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Designing Strategies Framework for Effective Funding Formula Implementation at Malaysian Public Universities

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ABSTRACT

Over the past few decades, Malaysia's higher education system has undergone significant evolution and growth. With notable achievements in areas such as student enrolment, research publication, patents, and institutional excellence, the system has earned a global reputation and become a preferred destination for international students. However, the Ministry of Higher Education recognizes the need for the system to continue to evolve in order to stay current with global trends. A crucial element in this evolution is the provision of long-term funding to support and enhance the country's capacity to deliver high-quality education that meets international standards. In response to this need, the Ministry of Higher Education has proposed a change to the funding formula for Malaysian public universities, with the goal of improving the relationship between performance and outcomes. To this end, this study was conducted to design a strategy for the effective implementation of this new funding formula in Malaysian public universities. By providing a deeper understanding of the strategies required for successful implementation, the study's findings will be invaluable to both the Ministry of Higher Education and Malaysian public universities.

Contribution/Originality: This The findings of this study offer valuable insights into the challenges, opportunities, and potential reforms within Malaysia's higher education landscape, thereby advancing the knowledge base in this field.

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1. Introduction

Malaysia's higher education system has made significant strides in recent years, including increased student enrollment, global recognition in areas such as research and institutional excellence, and becoming a top destination for international students. However, the Ministry of Education acknowledges that the system must continue to evolve to keep up with global trends. To achieve this, the Malaysia Education Blueprint 2015-2025 (Higher Education) was developed, outlining 10 shifts to encourage the higher education system to maintain its excellence. One of these shifts is financial sustainability. Long-term funding for higher education is crucial to sustaining and rapidly improving Malaysia's ability to provide accessible, equitable, and high-quality education that meets international standards. Implementing a good funding formula is a critical step towards achieving this goal. A funding formula involves applying a mathematical formula to determine the allocation of resources to higher education institutions based on objective criteria such as student enrollment, degree programs, and program costs. Funding formulae have become essential tools for budgetary decision-making, particularly as the number of higher education institutions and student enrollment continue to grow rapidly. By adopting a funding formula, comprehensive conversations and negotiations can be eliminated, as the formula is based on a limited set of well-defined criteria that are clear and acceptable to all parties involved. Ultimately, implementing a good funding formula will be critical to sustaining and improving Malaysia's ability to provide high-quality education that meets international standards. By ensuring that resources are distributed fairly and efficiently, Malaysia can build a world-class higher education system that benefits students, employers, and society as a whole for years to come.

Public authorities face a critical challenge in funding mass higher education, not only due to the large amount of money involved, but also because of the need to distribute available funds equitably among different types of educational institutions. To address this challenge, Malaysia's Ministry of Higher Education (MoHE) is shifting away from traditional funding methods to new funding formulae that can finance HEIs' programs and student services while maintaining access and quality of education (Ahmad et al., 2012b). However, the need to improve the efficiency and effectiveness of higher education funding for long-term economic growth has prompted many policy reforms in both developed and developing countries (Ahmad et al., 2012a). To align higher education financing with overall government strategic planning, many countries, including Malaysia, have restructured their resources for funding higher education (Ahmad et al., 2012a). Therefore, HEIs must plan, strategize, and position themselves effectively to ensure the successful implementation of the new funding formulae at Malaysian public universities (Abdullah & Rahman, 2011). This study aims to investigate the strategies required to implement effective funding formulae by the MoHE to Malaysia's public universities, with the goal of determining the optimal approach for supporting the development of these funding formulae at Malaysian public universities.

2. Designing Strategy for Funding Higher Education Institutions

The pursuit of improved performance has become increasingly urgent for many higher education institutions in Malaysia. To assess their progress, these institutions have implemented performance monitoring systems, highlighting the importance of designing effective strategies in higher education. Such strategies involve creating and shaping the future, while also making sense of the past, and responding to changing

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circumstances rather than simply predicting them (Abdullah & Rahman, 2011). Strategic planning is an essential tool for higher education institutions to initiate policy reforms and adapt to changing economic conditions (Taylor et al., 2008). By aligning their strategies and actions with the government's agenda, strategic planning can help these institutions effectively adjust to new challenges and opportunities.

