Strategies for Sustainable Education in Egyptian Universities: A Conceptual Framework in Light of Nafee's Integrated Model of Institutional Excellence and Smart Transformation (N. IMOE)

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Abstract:

Egyptian universities face a series of rapidly evolving and complex challenges, most notably limited financial resources, intensifying competition at the regional and global levels, rapid digital transformations, and academic quality and accreditation requirements. Based on these challenges, this research seeks to develop a conceptual framework for strategies for sustainability in Egyptian universities, based on Nafee's integrative model of institutional excellence and smart transformation (N. IMOE). The research employed a descriptive-analytical approach, supported by a conceptual review of existing policies and prior studies, and incorporated comparisons with prominent international models such as EFQM. The proposed framework illustrates mechanisms for integrating key model components—strategic intelligence, strategic agility, leadership, innovation and digital learning management, artificial intelligence capabilities, and talent management—with the phased transformation cycle comprising abandonment, adoption, adaptation, excellence, competition, and smart transformation. This integration facilitates the translation of strategic objectives into actionable, measurable, and sustainable practices. The results revealed a gap between the level of awareness of the importance of sustainability and the level of its actual implementation, highlighting the need for an integrated institutional framework that links policies, resources, and digital infrastructure to ensure sustainable performance and enhance institutional excellence in Egyptian universities. Based on this, the research proposes a set of recommendations, most notably integrating sustainability into university policies, developing digital infrastructure, building human capacity, allocating stable financial resources, expanding community and international partnerships, and adopting pilot projects supported by accurate performance indicators to measure progress toward smart transformation.

Key words: *Strategies for sustainable education; N. IMOE model: Smart transformation; Institutional excellence; Egyptian universities.*

إستراتيجيات التعليم المستدام في الجامعات المصرية:
إطار مفاهيمي في ضوء نموذج نافع المتكامل للتميز المؤسسي والتحول الذكي (N. IMOE)

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الملخص:

تواجه الجامعات المصرية جملة من التحديات المتسارعة والمعقدة، من أبرزها محدودية الموارد المالية، وتصاعد حدة المنافسة على المستويين الإقليمي والعالمي، إلى جانب التحولات الرقمية المتلاحقة، ومتطلبات الجودة والاعتماد الأكاديمي. وانطلاقًا من هذه التحديات، يسعى البحث الحالي إلى تطوير إطار مفاهيمي لاستراتيجيات استدامة التعليم في الجامعات المصرية، بالاستناد إلى نموذج نافع التكاملي للتميّز المؤسسي والتحوّل الذكي. استند البحث إلى المنهج الوصفي التحليلي، مدعومًا بمراجعة مفاهيمية للسياسات والدراسات السابقة، مع الاستفادة من المقارنة مع نماذج دولية رائدة مثل EFQM. ويبيّن الإطار المقترح آليات دمج مكوّنات النموذج (الذكاء الاستراتيجي، البراعة الاستراتيجية، القيادة، إدارة الابتكار والتعلم الرقمي، جدارات الذكاء الاصطناعي، وإدارة المواهب) مع دورة التحوّل المرحلية (التخلي، التبني، التكيّف، التميّز، التنافس، التحوّل الذكي)، بما يتيح ترجمة الاستراتيجيات إلى ممارسات قابلة للتنفيذ والتقويم وقد كشفت النتائج عن وجود فجوة بين مستوى الوعي بأهمية الاستدامة ومستوى تطبيقها الفعلي، الأمر الذي يبرز الحاجة إلى إطار مؤسسي متكامل يربط بين السياسات والموارد والبنية التحتية الرقمية، بما يضمن استدامة الأداء ويعزّز التميّز المؤسسي في الجامعات المصرية. وبناءً على ذلك، يقترح البحث حزمة من التوصيات، من أبرزها: دمج الاستدامة في السياسات الجامعية، تطوير البنية التحتية الرقمية، بناء القدرات البشرية، تخصيص موارد مالية مستقرة، توسيع نطاق الشراكات المجتمعية والدولية، إلى جانب تبني مشروعات تجريبية مدعومة بمؤشرات أداء دقيقة لقياس التقدّم نحو التحوّل الذكي.

