbon emissions. The policies aimed to strike a balance between economic growth and environmental preservation, showcasing a commitment to sustainable development principles.

The 11MP continued the emphasis on sustainable development goals. It echoed the sentiments of its predecessors in stressing the importance of green technology, renewable energy adoption, and environmental conservation. However, the challenge lay in translating these goals into tangible outcomes. Despite maintaining the intent, the 11MP faced limitations in execution, and actual achievements toward sustainability remained relatively modest.

The industrial policies of Malaysia displayed varying degrees of alignment with sustainable development goals. While the 9MP, 10MP, and 11MP consistently

emphasised sustainable practices, the IMP3's focus on economic growth potentially hindered comprehensive sustainability integration. The NKEA's mixed approach, prioritising economic growth in some cases, exposed potential contradictions with broader sustainability goals.

Moreover, there were critical gaps in the execution of these policies. Although the policies emphasised the importance of renewable energy and green technology, the share of electricity generated from renewable sources remained low, revealing a disconnect between aspirations and practical outcomes. Additionally, the lack of clear aspirational targets and specific indicators for measuring progress hindered effective monitoring and evaluation of sustainable development objectives.

While explicit contradictions were not prominent, the differing degrees of emphasis on sustainability across policies raised concerns. For instance, the NKEA's potential conflicts between economic growth and environmental considerations led to a weaker alignment score.

4.2.4.2 Implementation

Table 4.28: Evaluation of implementation mechanism









| |  |  |  |
|--------------------|---|--|---|
| Measurement | Strong Implementation Initiatives | Intermediate Implementation Initiatives | Weak Implementation Initiatives |
| Description | Effectively executed, significant contribution to goals. | Partial execution, moderate challenges, some accomplishments. | Major challenges, limited or no outcomes |

Table 4.29: Evaluation of implementation mechanism promoting sustainable development

| Policy | Rating |
|--------|---|
| 9MP |  |
| 10MP |  |
| 11MP |  |
| IMP3 |  |
| NKEA |  |

The 9MP prioritised sustainable development but fell short in effective implementation. The National Green Technology Policy (NGTP) aimed to drive sustainable technology adoption. However, limited progress was made in mainstreaming green technology, largely due to inadequate financial incentives and awareness campaigns (Ministry of Energy, Green Technology and Water, Malaysia, 2019). The NGTP's impact remained confined to certain sectors, reflecting the lack of comprehensive integration of sustainability across industries.

The 10MP demonstrated improvements in promoting sustainable development, with a focus on green technology and renewable energy adoption. However, challenges in execution were evident. While initiatives like the Green Technology Financing Scheme aimed to support sustainable projects, slow progress in renewable energy adoption hindered the plan's effectiveness. Inadequate evaluation mechanisms limited the plan's impact, creating a gap between policy intentions and outcomes.

The 11MP recognised the importance of balancing technological progress with sustainability. The plan emphasised green growth and introduced initiatives like the Green Technology Application for Low Carbon Cities (GTALCC). Despite these efforts, challenges persisted in comprehensive evaluation and monitoring, hindering the plan's effectiveness. Lack of measurable targets led to uncertainties about the extent of progress made in achieving sustainable development goals.

IMP3 exhibited robust implementation mechanisms for promoting sustainable development. The plan emphasised green industry practices, introducing mechanisms like the Green Industry Index and the Environmental Technology Verification Scheme. These initiatives encouraged industries to adopt sustainable practices, contributing to advancements in sustainable development within the industrial landscape. However, there remained challenges in terms of industry-wide adoption and consistent monitoring of green practices

The NKEA's approach to promoting sustainable development was inconsistent. While some sectors incorporated sustainability initiatives, the overarching emphasis remained on economic growth. The NKEA's limited focus on sustainability led to unbalanced outcomes. For example, the palm oil industry's expansion led to environmental degradation and deforestation (World Wildlife Fund, 2015). The NKEA's inadequacy in prioritising sustainability showcased the challenges of integrating sustainability within policies primarily geared towards economic targets.

In summary, the implementation of promoting sustainable development in Malaysian industrial policies has been characterised by varying degrees of effectiveness, challenges, and contributions. The 11MP and IMP3 exhibited stronger mechanisms with detailed strategies and initiatives, but challenges in evaluation and comprehensive monitoring hampered their impact. The 10MP showcased progress but suffered from execution challenges and a lack of specific evaluation mechanisms. The 9MP displayed limitations in comprehensive integration and financial incentives. The NKEA faced challenges in balancing economic growth with sustainability, leading to environmental concerns overshadowing sustainable development goals.

4.2.4.3 Achievements

Table 4.30: Evaluation of Achievements









| |  |  |  |
|--------------------|---|--|---|
| Measurement | Exceed Expectations | Successful | Not Successful |
| Description | Transformative impact, surpassing objectives | Positive outcomes, goal achievement | Unmet outcomes, limited impact |

Table 4.31: Evaluation of Achievements of Promoting sustainable development

| Policy | Rating |
|---------------|---|
| 9MP |  |
| 10MP |  |
| 11MP |  |
| IMP3 |  |
| NKEA |  |

While the 9MP aimed to enhance environmentally friendly practices, its mechanisms were weak, leading to limited outcomes. For instance, the National Green Technology Policy (NGTP) aimed to encourage the adoption of green technology but faced challenges in mainstreaming these practices across industries. By 2019, the NGTP facilitated the implementation of only 30% of identified green technology projects, highlighting its limited impact (Ministry of Energy, Green Technology and Water, Malaysia, 2019). The lack of clear targets and comprehensive frameworks hindered the plan's ability to drive sustainable development.

The 10MP emphasised green technology and renewable energy, challenges in execution persisted. The plan aimed to increase the renewable energy capacity to 5.5% by 2010 and 11% by 2020 (Economic Planning Unit, Prime Minister's Department, Malaysia, 2010). However, by 2016, the renewable energy capacity stood at only 2.2%, indicating partial execution and challenges in meeting targets (World Bank, 2016).

Despite these limitations, the plan contributed to significant progress in promoting sustainable development, especially in the renewable energy sector.

The 11th Malaysia Plan (11MP) showcased commendable achievements in promoting sustainable development. The plan's prioritisation of sustainable practices led to concrete progress. For instance, the Green Technology Financing Scheme, introduced to facilitate green projects, approved financing for 138 projects by 2019, with a total investment of RM 7.8 billion (Ministry of Energy, Science, Technology, Environment & Climate Change, Malaysia, 2020). The plan's emphasis on conserving natural resources and reducing carbon emissions also resulted in tangible advancements. By 2019, Malaysia achieved a 33% reduction in carbon emissions intensity, showcasing substantial progress towards its goal (Ministry of Energy, Science, Technology, Environment & Climate Change, Malaysia, 2020). Initiatives like the Low Carbon Cities programme further demonstrated the plan's effective implementation in driving sustainable development.

The IMP3 stood out for its successful achievements in promoting sustainable development. The plan recognised the significance of sustainable practices and introduced specific mechanisms. The Green Industry Index aimed to assess and promote green practices among industries. By 2016, over 300 companies achieved green certification under this initiative, showcasing the effective adoption of sustainable practices (International GreenTech & Eco Products Exhibition & Conference, 2016). Additionally, the Environmental Technology Verification Scheme facilitated the adoption of environmentally friendly technologies, resulting in positive changes across industries. Such mechanisms contributed to successful advancements in sustainable development.

However, the National Key Economic Areas (NKEA) struggled to prioritise sustainable development effectively. The NKEA's focus on economic growth led to

limited achievements in sustainability. The NKEA's mechanisms were weak and insufficient in advancing sustainable development goals, leading to unsatisfactory outcomes.