Developing flexibility and strategic opportunism should be prioritized in higher education (Altbach & de Wit, 2017), rather than relying solely on longer-term plans. To actively contribute towards the national agenda, institutions need to guide their course of action through a conscious effort to operationalize their planning approach (Kettunen, 2008). One of the key factors influencing institutional strategies in higher education is the funding system (Johnson, 2019). A well-designed funding system can stimulate strategic activities, such as workforce development and the establishment of effective procedures and systems (Smith & Brown, 2020). HEIs must, therefore, focus on developing funding rules that align with government objectives (Davis et al., 2021).

Higher education institutions play a vital role in shaping the future (Altbach & de Wit, 2017) by preparing individuals to meet the demands of a rapidly changing world (Clark & Thomas, 2018). In this dynamic landscape, the ability to adapt and seize emerging opportunities is paramount (Johnson, 2019). By embracing flexibility and strategic opportunism (Miller & Anderson, 2021), institutions can effectively respond to evolving societal needs (Smith & Brown, 2020), economic shifts, and technological advancements (Davis et al., 2021). This approach enables them to remain agile and resilient in the face of uncertainty (Clark & Thomas, 2018), ensuring their long-term sustainability and relevance (Miller & Anderson, 2021).

Operationalizing the planning approach is essential for higher education institutions (Kettunen, 2008). It involves translating strategic objectives into actionable plans and implementing them effectively (Johnson, 2019). Rather than relying solely on abstract, long-term plans, institutions should adopt a more proactive and adaptable stance (Miller & Anderson, 2021). This requires a deliberate effort to incorporate flexibility into their decision-making processes and structures (Smith & Brown, 2020). By doing so, institutions can swiftly adjust their strategies in response to changing circumstances (Clark & Thomas, 2018) and seize strategic opportunities as they arise (Davis et al., 2021).

The funding system holds significant influence over institutional strategies in higher education (Kettunen, 2008). Effective funding mechanisms can serve as powerful catalysts for positive change (Altbach & de Wit, 2017). They can incentivize strategic activities, including the development of a skilled workforce equipped to address emerging challenges and opportunities (Smith & Brown, 2020). For instance, funding programs can support initiatives such as professional development programs for faculty, curriculum enhancements, and the establishment of state-of-the-art infrastructure (Johnson, 2019). Such investments contribute to the overall quality and competitiveness of higher education institutions, enabling them to better serve their students and stakeholders (Davis et al., 2021).

Furthermore, a well-designed funding system can facilitate the establishment of efficient procedures and systems within higher education institutions (Kettunen, 2008). Adequate financial resources allow institutions to invest in technological advancements, administrative frameworks, and data-driven decision-making processes (Miller &

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Anderson, 2021). These investments not only improve operational efficiency but also enhance the overall student experience (Clark & Thomas, 2018). For example, funding can be allocated towards implementing student support services, creating digital learning platforms, or improving research infrastructure (Johnson, 2019). Such initiatives ensure that institutions can effectively adapt to the evolving needs of students and offer them a high-quality learning environment (Smith & Brown, 2020).

In line with this, the committee tasked with reviewing higher education in Malaysia has recommended increasing the total funding for higher education as a strategic investment in improving the quality and quantity of Malaysian human capital (Ahmad et al., 2012b). Previous research has also highlighted the significance of financial structures as a lever for policy change in higher education institutions (Strehl et al., 2007). Funding reform can address issues such as expansion and diversification, fiscal pressure, market orientation, demand for greater accountability, and demand for greater quality and efficiency (Johnstone, 2004).