الكلمات المفتاحية: ***إستراتيجيات التعليم المستدام؛ التحوّل الذكي؛ التميّز المؤسسي؛ الجامعات المصرية؛ نموذج نافع التكاملي (N. IMOE).***

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Introduction

Egyptian universities currently face a number of accelerating and complex challenges stemming from internal and external factors, most notably limited financial resources, intensifying regional and global competition, successive digital transformations, quality requirements, and academic accreditation. These challenges have necessitated the adoption of comprehensive sustainability strategies that enable higher education institutions to adapt and innovate while simultaneously enhancing their pivotal role in achieving the Sustainable Development Goals for 2030.

Educational sustainability strategies are the independent variable in this research, embodied in a system of policies and practices that establish the principles of efficiency, flexibility, reliance on innovation, and modern technology in university education. Egyptian universities represent the application area of these strategies, which directly impacts the quality of institutional performance and levels of excellence (Abdullah, 2020).

Given that sustainability strategies cannot achieve their objectives in isolation from an integrated framework, Nafee's Integrated Model of Institutional Excellence and Smart Transformation (N. IMOE) emerges, explaining the dynamic relationship between strategies and their outcomes (Nafee, 2025a). This model is based on an interconnected engineering design philosophy that weaves complementary relationships between the elements of institutional excellence and smart transformation across three core circles. Nafee (2025h) defined them as follows:

- The central circle includes six core components: strategic intelligence, strategic agility, strategic leadership, innovation management, artificial intelligence competencies, and talent management. These components represent essential pillars of institutional excellence and enhanced university performance.
- The middle circle embodies the interconnections between these components within a flexible, open structure that ensures consistency between leadership, planning, implementation, and strategic empowerment.
- The outer circle includes six successive stages: abandonment, adoption, adaptation, excellence, competition, and digital transformation, forming a roadmap for managing institutional change in a gradual and cumulative manner.

The model, as a whole, embodies a philosophy based on the principles of continuity and continuous improvement. It relies on a circular mechanism that links planning, leadership, and strategy within a comprehensive framework for smart institutional excellence (Hassan, 2025g).

In the Egyptian context, Abu Saada et al.'s (2021) study demonstrated that institutional excellence represents a key approach to improving both educational and administrative performance within educational institutions. The study revealed that the level of practice of the dimensions of institutional excellence was average, while its importance was highly rated. This indicates a clear gap between awareness of the

importance of this approach and the level of its actual application in practice. As a study, Hassan & Hassan (2024a) also confirms the urgent need to adopt innovative mechanisms that enhance the effectiveness of institutional excellence to achieve efficiency and feasibility within educational institutions.

Shahata et al.'s (2021) study also found that institutional excellence standards are moderately available at Alexandria University, with obstacles limiting their optimal implementation. This prompted researchers to propose a vision for implementing these standards. The study by Hassan & Hassan (2025b) also pointed to the need for universities to provide more integrated and flexible performance quality models that are appropriate to the nature of the local environment and the requirements of sustainable development.

From this perspective, the importance of the current research emerges in employing Nafee's Integrated Model of Institutional Excellence and Intelligent Transformation (N. IMOE) to build a conceptual framework that contributes to overcoming the limitations of traditional models and enhancing the effectiveness of educational sustainability strategies in Egyptian universities. The model reflects the philosophy of continuous improvement and continuity, based on a circular approach that links leadership, planning, and strategy within a comprehensive framework of smart institutional excellence (Nafee, 2024d).

Accordingly, this research aims to analyze educational sustainability strategies in Egyptian universities in light of Nafee's integrative model, with the goal of formulating an integrated conceptual framework that contributes to the development of university policies and enhances the ability of higher education institutions to innovate, adapt, and compete regionally and internationally.

Research Problem

Egyptian universities have witnessed an increase in the challenges associated with achieving educational sustainability, whether in terms of securing funding, ensuring the quality of academic programs, or enhancing the ability to keep pace with global digital transformations. Despite partial attempts to adopt strategies based on continuity and development, these efforts often lack integration and comprehensiveness. This leads to a widening gap between theoretical policies and applied practices within educational institutions.

A study by Tawfik and Refaat (2023) in the Egyptian context indicated that the use of artificial intelligence (AI) technologies represents a strategic necessity for supporting academic excellence and developing teaching and learning processes. However, the study also highlighted a gap between the theoretical importance of AI and its practical application within Egyptian universities. Traditional educational practices still dominate, while smart transformation initiatives are characterized by slowness and a lack of an integrated institutional vision. The study demonstrated that the lack of systematic integration of AI into educational policies is one of the obstacles to

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achieving educational sustainability. This confirms that any strategy for achieving sustainable education cannot ignore AI as a necessary requirement for institutional development, especially in light of Nafie's Integrated Model for Institutional Excellence and Smart Transformation (N. IMOE), which focuses on digital innovation as one of the drivers of sustainable university transformation.