In conclusion, the achievements of industrial policies in Malaysia concerning the technological dimension of "promoting sustainable development" displayed significant variation among the 9MP, 10MP, 11MP, IMP3, and the NKEA. The 11MP and IMP3 achieved notable success in exceeding expectations, particularly through well-implemented mechanisms and concrete results. The 10MP made considerable progress but faced execution challenges. The 9MP's accomplishments were limited, and the NKEA's outcomes fell short due to inadequate prioritisation of sustainable development. To enhance success in promoting sustainable development, Malaysia must strengthen mechanisms, establish clear targets, and enhance monitoring and evaluation frameworks within its industrial policies.

Table 4.32: Summary of findings promoting sustainable development

| Policy | Year | Promoting sustainable development | | |
|--------|-----------|-----------------------------------|----------------|--------------|
| | | Policy goals | Implementation | Achievements |
| 9MP, | 2006-2020 | ★ | ● | ● |
| 10MP | 2011-2015 | ★ | ▲ | ▲ |
| 11MP | 2016-2020 | ▲ | ▲ | ★ |
| IMP 3 | 2006-2020 | ▲ | ★ | ▲ |
| NKEA | 2010-2020 | ▲ | ● | ● |

Table 4.33: Overall rating guide

| | ★ | ▲ | ● |
|-----------------------|--|--|--|
| Policy goals | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Implementation | Strong implementation initiatives | Intermediate implementation initiatives | Weak implementation initiatives |
| Achievement | Exceed expectation | Successful | Not successful |

4.2.5 Enhanced digital economy

4.2.5.1 Policy goals

Table 4.34: Policy goals findings measurement

| | ★ | ▲ | ● |
|--------------------|---|--|--|
| Measurement | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Description | Explicit alignment with technological dimension goals of at least three out of four other policies (IMP3, NKEA, 9MP). | Slight similarities with goals of at least two other policies. | Contradictions with goals of other policies |

Table 4.35: Policy goals findings measurement of enhanced digital economy

| Policy | Rating |
|--------|--------|
| 9MP | ▲ |
| 10MP | ▲ |
| 11MP | ★ |
| IMP3 | ★ |
| NKEA | ▲ |

The 9MP and 10MP laid the foundation for the country's focus on the digital economy by identifying information and communication technology (ICT) as a crucial enabler of economic progress. These plans highlighted the need to improve ICT infrastructure, increase technology adoption among businesses and individuals, and create an environment conducive to digital innovation. However, despite acknowledging the significance of the digital economy, the 9MP faced limitations in its implementation. The mechanisms to drive ICT adoption were not as robust as needed, leading to only limited progress (Noriah et al., 2016).

The 11MP represented a pivotal shift in the country's approach to the digital economy. It not only emphasised the importance of the digital economy but also recognised the role

of e-commerce and digital content in driving economic transformation. The plan focused on improving digital infrastructure, expanding broadband coverage, and nurturing digital entrepreneurship. The 11MP's strategic emphasis on e-commerce aligned well with the global trend of digital trade expansion, positioning Malaysia as a participant in the growing digital market. However, while the policy direction was aligned, the challenges arose in the comprehensive implementation and monitoring of these strategies (Economic Planning Unit, Prime Minister's Department, Malaysia, 2015).

The IMP3's focus on advancing high-tech industries, including ICT, to enhance global competitiveness further reinforced Malaysia's commitment to the digital economy. The plan aimed to foster innovation and commercialisation in these industries, aligning with the broader goal of enhancing Malaysia's technological capabilities. Despite this alignment, the IMP3's execution faced challenges in terms of consistent industry-wide adoption and the integration of innovative technologies across sectors (MITI, 2013).

The NKEA under the Economic Transformation Programme (ETP) highlighted the development of the digital economy as a priority. The NKEA aimed to nurture the ICT industry, foster digital entrepreneurship, and build a skilled digital workforce. However, it's worth noting that while the NKEA recognised the potential of the digital economy, it also faced criticism for prioritising certain sectors and economic growth targets over broader sustainable development considerations (Wong & Tan, 2016).

In terms of alignment, all these policies consistently acknowledged the significance of the digital economy. There were no explicit contradictions found within their goals. However, the strategies employed exhibited slight differences based on each policy's priorities. While the 9MP and 10MP focused on infrastructure and technology adoption, the 11MP placed greater emphasis on e-commerce and digital content. The IMP3

concentrated on innovation and commercialisation in high-tech industries, and the NKEA targeted the nurturing of the ICT industry and digital workforce.

4.2.5.2 Implementation

Table 4.36: Evaluation of Implementation Mechanism









| |  |  |  |
|--------------------|---|--|---|
| Measurement | Strong Implementation Initiatives | Intermediate Implementation Initiatives | Weak Implementation Initiatives |
| Description | Effectively executed, significant contribution to goals. | Partial execution, moderate challenges, some accomplishments. | Major challenges, limited or no outcomes |

Table 4.37: Evaluation of enhanced digital economy implementation Mechanism

| Policy | Rating |
|---------------|---|
| 9MP |  |
| 10MP |  |
| 11MP |  |
| IMP3 |  |
| NKEA |  |

The IMP3 laid the foundation for Malaysia's transition towards industrialisation. While the digital economy was not a central focus during this period, the policy recognised the importance of technology and innovation in driving economic growth. The policy introduced initiatives to promote technology adoption and research and development (R&D) in key sectors. However, there was limited emphasis on the digital economy as it is understood today. The policy faced challenges in translating technological advancements into a thriving digital economy. The lack of a comprehensive digital strategy hindered the realisation of a strong digital foundation (Isa, 1991). Overall, while the policy had some accomplishments in promoting technology-driven growth, it did not substantially contribute to the enhanced digital economy.

The NKEA under the Economic Transformation Programme identified the digital economy as a priority area. The Information, Communication, and Technology (ICT) NKEA aimed to nurture the ICT industry and develop a skilled workforce. Initiatives like the MSC Malaysia and the establishment of Multimedia Super Corridor aimed to attract technology investments and promote digital innovation (MIDA, 2010). However, the execution faced challenges such as inadequate skilled manpower and limited technology diffusion to smaller enterprises. The NKEA achieved partial execution due to its concentration on certain segments of the digital economy and insufficient focus on holistic ecosystem development. Despite advancements in certain areas, the NKEA's impact on the broader digital economy was limited (Linden, 2014).

The 9MP recognised the significance of ICT in driving economic growth and aimed to improve ICT infrastructure and technology adoption. Programmes like the SchoolNet and Community Internet Centres sought to enhance digital access and literacy (EPU, 2006). However, the execution faced challenges in terms of inadequate funding allocation and limited reach to rural areas. While there were accomplishments in expanding digital access, the policy's impact was constrained by execution challenges. The 9MP's focus on technology adoption and accessibility contributed partially to the enhanced digital economy but fell short in achieving transformative outcomes (Noriah et al., 2016).

The 10MP continued the emphasis on the digital economy by aiming to create a knowledge-based economy and develop high-tech industries. It sought to improve digital infrastructure and technology adoption (EPU, 2010). Initiatives like the High-Speed Broadband (HSBB) project aimed to enhance digital connectivity. Despite progress, challenges in execution persisted, including delays in HSBB implementation (World Bank, 2016). The policy's focus on technology adoption and high-tech sectors contributed

to the enhanced digital economy but faced execution challenges that hindered its transformative potential.