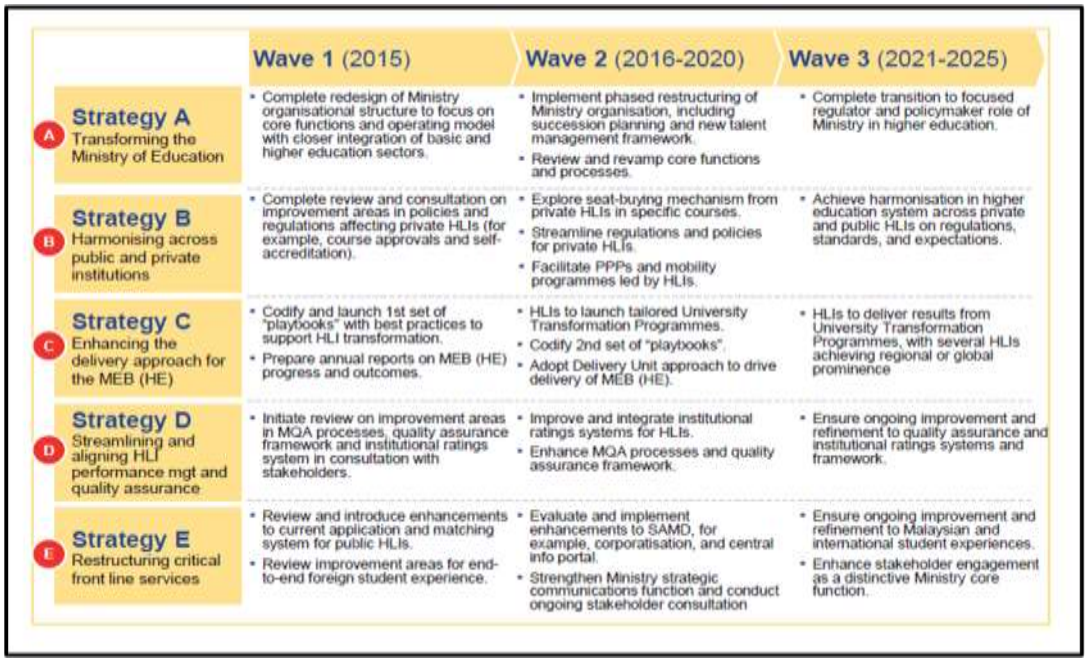
The implementation of a performance-based financing model was a significant change for Malaysia's higher education funding and resource distribution processes. This approach is based on specific criteria and indicators of performance, such as student enrollment and graduation rates, research output, and industry partnerships. HEIs are evaluated based on their performance, and the amount of funding they receive is tied to their results. This system ensures that public funds are used efficiently and effectively, encouraging HEIs to improve their performance and achieve better outcomes. Overall, the performance-based financing model promotes accountability and transparency in higher education funding, which is crucial for building public trust and confidence in the system.

The Malaysian Higher Education Blueprint (MEB) is a comprehensive plan that outlines the vision, goals, and strategies for the development of the country's higher education system. It was developed through a collaborative effort involving various stakeholders and is aimed at making Malaysia a developed nation by 2020. The blueprint aims to make Malaysia's higher education system more competitive and internationally recognized, with a focus on producing graduates who are highly skilled, innovative, and entrepreneurial.

The MEB has three waves of work that are designed to ensure that the system has the necessary capacity, capability, and readiness to achieve its goals. Wave 1 as stated in Figure 1 focuses on strengthening the governance and management of higher education institutions (HEIs), improving the quality of teaching and learning, enhancing research and innovation, and fostering greater collaboration between HEIs and industry. Wave 2 aims to enhance the internationalization of Malaysian higher education, increase the participation of underrepresented groups in higher education, and improve the employability of graduates. Wave 3 focuses on developing a sustainable financing model for higher education, improving the regulatory framework, and promoting lifelong learning. Overall, the MEB is a significant step towards making Malaysia's higher education system more competitive and internationally recognized. It provides a clear roadmap for the development of the system and emphasizes the importance of collaboration between various stakeholders as stated in Figure 2.

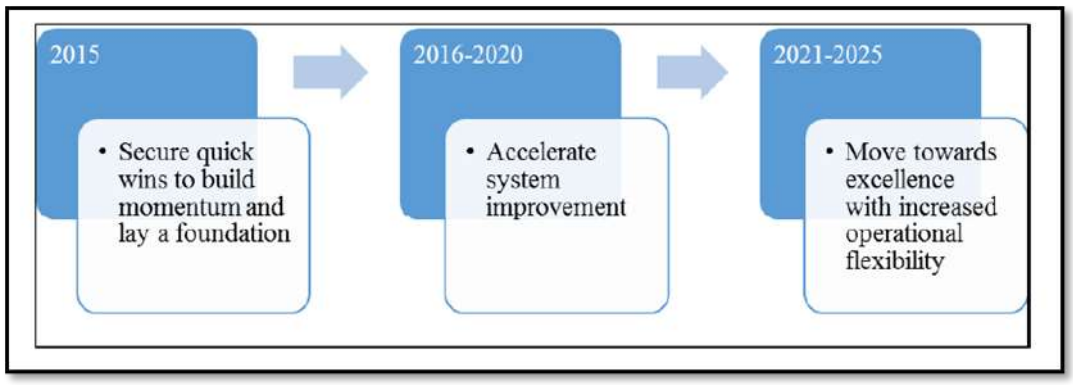
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Figure 1: Initiative Implementation Roadmap