In the same context, Hashem's (2024) study revealed a striking implementation gap. Despite widespread recognition of the importance of AI in improving the quality of education and supporting faculty members, its adoption in Egyptian universities remains slow due to deficiencies in technological infrastructure, a scarcity of qualified human resources, and the lack of alignment of policies with a unified national vision. The study by Hassan & Hassan (2024c) also pointed out that most of the proposals contained in the literature remain confined to theoretical concepts and detailed scenarios, without being translated into integrated institutional implementation frameworks that ensure gradual adoption and a practical shift towards digital education.

Hassan's (2024d) study points to the heart of the research problem: while there is theoretical awareness of the feasibility of AI in education, limited institutional and practical integration between strategies and policies on the one hand and practical implementation on the other still prevents the achievement of educational sustainability. Hence, the need for an operational and engineering framework capable of transforming visions and policies into gradual implementation paths (from the phase of abandonment to the phase of digital transformation), while addressing the requirements of infrastructure, capacity building, talent management, and enhanced governance. This is embodied in Nafee's Integrated Model for Institutional Excellence and Intelligent Transformation (N. IMOE).

Based on the above, the justifications for the current research are increasingly important in developing a conceptual framework that links educational sustainability strategies with the components of the (N. IMOE) model, thus bridging the gap between the theoretical potential of artificial intelligence and the requirements of actual institutional application within Egyptian universities.

Hence, the need for an integrated conceptual framework is evident through which educational sustainability strategies can be analyzed and the dynamic interaction between the elements of institutional excellence and the requirements of smart transformation can be understood. Nafee's Integrated Model of Institutional Excellence and Smart Transformation (N. IMOE) provides a comprehensive vision that allows these strategies to be examined from a perspective that links leadership, governance, resource management, processes, results, and technological innovation.

Accordingly, the research problem is defined as identifying educational sustainability strategies in Egyptian universities and analyzing them in light of Nafee's Integrated Model of Institutional Excellence and Smart Transformation, leading to the construction of a conceptual framework that contributes to developing institutional performance

and promoting sustainable excellence. Based on the above, the research seeks to answer the following questions:

1. What are the most prominent frameworks of reference that address educational sustainability strategies?
2. What are the main components of Nafee's integrative model of institutional excellence?
3. What are the most important challenges facing Egyptian universities in adopting educational sustainability strategies?
4. What are the appropriate ways to apply Nafee's integrative model to analyze educational sustainability strategies at Egyptian universities?
5. What is the proposed conceptual framework for educational sustainability strategies at Egyptian universities in light of Nafee's integrative model?

Research Sample

Given the theoretical and analytical nature of the research, it does not rely on a traditional field sample. Rather, it relies on:

- Analysis of previous literature and studies (Arab and foreign) related to institutional excellence and higher education sustainability.
- Reviewing official policies and reports of Egyptian universities.
- Adopting the Nafie Integrative Model as an analytical framework.

Research Tools

The research tools consist of the following:

- Theoretical review and conceptual analysis of relevant literature.
- Analysis of policies and official documents related to higher education strategies in Egypt.
- The analytical framework of the Nafee Integrative Model (N. IMOE) as a tool for interpreting the relationship between sustainability strategies and institutional excellence.

Research Methodology

The research followed the following methodology:

- Descriptive-Analytical Approach: To monitor and analyze the literature and policies related to educational sustainability in universities.
- Conceptual Analysis: To derive a conceptual framework by integrating sustainability strategies with the dimensions of the model.
- Comparative Approach: To utilize international models (such as EFQM) and compare them to the extent to which a useful model fits the specificity of the Egyptian context.

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Delimitations and Scope of the Research

Substantive Delimitations (Content)

The research focuses on educational sustainability strategies in universities as institutional policies and practices and their relationship to the level of institutional excellence and performance quality in light of Nafee's Integrated Model of Institutional Excellence and Smart Transformation (N. IMOE).

The research does not address the details of field teaching or course content, unless they are directly related to institutional sustainability policies.