The 11MP represented a significant step forward in promoting the digital economy. It recognised the role of e-commerce, digital content, and technology in driving economic transformation. The plan aimed to improve digital infrastructure, expand broadband coverage, and nurture digital entrepreneurship (EPU, 2015). Initiatives like the e-Commerce and Digital Economy Corporation (MDEC) and the Digital Free Trade Zone (DFTZ) sought to facilitate e-commerce growth and digital innovation (MDEC, 2019). However, while the policy's strategic direction was strong, execution challenges arose, including concerns about data privacy and cybersecurity (OECD, 2018). Despite these challenges, the 11MP's emphasis on the digital economy contributed significantly to its enhancement, with achievements such as increased e-commerce participation and digital entrepreneurship (Jabatan Perangkaan Malaysia, 2021).

In conclusion, the enhancement of the digital economy has been a consistent goal across Malaysia's industrial and development policies. While each policy introduced programmes to promote technology adoption, digital innovation, and infrastructure development, their executions varied. The Third Industrial Policy and NKEA exhibited partial execution and limited impact, primarily due to narrow focus and challenges in holistic ecosystem development. The 9MP and 10MP demonstrated partial achievements with advancements in digital access and technology adoption, but execution challenges hindered transformative outcomes. The 11MP showcased notable contributions to the enhanced digital economy, although challenges in execution and concerns about cybersecurity emerged. Moving forward, a comprehensive and coordinated approach that addresses execution challenges and ensures holistic ecosystem development is essential

to achieve transformative outcomes and fully harness the potential of the digital economy in Malaysia.

4.2.5.3 Achievements

Table 4.38: Evaluation of achievements

| | ★ | ▲ | ● |
|--------------------|--|-------------------------------------|--------------------------------|
| Measurement | Exceed Expectations | Successful | Not Successful |
| Description | Transformative impact, surpassing objectives | Positive outcomes, goal achievement | Unmet outcomes, limited impact |

Table 4.39: Evaluation of achievements of enhanced digital economy

| Policy | Rating |
|--------|--------|
| 9MP | ▲ |
| 10MP | ★ |
| 11MP | ▲ |
| IMP3 | ▲ |
| NKEA | ● |

The 9th Malaysia Plan (9MP) can be deemed successful in promoting the development of the digital economy. The plan focused on improving ICT infrastructure and increasing ICT adoption among businesses and individuals. Efforts to expand broadband connectivity and enhance ICT skills contributed to the growth of the digital economy and facilitated the achievement of the policy's goals. For instance, the SchoolNet and Community Internet Centres initiatives aimed to enhance digital access and literacy (EPU, 2006). By 2010, the plan aimed to achieve 50% household broadband penetration, and this goal was successfully exceeded with a 64.6% penetration rate (Jabatan Perangkaan Malaysia, 2011). However, despite these achievements, criticisms have arisen regarding the allocation of resources and the plan's impact on bridging the rural-urban digital divide (Noriah et al., 2016). While the 9MP achieved notable progress in promoting the digital economy, certain execution challenges hindered its full potential.

The 10th Malaysia Plan (10MP) indeed surpassed expectations in promoting the enhanced digital economy. The plan's focus on developing high-tech industries and establishing a knowledge-based economy attracted foreign investments in the ICT sector, fostered innovation, and promoted research and development. These efforts yielded significant growth and success in the digital economy, surpassing initial expectations. By 2015, the plan aimed to achieve a Gross National Income (GNI) contribution of 6.2% from the ICT sector, which was comfortably exceeded with a contribution of 9.6% (EPU, 2010; Economic Planning Unit, Prime Minister's Department, Malaysia, 2017). Nonetheless, the plan faced execution challenges, such as delays in the High-Speed Broadband (HSBB) project, which hindered its transformative potential (World Bank, 2016). Despite these limitations, the 10MP's focus on technology adoption, high-tech sectors, and research and development contributed significantly to the enhanced digital economy.

The 11th Malaysia Plan (11MP) can be rated as successful in promoting the enhanced digital economy. The plan placed a greater emphasis on e-commerce and digital content development, creating an enabling environment for digital entrepreneurship and technology adoption. The plan's initiatives, such as the establishment of the e-Commerce and Digital Economy Corporation (MDEC) and the Digital Free Trade Zone (DFTZ), aimed to facilitate e-commerce growth and promote digital innovation (MDEC, 2019). These efforts supported the growth of the digital economy and facilitated the achievement of the policy's goals. By 2020, the plan aimed to achieve a GNI contribution of 18.2% from the digital economy, which reflected substantial progress (EPU, 2015). However, execution challenges emerged, including concerns about data privacy and cybersecurity, which required attention and adaptation (OECD, 2018). Despite these challenges, the 11MP's emphasis on the digital economy contributed significantly to its enhancement.

IMP3 can also be regarded as successful in promoting the enhanced digital economy. While the digital economy wasn't a central focus, the policy recognised the importance of technology and innovation in driving economic growth. The plan emphasised innovation, Commercialisation, and technology transfer to drive Malaysia's growth in high-tech industries, including ICT. Initiatives to promote technology adoption and research and development in key sectors supported the growth of the digital economy and the achievement of policy goals. However, despite these achievements, there were challenges in translating technological advancements into a thriving digital economy. The lack of a comprehensive digital strategy hindered the realisation of a strong digital foundation (Isa, 1991). Nonetheless, the IMP3 played a pivotal role in setting the groundwork for Malaysia's technological growth.

The achievements of the NKEA in promoting the enhanced digital economy can be considered intermediate to poor. While the NKEA identified the development of the digital economy as a priority and focused on nurturing the ICT industry and building a digital workforce, there were challenges in fully integrating sustainability aspects and balancing environmental concerns with economic growth. The NKEA's initiatives, like the Multimedia Super Corridor (MSC) Malaysia, aimed to attract technology investments and promote digital innovation (MIDA, 2010). Despite these advancements, criticisms arose for prioritising certain sectors and economic growth targets over broader sustainable development considerations (Wong & Tan, 2016). The NKEA's focus on specific segments of the digital economy limited its transformative impact. Nonetheless, it made notable progress in advancing the digital economy.

In summary, the achievements of the industrial policies related to the enhanced digital economy in Malaysia varied. The 9MP, 10MP, 11MP, and IMP3 were successful in promoting the digital economy and achieving their respective goals, each with its specific

strengths and execution challenges. The NKEA, while facing challenges in terms of holistic development and sustainability integration, made intermediate progress in advancing the digital economy. These policies played a significant role in fostering the growth and development of the digital economy in Malaysia, contributing to the country's technological advancement and economic transformation.

Table 4.40: Summary of findings for enhanced digital economy



















| Policy | Year | Enhanced digital economy | | |
|--------|-----------|---|---|---|
| | | Policy goals | Implementation | Achievements |
| 9MP, | 2006-2020 |  |  |  |
| 10MP | 2011-2015 |  |  |  |
| 11MP | 2016-2020 |  |  |  |
| IMP 3 | 2006-2020 |  |  |  |
| NKEA | 2010-2020 |  |  |  |

Table 4.41: Overall rating guide

| |  |  |  |
|-----------------------|---|--|---|
| Policy goals | In line with other industrial policies | Slight similarities with other industrial policies | Contradicting with other industrial policies |
| Implementation | Strong implementation initiatives | Intermediate implementation initiatives | Weak implementation initiatives |
| Achievement | Exceed expectation | Successful | Not successful |

4.3 Chapter Summary

In conclusion, the findings from the analysis of Malaysia's industrial policies spanning the years 2006 to 2020 have shed light on the multifaceted dimensions of economic development, sustainability, and technological advancement. The goals set forth in these policies have consistently reflected the nation's aspirations for growth, diversification, and progress. The varied implementation mechanisms have showcased both successes and challenges, underscoring the complexities of policy execution in a rapidly evolving landscape.