Source: MoHE (2015)

Figure 2: Three implementation waves of MEB (2015-2025)



Source: Zain et al. (2017)

For Malaysia to achieve its ambitious vision and objectives for higher education, a complete overhaul of the system is necessary. The transformation process is expected to take 11 years and will require a comprehensive strategy that addresses the system's complexity and depth. However, a well-designed strategy alone is not enough. To succeed, the Malaysian Higher Education Blueprint (HEB) needs effective implementation, as well as the commitment and engagement of key stakeholders and higher education institutions (HEIs). The delivery of higher education encompasses all aspects of the Ministry of Education's activities, including policy and regulatory formulation, programme implementation, and oversight of HEIs. The Ministry's organizational structure, operational model, critical procedures, and internal competencies all play a crucial role in determining the efficiency and effectiveness of the system's delivery. Therefore, it is essential to ensure that these factors are aligned and optimized to achieve the goals set out in the HEB. The transformation of Malaysia's higher education system is a complex and challenging process that requires a well-planned strategy, effective implementation, and the involvement of all stakeholders. Only with a concerted effort and commitment can the country achieve its vision of

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becoming a leading global player in higher education and compete effectively in the global economy.

The MEB (HE) is a comprehensive plan that aims to transform Malaysia's higher education system into one of the world's leading educational systems. To achieve this, the plan outlines several strategies and initiatives that focus on redefining the role and organization of the Ministry of Higher Education, harmonizing across public and private institutions, strengthening quality assurance, enhancing delivery capabilities, and improving critical student-facing central platforms. These strategies and initiatives are sequenced across three waves to avoid overtaxing the system and to ensure that each successive wave builds on the foundations laid previously. The proposed roadmap provides a clear plan for planning, execution, and monitoring of the implementation process.

3. Funding Formula

A funding formula is a mathematical mechanism used to determine the amount of funding allocated to a higher education institution, based on measurable indicators such as student numbers (Estermann et al., 2013). This approach differs from other methods of determining funding, such as negotiation and historical allocation. The goal of using a funding formula is to increase transparency in the allocation process by linking funding to objective metrics.

The introduction of funding formulas in many countries has predominantly occurred since the 1980s and 1990s, although they have been utilized for an extended period in Canada and South Africa (Schiller & Liefner, 2007). As governments have increasingly committed themselves to directing higher education institutions towards specific goals, funding formulas have grown more prescriptive, as highlighted by Breier and le Roux (2012). Over time, funding formulas have evolved into intricate methodologies for allocating public funds. While funding formulas serve to provide a rationale and consistency in the distribution of state funds for higher education, they are designed and employed for multiple purposes, including measuring productivity. The complexities arise from variations in institutional missions and their capacities to fulfill those missions. However, these differences do not undermine the significance of funding formulas; instead, they suggest that such formulas can serve as a fiscal foundation to which funding can be supplemented or reduced.

4. Advantages of Funding Formula

The concept of funding formula emerged in many countries as a solution to simplify budget decisions amidst a rapid increase in the number of higher education institutions and students. As a result, budget authorities needed an efficient means of distributing resources fairly to HEIs without engaging in time-consuming discussions with individual institutions about their resource needs (Jongbloed, 2018). By basing funding allocation on a set of clear and well-defined criteria and indicators, the funding formula eliminates the need for lengthy negotiations and discussions between budget authorities and HEIs.

Formula funding has several benefits, including transparency, equality, accountability, and predictability, according to Mckeown-Moak (2010). The funding process becomes more transparent because money is no longer allocated based on discretionary decisions, but rather on quantifiable and transparent criteria. Institutions are treated

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equally regardless of their standing, ensuring greater fairness. Additionally, the formula provides accountability by specifying the usage and purpose of the funds, which improves responsibility on the part of both the funding agency and the receiving institution (Jongbloed, 2018). Finally, HEIs may use their own projections of the formula's components, such as student registration trends and completion rates, which allows them to plan their budgets more accurately.