Spatial Delimitations

The scope of the study is limited to Egyptian universities (public and private), as they are the primary application area for employing the N. IMOE framework.

Temporal Delimitations

The research covers relevant literature, policies, and reports from 2020 to 2025, drawing on older sources when necessary to support the theoretical and applied frameworks.

Methodological Limits

The research relies primarily on descriptive analytical approaches, conceptual analysis, and policy and document analysis, employing a comparative approach to review international models (such as EFQM) and compare them to the suitability of Nafee's integrative model.

The research does not include a large quantitative field study (such as representative questionnaires). Rather, it focuses on documentary review and theoretical analysis, along with a preliminary evaluation of the model through the opinions of a selected group of experts to support its practical validity.

Human Limitations (Expert Sample)

Model validation is based on the opinions of a select group (13) of experts and specialists in the fields of strategic planning, institutional excellence, artificial intelligence, and university leadership. This is done through a purposive sample for validation purposes, without including a representative sample of faculty members or students.

Variable Limits

- **Independent Variable:** Education Sustainability Strategies (policies, practices, programs).
- **Mediating/Controlling Variable:** The Nafee Integrated Model of Operational Excellence (N. IMOE) with its components (strategic intelligence, strategic agility, strategic leadership, innovation management, artificial intelligence competencies, and talent management).
- **Dependent Variable:** Level of Institutional Excellence and Quality of Performance in Universities.

The analysis is limited to examining the theoretical and analytical relationships between these variables, without directly quantifying the magnitude of the impact through extensive field data.

Definition of Terms

The research terms are operationally defined as follows:

- **Education Sustainability Strategies**: Policies and practices that aim to ensure the continuity of higher education with efficiency, effectiveness, and quality, with the ability to adapt to internal and external variables to serve the goals of sustainable development.
- **Institutional Excellence:** The ability of educational institutions to achieve sustainable and distinguished results through the integration of leadership, governance, resource management, processes, and results.

Nafee Integrated Model for Institutional Excellence and Smart Transformation (N. IMOE): A strategic framework for improving the performance of Egyptian universities, based on the following elements: digital transformation, artificial intelligence, innovation management, and talent management.

Theoretical framework

The concept of education sustainability strategies

Education sustainability strategies refer to a system of theoretical frameworks and practical applications that aim to enable educational institutions, particularly universities, to meet the needs of the present without compromising the ability of future generations to meet their own needs. These strategies are not limited to the introduction of a single course or program but extend to comprehensive reforms in educational policies, curricula, teaching methods, and infrastructure, in addition to building effective partnerships with the community and the environment. These strategies also rely on measurement and digitization tools to support sustainable and smart transformation (Hassan, 2024e). Their most prominent concepts can be summarized as follows:

Education for Sustainable Development (ESD): A global framework led by UNESCO that aims to integrate the values, knowledge, and skills of sustainable development into educational policies, curricula, and learning environments. This includes incorporating sustainability topics into academic programs, training faculty members, and linking university research to community service and the achievement of sustainable development goals (The Arab Centre for Educational Research for Gulf States, 2024, p. 121).

1. **Systems Thinking:** A methodology that views educational sustainability as an interconnected system whose elements and relationships influence each other. This approach contributes to the design of integrated policies that link

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curricula, infrastructure, governance, and funding, rather than relying on isolated initiatives (Obaidat & Abu Al-Samid, 2013, p. 114).

2. **Institutional Theory:** A framework that explains why institutions adopt certain practices in response to regulatory, social, or cultural pressures. It helps analyze the factors that motivate and resist change within public and private universities, such as laws, funding mechanisms, societal pressures, and academic accreditation expectations (Al Mishbahy, 2024).
3. **Triple Bottom Line:** People, Planet, Prosperity: A measure of institutional performance that balances social, environmental, and economic dimensions, going beyond the traditional focus on profit to include social justice, environmental protection, and resource sustainability (Al-Saad et al., 2012).
4. **Transformative & Organizational Learning:** Concepts that emphasize the ability of individuals and institutions to reshape beliefs, practices, and organizational structures in order to embrace new visions. This requires developing the capabilities of faculty members, adopting critical and participatory teaching methods, and building an institutional culture based on innovation and continuous experimentation (Mohammad, 2015).