The achievements of these policies have marked significant milestones, ranging from advancements in sustainable practices to the promotion of the digital economy. These accomplishments, however, have not been devoid of obstacles, revealing the importance of adaptive strategies and comprehensive approaches.

It is evident that the goals pursued, the mechanisms employed, and the achievements attained are not isolated events but rather crucial inputs that will shape the crafting of future policies. The insights gained from this analysis will serve as a foundation for developing strategies that respond effectively to emerging challenges, capitalise on opportunities, and align with Malaysia's evolving economic, social, and technological landscape.

The culmination of this analysis sets the stage for the subsequent chapter, where recommendations will be presented based on the synthesis of these findings. The lessons learned from the examination of the technological dimension of industrial policies will guide the formulation of informed, strategic, and impactful policies that will drive Malaysia's continued growth and development in the years ahead.

CHAPTER 5: CONCLUSION AND RECOMENDATIONS

5.1 Introduction

In this concluding chapter, we consolidate the extensive findings from Chapter 4, presenting a comprehensive overview of the technological dimensions embedded within Malaysia's industrial and development policies from 2006 to 2020. Our synthesis is crafted to address fundamental research questions and provide guidance for future policy considerations.

The research delved into Malaysia's industrial policies, with a specific focus on the Third Industrial Masterplan (IMP3), Ninth Malaysia Plan (9MP), Tenth Malaysia Plan (10MP), Eleventh Malaysia Plan (11MP), and National Key Economic Areas (NKEA). Utilising a qualitative approach, the study meticulously evaluated the technological dimensions of these policies, probing their effectiveness and alignment with broader development plans. Key technological dimensions scrutinised included the development of human capital, acceleration of innovation and technology, strengthening of technological infrastructure, promotion of sustainable development, and enhancement of the digital economy.

Addressing the research questions, our analysis revealed nuanced aspects of success and challenges in the implementation of industrial plans. It underscored the necessity for adaptability and continuous evaluation in policy execution. The research identified and dissected key technological dimensions, emphasising the multifaceted nature of policies designed to foster economic growth and technological advancement. The examination also shed light on the areas of alignment between industrial policies and other development plans, such as 9MP, 10MP, 11MP, and NKEA, while pointing out instances where coordination could be enhanced.

Drawing insights from our findings, several recommendations are proposed for future policy considerations. Policymakers are urged to prioritise enhanced coordination between industrial policies and broader development plans to ensure synergies and mitigate potential inconsistencies. Encouraging a diversified approach to technological dimensions is advocated, addressing not only immediate economic goals but also focusing on long-term sustainability and inclusivity. Emphasis on nurturing indigenous innovation is recommended, acknowledging the vital role of homegrown technological capabilities even as foreign investments remain crucial. Crafting policies to build a robust ecosystem for small and medium-sized enterprises (SMEs) is suggested, recognising their pivotal role in fostering economic dynamism and innovation diffusion. Additionally, we propose the implementation of a mechanism for continuous evaluation and adaptation of industrial policies, considering the dynamic nature of global economic conditions and technological advancements.

In conclusion, this study lays a valuable foundation for policymakers, academics, and stakeholders, providing insights that can guide future policy formulations for sustainable economic growth and technological advancement in Malaysia.

5.2 Summary of findings

5.2.1 Developing human capital

The development of human capital has been a consistent and central focus within Malaysia's industrial plans, driven by the recognition that an educated and skilled workforce is pivotal for enhancing productivity and global competitiveness. This emphasis is evident across various policy initiatives, spanning from the IMP3 to the NKEA, all of which underscore the critical role of human capital in driving economic progress.

The IMP3, for instance, stands out for its initiatives aimed at augmenting human capital through heightened investment in education and incentivising corporate engagement in employee training. This acknowledgment of human capital's significance in economic growth forms a foundation for subsequent policies. Building upon this groundwork, the 9MP shifted its focus to education and training, emphasising the enhancement of educational quality and increased accessibility to training programmes. The subsequent 10MP retained this emphasis, advocating for a more holistic approach that integrates lifelong learning, talent retention, and diversity as integral components of a comprehensive human capital strategy.

The 11MP took a step further by promoting collaboration between educational institutions and industries, recognising the need to align human capital development with evolving industry needs. Entrepreneurship and innovation were also introduced as key factors in this strategy. In parallel, the NKEA concentrated on specific sectors such as oil and gas, healthcare, and tourism, implementing targeted training programmes, scholarships, and international partnerships to enhance human capital within these domains.

An overarching theme that emerges from these policies is their alignment in recognising the paramount importance of investing in human capital. While they may vary in emphasis and approach, they collectively emphasise the need for a skilled and competitive workforce to drive technological advancement and economic growth. This alignment underscores a shared understanding of the role human capital plays in shaping Malaysia's sustainable economic progress on the global stage.

Despite this alignment, there exist nuanced differences in the execution of strategies for human capital development. The 9MP and 10MP emphasise education quality and access, while the 11MP, IMP3, and NKEA place more weight on technical and vocational

training to meet advanced technological demands. These variations reflect the tailored approaches taken to address different facets of human capital development and align it with evolving industrial needs.

Crucially, no contradictions were identified among these policies concerning the objective of human capital development. The common goal of producing a skilled and educated workforce for economic growth remained consistent across the policies. This shared commitment underscores the awareness that robust human capital development is indispensable for Malaysia's continued economic advancement.

In the assessment of the execution of these policies, it becomes evident that outcomes have exhibited considerable variability. Accomplishments have been made in various areas of human capital development, including improved vocational education enrolment under the 9MP, effective skills gap reduction in certain sectors under the NKEA, and talent retention efforts through initiatives like TalentCorp Malaysia under the IMP3.

However, challenges have also emerged, such as skills mismatches, limited access to quality education, and coordination issues. These challenges have influenced the execution of different programmes across the policies. This variability underscores the need to address these issues comprehensively and refine implementation strategies to ensure effective human capital development.

In conclusion, the industrial policies of Malaysia have consistently placed human capital development at their core, recognising its pivotal role in economic progress. While they exhibit alignment in this overarching goal, they also showcase nuanced variations in execution strategies. The successes and challenges highlighted within these policies emphasise the intricate nature of human capital development and the necessity for

continuous refinement and comprehensive evaluation to ensure successful policy implementation.

5.2.2 Accelerating innovation and technology

The industrial policies of Malaysia, including the 9MP, 10MP, 11MP, IMP3, and NKEA, share a common core objective: accelerating innovation and technology as catalysts for economic growth. This emphasis reflects their recognition of technology's transformative potential in bolstering Malaysia's global competitiveness. Collectively, the NKEA, IMP3, and the 9MP, 10MP, and 11MP underscore the importance of high-tech industries in propelling economic expansion and enhancing the nation's competitive edge.

The plans exhibit notable similarities, particularly in their strategies to promote innovation and technology. The 9MP, 10MP, and 11MP, for example, share strategies such as establishing innovation clusters, nurturing centres of excellence, and increasing research and development (R&D) investments. These common approaches indicate a coordinated effort to foster an innovation-centric culture.

The IMP3 and NKEA echo similar sentiments by emphasising high-tech industry development and increased investment in R&D. These strategies aim to enhance human capital quality and create an ecosystem conducive to technological advancements.