5. Input and Output Criteria of Funding Formula

Formula-based allocation is a funding mechanism that uses a mathematical formula to determine the amount of funds allocated to higher education institutions based on specific inputs and outputs (Lepori et al., 2007). This approach is advantageous because it recognizes and values universities' ability to engage in long-term planning and adapt to changing circumstances. However, the effects of formula-based funding depend on various factors such as the extent to which input or output indicators are emphasized, as well as whether the budget is open or closed (Kalpazidou Schmidt, 2012).

Input criteria in funding allocation refers to the resources and activities employed by the HEI, and may include limitations on student enrollment, teaching personnel credentials, and state authorization of course syllabi (Jongbloed & Vossensteyn, 2001). Accreditation processes are another means of evaluating input criteria, often initiated by the government and resulting in public funding if successful. Unlike previous methods, however, accreditation decisions are made by academics or practitioners rather than government officials (Orr, 2005).

Output criteria refer to indicators that assess the performance of higher education institutions in terms of teaching and research (Jongbloed & Vossensteyn, 2001). The use of output criteria in higher education is gaining popularity as it shifts the focus from input management to evaluating the actual outcomes produced by the institution. This approach aims to make the work of universities more visible and facilitates evaluation, which can result in recommendations for future practice or summative quality judgments that allow for direct comparisons between institutions. Quality audits are a type of output criteria that are more nuanced than external quality evaluations, as they assess the effectiveness of an institution's internal quality evaluation systems in ensuring output quality, rather than the actual output produced.

In fulfilling its obligations to the government, a university engages in productive activity that can be analyzed using production theory, an input-output approach (Kivistö, 2007). The primary aim of production theory is to understand how inputs are transformed into outputs. In a simplified theoretical model, a production unit, such as a corporation or an organization, is expected to produce a single homogeneous product using various production techniques (Kivistö, 2007). For a university, production theory suggests that it should utilize its production technology to convert inputs into teaching and research outputs. These inputs may include human, financial, and physical resources, with human resources comprising the time and effort invested by university employees and students, financial resources consisting of monetary revenue and assets, and physical resources encompassing buildings, land, equipment, and consumables. The quantity and quality of outputs generated depend on the types of resources employed and how they are used.

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Governments worldwide have increasingly emphasized the importance of optimizing the economy, efficiency, and effectiveness of public resources allocated to higher education institutions (Cave, 1997). This focus on the "economic use of resources" entails producing the same level of teaching and research outputs with the least amount of expenditure, i.e., maximizing economic efficiency. The ratio of outputs to inputs is influenced by a university's technical efficiency, which refers to its ability to produce more teaching or research output without compromising quality or effectiveness (Abbott & Doucouliagos, 2003; Kivistö, 2007). The government's effectiveness requirements emphasize that universities should be "doing the right things" by achieving the government's objectives or accomplishing the desired outputs or outcomes.

6. Developments of Funding Formula

In the past, institutions often received their budgets based on the previous year's allocation, with adjustments made by the financial authority, usually a ministry of education or funding agency (Jongbloed, 2018). However, this gradual approach was criticized for being opaque and failing to provide adequate incentives for efficiency and innovation. As a result, funding formulae began to emerge as a more transparent and effective basis for budgeting decisions. Funding formulae have been utilized in the United States for over 50 years (Lasher & Greene, 2001).

Over time, funding formulae have become more sophisticated in their approach to achieving various system goals, moving beyond their initial aim of providing transparency and rationality in resource allocation decisions (Jongbloed, 2018). Rather than a simple calculation of a volume measure, a unit cost, and a program weight, modern funding formulae provide a framework for making institutions more responsive to central policy direction. To achieve this, formulae now include increasingly detailed measures such as performance indicators that reflect the growing diversity of institutional missions and their changing clientele.

7. Implementation of Funding Formula in Malaysia

It is worth noting that the PBF mechanism is an output-based funding model that provides funding to HEIs based on their performance in achieving specific objectives and targets (Salmi & Hauptman, 2006). In this system, the government sets specific performance indicators and targets, such as increasing the number of graduates or improving the research output, and universities receive funding based on their ability to achieve these targets. The adoption of the PBF mechanism can be beneficial as it encourages universities to focus on achieving specific outcomes and provides incentives for continuous improvement. However, it can also place additional pressure on universities to meet these targets and may result in a narrow focus on certain performance indicators at the expense of other important aspects of the university's mission, such as community engagement or equity considerations.