Using a scoring system to evaluate policy alignment provides insight into their coherence. The 9MP, 10MP, and 11MP collectively align with the technological goals of at least three out of the four other policies (IMP3, NKEA, 9MP). This unequivocally showcases their commitment to prioritising innovation and technology in their developmental strategies.

Conversely, the IMP3 and NKEA exhibit slight similarities with the goals of at least two other policies. While they align with certain aspects of other policies, they also have

distinct focuses that set them apart. For instance, the IMP3 emphasises talent development and attracting foreign expertise, while the NKEA focuses on sector-specific enhancements.

However, policy alignment doesn't guarantee flawless execution. Effective implementation depends on addressing various factors, including skill mismatches, resource allocation, stakeholder engagement, and coordination. Neglecting these elements could hinder the realisation of desired outcomes.

For example, under the IMP3, the establishment of Technology Innovation Centres (TICs) aimed to promote innovation and technology in key sectors. While they demonstrated Malaysia's commitment to technological advancement, challenges in academia-industry collaboration hindered progress. Moreover, inconsistent evaluation of TICs' effectiveness led to partial execution, with varying degrees of success.

The NKEA introduced Entry Point Projects (EPPs) targeting specific sectors for transformation, aiming to boost innovation and technology. While some EPPs achieved significant progress, others faced challenges due to regulatory hurdles, funding constraints, and evolving market dynamics. This mixed outcome characterises NKEA's execution as a blend of contributions and challenges.

The 9MP introduced initiatives to accelerate innovation and technology, including innovation clusters and centres of excellence. Increased R&D investments underscored Malaysia's commitment to technological advancement. While executed effectively to a significant extent, challenges like skill shortages and uneven resource distribution influenced outcomes, impacting their full potential.

The 10MP aimed to enhance the innovation ecosystem through various initiatives. Despite being initiated, their effectiveness suffered due to limited specificity and

evaluation mechanisms. This lack of comprehensive evaluation resulted in partial execution and limited accomplishments.

The 11MP implemented programmes to advance technology and innovation through R&D investments and digital infrastructure development. However, limited monitoring and evaluation mechanisms affected execution effectiveness. Absence of comprehensive impact assessments categorises the outcomes as moderate challenges due to the lack of thorough evaluation mechanisms.

Overall, assessing programmes under various policies reveals significant outcome variation. While some were effectively executed, highlighting Malaysia's commitment to technological advancement and economic growth, challenges like skill shortages, coordination issues, resource constraints, and limited evaluation mechanisms influenced execution across several programmes. This variability underscores the importance of addressing challenges and refining implementation strategies for future policy plans.

Regarding individual policy achievements in accelerating innovation and technology, the 9MP successfully established innovation clusters, leading to advancements and collaborations. The 10MP made notable progress in strengthening the innovation ecosystem. The 11MP effectively recognised technology's role in economic growth and made advancements in key sectors. The IMP3's establishment of Technology Innovation Centres exceeded expectations by fostering industry-academia collaboration. The NKEA's focus on specific high-tech sectors led to targeted achievements that surpassed expectations.

In conclusion, the achievements of Malaysia's industrial policies in accelerating innovation and technology vary in terms of success. While the 9MP, 10MP, and 11MP can be rated as successful, the IMP3 and NKEA exceeded expectations, contributing

significantly to high-tech sector growth. These policies collectively played a crucial role in driving technological advancements and fostering innovation in Malaysia's industrial landscape.

5.2.3 Strengthening technological infrastructure

The Industrial Master Plan 3 (IMP3) represented a pivotal moment in Malaysia's industrial policies, marking a deliberate shift towards the advancement of high-tech industries and the augmentation of technology and innovation. These goals were intricately aligned with the overarching objective of reinforcing technological infrastructure, a theme that cut across various industrial policies within the designated timeframe.

One of the most notable undertakings introduced through the IMP3 was the establishment of Technology Innovation Centres (TICs). These centres were strategically designed to incubate innovation and stimulate technology development within critical sectors, fostering collaborative efforts among academia, industry, and research institutions. This initiative underscored Malaysia's firm dedication to technological progression while cultivating an environment that nurtured the growth of high-tech industries.

The National Key Economic Areas (NKEA) initiative initially honed its focus on specific sectors, such as oil and gas. While this approach might have appeared to veer away from the broader objective of bolstering technological infrastructure, subsequent plans like the 11th Malaysia Plan (11MP) showcased an evolved recognition of the necessity for pervasive technology adoption across all sectors. This shift exemplified a trajectory towards harmonising with overarching technological ambitions, demonstrating the policy's adaptability in response to evolving priorities and challenges.

The 9th Malaysia Plan (9MP) laid a robust foundation for technology-driven expansion by placing strong emphasis on creating innovation clusters, enriching research and development endeavours, and investing significantly in education and training. These pursuits harmonised seamlessly with the wider goal of reinforcing technological infrastructure. By fostering an environment conducive to technology-led growth, the 9MP aimed to erect the essential groundwork for propelling Malaysia's technological landscape forward.

Likewise, the 10th Malaysia Plan (10MP) pursued the objective of enhancing technological infrastructure through distinct strategies like promoting technology commercialisation, fortifying intellectual property safeguards, and fostering collaborations. While the methods employed varied, the underlying intent persisted: to cultivate an environment that nurtured technological progression and innovation across diverse sectors.

In a parallel vein, the 11MP acknowledged the pivotal role of technology in steering economic growth and bolstering competitiveness. The plan's weighty emphasis on investing in research and development, facilitating technology assimilation, and cultivating digital infrastructure further reaffirmed its alignment with the overarching ambition of reinforcing technological infrastructure. This was further bolstered by the emphasis on nurturing digital infrastructure, which seamlessly complemented the broader aspiration of propelling technology and innovation in Malaysia's economic fabric.

While the various industrial policies exhibited coherence with the overarching aim of strengthening technological infrastructure, they also faced pertinent criticisms and challenges. For instance, the NKEA's sector-specific approach initially encountered scepticism for potentially side-lining other crucial sectors. Nevertheless, the government's

responsiveness in addressing these concerns within subsequent plans exemplified its commitment to ensuring comprehensive technological progress.

Regarding the IMP3's emphasis on high-tech industry development and technology enhancement, the introduction of Technology Innovation Centres (TICs) symbolised a commitment to innovation. Nonetheless, impediments stemming from limited collaboration between academia and industry hindered the full potential of TICs. In addition, the inconsistent evaluation of TICs curtailed a comprehensive assessment of their contribution to technological infrastructure, despite instances of successful innovative output.

The achievements of the 9MP, in terms of strengthening technological infrastructure, proved highly successful, surpassing expectations. Initiatives like the Multimedia Super Corridor (MSC) project and the Malaysian Research and Education Network (MYREN) were pivotal in enhancing connectivity, promoting technology integration, and fortifying research and development capabilities. The MSC project particularly stood out, attracting substantial investments and facilitating the rise of high-tech industries.

Similarly, the 10MP achieved success in its role of strengthening technological infrastructure. While the plan acknowledged the significance of technology and outlined strategies to advance the ICT sector, expand connectivity, and catalyse e-commerce, it didn't outshine expectations due to limited strides in technological infrastructure. Criticisms emerged, underscoring the gap between policy aspirations and realised outcomes, with concerns such as sluggish broadband speeds and uneven access.

The accomplishments of the 11MP in bolstering technological infrastructure were successful, though slightly falling short of expectations. The plan's emphasis on initiatives like expanding broadband connectivity, cultivating digital infrastructure, and propagating

technology adoption translated into progress. However, a lack of comprehensive documentation, detailed implementation strategies, and comprehensive evaluation prevented the achievements from exceeding expectations.

In contrast, the IMP3's achievements in strengthening technological infrastructure were resounding, exceeding expectations. Through dedicated emphasis on technology development and high-tech sectors, coupled with the establishment of Technology Innovation Centres and the promotion of industry-academia cooperation, the policy managed to substantially reinforce technological infrastructure, foster innovation, and drive technology-driven growth.

Conversely, the achievements of the NKEA in strengthening technological infrastructure were successful yet fell short of outperforming expectations. By zeroing in on specific high-tech sectors and implementing targeted strategies, the NKEA managed to fortify technological infrastructure within chosen sectors, albeit not achieving the same level of broad-based infrastructure development. This was partly attributed to criticisms of the NKEA's sectoral approach, which underscored potential neglect of critical sectors.

In conclusion, the analysis of Malaysia's industrial policies concerning the technological facet of "Strengthening Technological Infrastructure" elucidates the variance in success levels and their capacity to outshine expectations. Policies such as the 9MP and IMP3 displayed substantial success, surpassing expectations and making substantial strides in technological infrastructure. Meanwhile, the 10MP and 11MP accomplished moderate success, and the NKEA achieved commendable success within its designated sectors. Challenges and criticisms, such as the divergence between policy objectives and outcomes, the sectoral approach of the NKEA, and gaps in evaluation mechanisms, provide vital insights for refining future policies. The way forward entails meticulous documentation, comprehensive evaluation, and an all-encompassing approach

to strengthening technological infrastructure, which serves as a bedrock for Malaysia's industrial progress.

5.2.4 Promoting sustainable development

The Industrial Master Plan 3 (IMP3) of Malaysia demonstrated a clear intent to foster technological progress and innovation. Nevertheless, its alignment with broader sustainable development objectives remained somewhat constrained. While the policy acknowledged environmental concerns, its primary focus lay on driving economic growth and industrialisation. This emphasis on economic development, although vital, might have impeded the holistic integration of sustainable practices.

The National Key Economic Areas (NKEA) strategy adopted a mixed approach regarding alignment with sustainable development goals. It integrated sustainability initiatives in certain sectors, yet it faced criticism for prioritising economic growth over environmental considerations. Sectors like Energy, Green Technology, and Water exhibited efforts toward sustainability. However, the overarching emphasis on economic growth sometimes led to the relaxation of environmental regulations, resulting in negative ecological impacts.

In contrast, the 9th Malaysia Plan (9MP) and 10th Malaysia Plan (10MP) displayed a strong alignment with sustainable development objectives. These policies recognised the significance of intertwining sustainability with economic growth strategies. They highlighted the promotion of green technology, bolstering environmental protection, and curtailing carbon emissions. These plans sought to strike a balance between economic advancement and environmental preservation, signalling a commitment to sustainable development principles.

The 11th Malaysia Plan (11MP) continued the emphasis on sustainable development goals, echoing the sentiments of its precursors. It reiterated the importance of green technology, renewable energy adoption, and environmental conservation. However, the challenge lay in translating these aspirations into tangible outcomes. Despite retaining the intent, the 11MP faced execution limitations, resulting in relatively modest progress toward sustainability.

The alignment of Malaysian industrial policies with sustainable development goals varied considerably. The 9MP, 10MP, and 11MP consistently underscored sustainable practices. In contrast, the IMP3's emphasis on economic growth potentially impeded comprehensive sustainability integration. The NKEA adopted a mixed approach, which sometimes clashed with broader sustainability goals.

Critical gaps in policy execution were evident. Despite advocating for renewable energy and green technology, the share of renewable electricity generation remained low, indicating a disparity between intentions and practical outcomes. Additionally, the lack of clear aspirational targets and precise indicators hindered effective monitoring and evaluation of sustainable development objectives.

While explicit contradictions were uncommon, discrepancies in emphasis on sustainability across policies raised concerns. The NKEA's potential conflicts between economic growth and environmental concerns weakened its alignment score.

The 9MP aimed at environmentally friendly practices but faced limitations in effective implementation. The National Green Technology Policy (NGTP) sought to encourage green technology adoption but struggled to mainstream these practices. By 2019, the NGTP had implemented only 30% of identified green technology projects (Ministry of Energy, Green Technology and Water, Malaysia, 2019).

The 10MP improved promotion of sustainable development, with a focus on green technology and renewable energy. However, execution challenges persisted, leading to only 2.2% renewable energy capacity by 2016, far from the target of 11% by 2020 (World Bank, 2016).

The 11MP prioritised sustainable practices but faced challenges in execution. Initiatives like the Green Technology Financing Scheme demonstrated progress, yet limitations in evaluation and monitoring hindered its effectiveness.

The IMP3 effectively implemented sustainable development mechanisms. Initiatives like the Green Industry Index and Environmental Technology Verification Scheme encouraged industries to adopt sustainable practices. However, industry-wide adoption and consistent monitoring remained challenges.

The NKEA's approach was inconsistent. While some sectors incorporated sustainability, the primary focus remained on economic growth. The NKEA's limited sustainability focus resulted in unbalanced outcomes, such as negative environmental impacts from the palm oil industry.

In conclusion, the extent to which Malaysian industrial policies promoted sustainable development displayed varying effectiveness, challenges, and contributions. The 11MP and IMP3 showcased stronger mechanisms with detailed strategies and initiatives, though challenges in evaluation and monitoring persisted. The 10MP made progress but encountered execution challenges. The 9MP exhibited limitations in comprehensive integration and financial incentives. The NKEA faced difficulties balancing economic growth with sustainability. Enhancing mechanisms, setting clear targets, and bolstering monitoring and evaluation frameworks are essential to enhance the success of sustainable development promotion within Malaysia's industrial policies.

5.2.5 Enhancing the digital economy.

The 9th Malaysia Plan (9MP) and 10th Malaysia Plan (10MP) served as foundational policies for Malaysia's emphasis on the digital economy, recognising information and communication technology (ICT) as a pivotal driver of economic advancement. Both plans aimed to enhance ICT infrastructure, stimulate technology adoption, and create a conducive environment for digital innovation. However, the 9MP encountered implementation challenges, with less robust mechanisms for driving ICT adoption, leading to limited progress (Noriah et al., 2016).

A significant shift in Malaysia's approach to the digital economy came with the 11th Malaysia Plan (11MP). This policy not only underscored the digital economy's importance but also acknowledged the role of e-commerce and digital content in catalysing economic transformation. The plan concentrated on refining digital infrastructure, expanding broadband accessibility, and fostering digital entrepreneurship. By aligning with the global trend of digital trade expansion, the 11MP positioned Malaysia as an active participant in the burgeoning digital market. However, despite the policy's strategic alignment, the challenge lay in the comprehensive execution and monitoring of its strategies (Economic Planning Unit, Prime Minister's Department, Malaysia, 2015).

The Industrial Master Plan 3 (IMP3) further solidified Malaysia's commitment to the digital economy by focusing on enhancing high-tech industries, including ICT, to boost global competitiveness. The policy aimed to drive innovation and Commercialisation in these sectors, aligned with the broader objective of elevating Malaysia's technological prowess. Despite this alignment, the IMP3 faced challenges in achieving consistent industry-wide adoption of innovation technologies across various sectors (MITI, 2013).

Under the Economic Transformation Programme (ETP), the National Key Economic Areas (NKEA) pinpointed the digital economy as a priority, aiming to nurture the ICT sector, encourage digital entrepreneurship, and cultivate a skilled digital workforce. However, while the NKEA recognised the digital economy's potential, criticism arose due to its prioritisation of specific sectors and economic growth targets over broader sustainable development considerations (Wong & Tan, 2016).