Performance-based funding systems aim to acknowledge institutions based on their demonstrated achievements rather than anticipated or promised outcomes (Salmi & Hauptman, 2006). To accomplish this, performance indicators should align with public policy goals and encompass incentives for institutional reform. Within a performance-based funding framework, universities are motivated to prioritize their outputs concerning students and research. The underlying objective of connecting funds to

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performance indicators is to enhance quality, productivity, and efficiency while augmenting the international prominence of institutions. While even a minimal allocation of financing tied to moderate objectives can boost efficiency, the task becomes more challenging when funding is contingent upon an extensive array of objectives. This may potentially lead to long-term efficiency concerns. Additionally, formulating quality metrics that can be integrated into formulas and calculations poses a significant challenge, and the efficacy of performance-based funding in improving quality is somewhat debatable (Salmi & Hauptman, 2006). The efficacy of performance-based funding hinges on the ability to articulate precise objectives and establish quality assessments that are valid, reliable, and widely accepted within the higher education system.

The identification of appropriate indicators for performance-based funding has been a prominent subject in scholarly literature. The contractual and competitive approach to funding university research assumes the accurate evaluation of research output quality and the identification of promising research avenues (Geuna, 2001). The effectiveness of funding reforms that link performance to funding relies heavily on establishing indicators that are reliable, uncontested, and accurately measure educational and research performance (Jongbloed & Vossensteyn, 2001). In financing systems that employ indicators as parameters for resource allocation, it is crucial to ensure high validity and reliability while minimizing potential side effects, which poses a significant challenge. The availability of data presents a major limitation that impacts the implementation of performance indicators (Layzell, 1998). Hence, it is crucial to identify and select pertinent and reliable indicators that are in line with policy objectives to ensure the prosperous implementation of performance-based funding systems.

In practice, to avoid potential injustices to higher education institutions (HEIs), financial bodies often use a combination of input and output measures when allocating resources. However, according to Jongbloed and Vossensteyn (2001), using a variety of indicators is preferable to relying on a single, one-dimensional metric, as it allows for a more comprehensive and accurate approximation of the output's various dimensions in terms of quantity and quality. Nevertheless, the mix of input and output components in the funding mechanism will ultimately be a political decision, as the indicators will directly relate to the financial authorities' aims and how they believe these objectives can be best achieved. Furthermore, objectives are often ephemeral and subject to political agendas and priorities, which can complicate the task of identifying relevant indicators and designing a funding system that effectively balances input and output measures (Jongbloed & Vossensteyn, 2001).

The implementation of the new performance and outcome-based funding formulae in public higher learning institutions (HLIs) has been outlined by the ministry and includes specific terms to be followed. These terms include the definition of clear key performance indicators (KPI) for each public HLI, the replacement of block grants with performance-linked and per-student funding, the implementation of 5-year performance contracts (3+2), and the targeting of government investment in priority areas (MoHE, 2015). By setting clear KPIs, the ministry aims to establish a performance-based culture in HLIs, with funding linked to performance outcomes. Additionally, the implementation of performance contracts and the targeting of investment in priority areas will help ensure that public funds are used effectively and efficiently to achieve the desired outcomes in higher education.

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8. Conclusion

The new funding model aims to better reflect the needs of the nation's economy, students, and higher education institutions (HLIs). This will increase competition among institutions, as funding will increasingly follow students, allowing them to make informed decisions based on HLI performance. The government can harmonize institutional and national interests by varying funding levels and incentives. The new model will be implemented gradually, with a focus on institutions that are ready to accept it, to avoid significant funding swings. The deployment pace and measurements will be customized to each HLI's type, profile, and characteristics. Although funding formulas still account for the majority of an institution's budget in many countries, funding authorities are employing alternative revenue streams and devices to encourage institutions to engage in extra activities aligned with statewide goals. Developing sufficient funding formulas is a challenging task that must be regularly revised to keep up with changes in higher education governance and reflect economic and political realities. As a result, many higher education institutions, both large and small, have begun to develop their own strategic plans, reflecting their vision for institutional development prospects. This study significantly contributes to the existing literature on Malaysia's higher education system by shedding light on previously unexplored aspects, expanding upon prior research, and providing fresh perspectives that enrich our understanding of the specific context.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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