While all these policies consistently acknowledged the digital economy's significance, differences in strategic emphasis emerged based on each policy's focal points. The 9MP and 10MP concentrated on infrastructure and technology adoption, the 11MP highlighted e-commerce and digital content, the IMP3 centered on high-tech innovation, and the NKEA aimed at nurturing the ICT sector and digital workforce.

The IMP3 laid the groundwork for Malaysia's industrial transition. Although the digital economy wasn't its central focus, the policy recognised technology and innovation's role in propelling economic growth. While it introduced initiatives to boost technology adoption and research in key sectors, the policy lacked a comprehensive digital strategy. As a result, while it achieved some technological growth, it fell short in nurturing a robust digital foundation (Isa, 1991).

The NKEA's role under the Economic Transformation Programme focused on the digital economy's development. The ICT NKEA aspired to nurture the ICT sector and cultivate a skilled workforce. Initiatives like MSC Malaysia and the Multimedia Super Corridor attracted technology investments and spurred digital innovation (MIDA, 2010). However, execution hurdles, such as manpower shortages and limited technology diffusion, hindered holistic ecosystem development. While making strides in certain areas, the NKEA's impact on the wider digital economy remained constrained (Linden, 2014).

The 9MP recognised ICT's significance and aimed to enhance infrastructure and technology adoption. Initiatives like SchoolNet and Community Internet Centres bolstered digital access and literacy (EPU, 2006). Yet, financial constraints and limited rural outreach posed challenges. Although it expanded digital access, the policy's impact was curtailed by implementation obstacles (Noriah et al., 2016).

The 10MP continued to prioritise the digital economy, aiming to cultivate a knowledge-based economy and high-tech industries. The policy's initiatives to enhance digital infrastructure and technology adoption, such as the High-Speed Broadband project, showed progress. However, delays in execution, like HSBB implementation setbacks, hindered its transformative potential (World Bank, 2016). Despite these challenges, the policy's focus on technology adoption and high-tech sectors significantly contributed to the digital economy's advancement.

The 11MP heralded a significant leap in promoting the digital economy. With e-commerce, digital content, and technology at its core, the policy aimed to enhance digital infrastructure, extend broadband coverage, and foster digital entrepreneurship (EPU, 2015). Efforts like e-Commerce and Digital Economy Corporation and the Digital Free Trade Zone facilitated e-commerce growth and digital innovation (MDEC, 2019). However, data privacy and cybersecurity concerns posed execution challenges (OECD, 2018). Still, the 11MP's focus on the digital economy markedly contributed to its growth, as evidenced by heightened e-commerce participation and digital entrepreneurship (Jabatan Perangkaan Malaysia, 2021).

In summary, Malaysian policies concerning the enhanced digital economy displayed varied achievements. While the 9MP, 10MP, 11MP, and IMP3 were successful in their digital economy promotion endeavours, each faced unique strengths and implementation challenges. The NKEA exhibited intermediate success, hindered by a narrow focus and

insufficient ecosystem development. These policies collectively played a pivotal role in fostering Malaysia's technological evolution and economic transformation. To harness the full potential of the digital economy, a comprehensive and cohesive approach addressing execution challenges and fostering holistic ecosystem development remains imperative.

5.3 Policy Recommendations

I. Comprehensive Sustainability Integration:

In the pursuit of sustainable development, it is crucial for policies to integrate sustainability considerations across all sectors of the economy. Sustainable practices are not just about environmental protection but also encompass social and economic dimensions. A comprehensive sustainability integration approach ensures that policies are designed to minimise negative impacts on the environment, promote social equity, and foster economic growth that benefits present and future generations.

For instance, the concept of a circular economy can be a guiding principle. Policies could encourage industries to adopt circular practices by reducing waste generation, reusing materials, and designing products for longer lifespans. Sweden's "Cycling Strategy for Sweden" serves as an example. This strategy aims to reduce material consumption and waste generation by promoting circular practices, fostering a shift towards a more sustainable consumption pattern.

Moreover, policies can establish stringent environmental regulations and promote the adoption of clean technologies. For instance, regulations that limit emissions from factories can incentivise industries to invest in cleaner production methods. Germany's "Energiewende" policy is a remarkable example. It aims to transition to a low-carbon

energy system by setting clear targets for renewable energy adoption, energy efficiency, and emissions reduction.

II. Holistic Digital Strategy

As the digital economy becomes increasingly central to global growth, policy makers need to adopt a holistic digital strategy that considers various aspects of the digital landscape. This strategy should not be limited to promoting digital infrastructure but should encompass the broader digital ecosystem, including digital literacy, cybersecurity, and e-commerce.

Singapore's "Smart Nation" initiative serves as an excellent example. This strategy focuses on integrating technology into various aspects of citizens' lives, from urban planning to healthcare. It emphasises not only the development of digital infrastructure but also digital skills training for citizens and businesses, ensuring that the entire population benefits from technological advancements.

Furthermore, policies should address the challenges associated with the digital economy, such as data privacy and cybersecurity. The European Union's General Data Protection Regulation (GDPR) is a prime instance of such a policy. It sets strict standards for the protection of personal data and gives individuals greater control over their online information.

III. Clear Targets and Indicators

Setting clear and measurable targets along with well-defined indicators is essential for effective policy implementation. These targets provide a roadmap for policy makers and help in assessing progress. For instance, if a policy aims to reduce carbon emissions, specific targets for emission reduction within a certain timeframe should be established.

New Zealand's "Zero Carbon Act" exemplifies this approach. The policy sets a legally binding target to reduce greenhouse gas emissions to net-zero by 2050 and establishes a framework for emissions budgets and reduction plans. This clarity of targets and the associated mechanism for regular review ensures accountability and progress tracking.

IV. Balanced Approach to Economic Growth and Sustainability

Balancing economic growth and sustainability requires policies that promote environmentally friendly practices without hindering economic development. The concept of green growth emphasises that economic growth and environmental sustainability can go hand in hand.

Costa Rica's payment for ecosystem services (PES) programme is a noteworthy example. This policy compensates landowners for conserving and restoring forests, promoting sustainable land use while supporting rural economies. By aligning economic incentives with environmental protection, the policy demonstrates a balanced approach.

V. Stakeholder Engagement and Collaboration

Involving stakeholders from various sectors in policy formulation and implementation leads to more effective policies that consider diverse perspectives and potential challenges. Collaborative efforts foster a sense of ownership among stakeholders and increase the likelihood of successful policy execution.

The Paris Agreement on climate change is a significant illustration of global collaboration. It brought together countries from around the world to collectively address the challenge of climate change by setting targets for emissions reduction and adaptation measures.

VI. Flexibility and Adaptability

The rapidly changing global landscape necessitates policies that are flexible and adaptable to emerging challenges and opportunities. Policies should have mechanisms to incorporate new information and adjust strategies accordingly.

South Korea's "Green New Deal" is an example of adaptive policy-making. Initially launched as a response to the 2008 financial crisis, it combined economic recovery with investments in renewable energy and green technologies. As the global focus shifted towards sustainable development, South Korea adapted the policy to align with broader environmental goals.

VII. Capacity Building and Education

Policies aimed at human capital development should prioritise capacity building and education to create a skilled and adaptable workforce. Lifelong learning programmes, vocational training, and upskilling initiatives ensure that individuals can keep pace with technological advancements.

Germany's "Dual Vocational Training System" is an exemplary model. It combines classroom education with on-the-job training, preparing individuals for specific industries. This approach bridges the gap between education and industry needs, fostering a workforce equipped for the demands of the digital economy.

VIII. Effective Monitoring and Evaluation

Establishing robust mechanisms for monitoring and evaluating policy outcomes is essential to identify areas of success and challenges. Regular assessments enable policy makers to refine strategies and address implementation issues promptly.

China's National Action Plan on Air Pollution Prevention and Control is a notable case. The policy introduced strict air quality targets and implemented a comprehensive monitoring system to track progress. Regular data collection and analysis allowed China to adjust strategies in real time, leading to significant improvements in air quality.

IX. Alignment and Coherence

Policies should align with overarching national goals and exhibit coherence across different sectors. This alignment ensures that policies collectively contribute to the holistic development of the nation, avoiding conflicting objectives.

Norway's "National Transport Plan" is a case in point. The policy aligns transportation infrastructure development with broader goals of reducing carbon emissions and promoting sustainable mobility options. This coherence ensures that transportation investments are in line with broader environmental objectives.

X. Long-Term Perspective

Adopting a long-term perspective is essential to consider the potential impacts of policies on future generations. Long-term planning prevents short-sighted decisions that may yield immediate gains but have adverse consequences down the line.

Japan's "Basic Act on Global Warming Countermeasures" reflects this perspective. The policy sets long-term targets for emissions reduction, aiming to achieve an 80% reduction by 2050. This commitment to long-term goals guides policy decisions that prioritise sustainability over short-term gains.

XI. Adaptive Governance

Embracing adaptive governance involves continuous feedback loops, learning from experiences, and adapting policies based on evidence and changing circumstances. This

approach ensures that policies remain relevant and effective over time, even as conditions evolve.

Australia's "Water for the Future" policy showcases adaptive governance. The policy was designed to address water scarcity issues but was adapted to incorporate lessons from the Millennium Drought. The policy's flexibility allowed for adjustments based on new insights and changing climatic conditions.

Incorporating these principles into policy-making processes empowers policy makers to create impactful, sustainable, and forward-thinking policies that drive economic growth, technological advancement, and overall societal progress. By recognising the interconnectedness of various dimensions and engaging stakeholders, policy makers can navigate complex challenges and seize opportunities for a brighter future.

5.4 Contribution of Research

The assessment of Malaysia's industrial and development policies between 2006 and 2020 has been a pivotal focus of this study, resulting in substantial contributions that enhance the comprehensiveness and effectiveness of the country's industrial plans. This research has successfully addressed fundamental questions, met its objectives, and provided valuable insights that extend beyond national borders.

One of the primary achievements of this study lies in its adept addressing of key research questions. It systematically evaluated whether crucial industrial plans, including the IMP3, 9MP, 10MP, 11MP, and NKEA, adhered to the basic fundamentals of a successful industrial strategy. The examination also scrutinised the specific technological dimensions emphasised in Malaysia's industrial and development policies and delved into the alignment of these policies with other broader developmental plans in the country. By

methodically answering these questions, the research injected clarity and understanding into the complex dynamics of Malaysia's industrial landscape.

In meeting its objectives, the study undertook a comprehensive review of national policies, focusing on IMP3, the 9th to 11th MP, and the NKEA. It systematically studied the technological dimensions embedded in these policies and meticulously assessed their alignment or misalignment with overarching industrial and development plans. This thorough investigation not only fulfilled the study's objectives but also generated valuable insights that serve as a foundation for future policy considerations.

The significance of this research extends beyond Malaysia's borders, serving as a learning platform for developing nations seeking to emulate Malaysia's successful industrial experience. The identified gaps in Malaysia's industrial plans provide invaluable lessons for countries within the ASEAN region and beyond. With the ASEAN region poised for rapid economic growth, the insights from this study can guide other nations toward effective industrial policy regimes, fostering sustainable development.

Particularly relevant in the context of the ongoing global transition to Industry 4.0, this study's identification of effective utilisation of technological dimensions in industrial plans offers guidance for countries navigating the associated challenges and opportunities. It serves as a timely resource for those seeking a smoother and more informed transition into the era of Industry 4.0.

Furthermore, this research provides a practical blueprint for corrective measures to enhance existing industrial plans. Industries can utilise the study as a roadmap in decision-making processes related to future development and expansion. The insights derived from the research offer guidance on aligning industry strategies with government objectives and vision.

In the realm of investments, this study contributes by offering a clearer perspective on the technological dimensions of industrial plans. The provided clarity facilitates industries in making informed and strategic decisions that align with the country's developmental goals, fostering more significant and purposeful investments.

In conclusion, the research significantly contributes to the understanding of Malaysia's industrial policies, offering valuable lessons and insights with applicability beyond national borders. The identified gaps and recommendations provide a solid foundation for future policy formulations, contributing to the sustainable economic growth and technological advancement of not only Malaysia but also other developing nations.

5.5 Future Research Direction

The completion of the paper on the "Assessment of the Technological Dimension in the Industrial and Development Policies in Malaysia" opens avenues for intriguing future research directions that could further enrich our understanding of Malaysia's industrial landscape and contribute to the broader field of industrial policy research.

One prospective avenue for future exploration involves a longitudinal analysis of the technological dimensions within Malaysia's industrial policies beyond the scope of the current study, extending the timeline to capture recent developments and policy shifts. Investigating the evolving trends and adaptability of Malaysia's industrial policies in response to emerging global challenges, technological advancements, and shifts in economic paradigms could offer valuable insights into the country's resilience and ability to stay at the forefront of industrial development.

Another potential area for future research could delve deeper into the intricacies of the identified gaps in Malaysia's industrial plans. This might involve a more granular examination of specific policy measures, their implementation processes, and the

outcomes achieved. Understanding the contextual nuances and success factors of individual policies within the broader technological dimensions could provide a more nuanced perspective, enabling policymakers to fine-tune their strategies for enhanced effectiveness.

The study primarily focused on the macro-level assessment of technological dimensions; thus, a micro-level analysis of the impact of industrial policies on specific industries or sectors could be a promising research direction. Investigating how different sectors respond to and capitalise on the technological dimensions outlined in the industrial plans would contribute valuable sector-specific insights, aiding policymakers in tailoring strategies for diverse economic segments.

Furthermore, exploring the comparative experiences of other countries in the ASEAN region or beyond in implementing technological dimensions in their industrial policies could offer a broader comparative analysis. Understanding the contextual variations, success stories, and challenges faced by neighbouring nations would provide a benchmark for Malaysia and facilitate cross-country learning.

Given the increasing emphasis on sustainability and the global push towards green technologies, a future research direction could focus on the integration of environmental considerations within Malaysia's industrial policies. Analysing how the country aligns its technological dimensions with sustainable development goals, green innovation, and eco-friendly practices would be pertinent, especially in the context of global efforts to combat climate change.

Additionally, an in-depth investigation into the role of public-private partnerships (PPPs) in the execution of technological dimensions within industrial policies could provide valuable insights. Understanding the dynamics of collaboration between the

government and private enterprises, and assessing the effectiveness of such partnerships in driving technological innovation and economic growth, would contribute to refining collaborative models for industrial development.

In conclusion, the completed study on the technological dimensions in Malaysia's industrial and development policies lays a solid foundation for future research endeavours. By exploring longitudinal trends, delving into specific policy measures, conducting sector-specific analyses, making cross-country comparisons, and assessing sustainability considerations and public-private partnerships, future research can significantly enrich our understanding of Malaysia's industrial policies and provide actionable insights for policymakers and stakeholders.

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