Components of Education Sustainability Strategies

The structural framework for education sustainability strategies is an organizational map that illustrates the key dimensions and axes that must be integrated in order to transform the university into a sustainable education system. This transformation is not limited to curricula but also includes governance, infrastructure, human resources, scientific research, and community partnerships (Hassan, 2025f). This framework enables decision-makers and academic practitioners to plan interconnected interventions, measure their impact, and ensure their continuity and gradual expansion. Al-Balqasi (2025) defined it as follows:

- **Governance and policies:** Formulating institutional mechanisms for decision-making and oversight of sustainability issues through clear policies, dedicated budgets, specialized committees, and strategic plans, with performance indicators that measure the extent to which these mechanisms are being implemented (The Arab Centre for Educational Research in the Gulf States, 2022).
- **Curriculum and teaching methods:** Integrating sustainability concepts into coursework and adopting teaching methods that stimulate critical thinking and transformative learning, thereby enhancing graduates' skills and qualifying them for active participation in society (Da'amiss, 2008).
- **Capacity building and institutional learning:** Develop the skills of faculty and administrators, and establish a culture of continuous learning and innovative practices through training programs and platforms for sharing experiences (Al-Farzay, 2018).

- **Infrastructure and environment:** Creating environmentally friendly educational facilities that are efficient in their consumption of energy and resources, thereby reducing environmental impact and enhancing the learning environment (Kafi, 2017).
- **Technology and smart transformation:** Using digitalization and smart tools to track sustainability indicators in real time, improve the quality of education, and expand its scope (Al-Salhouti, 2025).
- **Research and knowledge production:** Directing scientific research towards sustainability issues and linking its results to the needs of society, ensuring the production of applicable local solutions (Farahati, 2012).
- **Partnerships and community engagement:** Building strategic relationships with government, industry, and civil society to transfer knowledge and strengthen the university's role as an engine of development (Abdel Galil, 2011).
- **Equity and inclusion:** Ensuring that educational opportunities and outcomes are accessible to all groups without discrimination (Hassan, 2025k), while adopting policies that support marginalized groups and students with special needs (Al Jabouri, 2015).
- **Monitoring and evaluation:** Establishing integrated systems to measure performance and track progress, and providing accurate data to correct policies and make evidence-based decisions (UNESCO, 2018).
- **Change management and leadership:** Develop mechanisms to lead institutional transformation and mitigate resistance to change through awareness campaigns and organizational incentives (Emad El-Din, 2010).
- **Financial and economic sustainability:** Securing sustainable financial resources for sustainability initiatives through diversifying funding sources and implementing green business models (Al Tarawneh & Al Ayyad, 2024).
- **Accreditation and quality:** Integrating sustainability elements into accreditation and quality assurance standards, making them an essential part of academic competitiveness (Al Buhay, 2018).

The essential elements of the "Nafee" integrated model for institutional excellence

Identifying the essential elements of any institutional excellence model is a fundamental step in understanding how it works and exploring its potential applications in practical contexts. With regard to the Nafee integrative model, the analysis requires clarification of the theoretical and functional components on which the framework is based, starting with leadership and strategic foresight, through artificial intelligence capabilities, to talent management. This clarification allows each component to be linked to educational sustainability strategies and its impact on institutional performance to be measured (Hassan, 2025i). This introduction highlights the

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importance of detailing the basic elements of the model, thereby enhancing its applicability and measurability within Egyptian universities. Nafee's integrated model is based on six interrelated strategic components that form the core structure of the framework, as defined by Nafee (2024b) as follows:

- **Strategic intelligence:** This includes foresight, adopting a systemic vision, and developing strategic alliances.
- **Strategic flexibility or agility:** This is the ability of an institution to combine exploration and exploitation with rapid adaptation to change.
- **Strategic leadership:** This means transformational leadership that is capable of driving innovation and taking calculated risks.
- **Talent management:** This includes attracting, developing, and retaining academic and administrative talent.
- **Artificial intelligence competencies:** Covers the technical, ethical, cognitive, and educational dimensions associated with the use of artificial intelligence in education.
- **Innovative prospects for digital learning and innovation management:** These include adaptive learning, smart assessment, virtual laboratories, and innovation governance.

The model links these components through what is known as the "triangle of forces," which consists of strategic leadership, strategic thinking, and strategic planning. The implementation of the model is supported by a phased framework known as "Nafee 3/6," which describes the path of organizational change through six consecutive stages: abandonment → adoption → adaptation → excellence → competition → digital transformation (Hassan, 2025g). This is illustrated in Figure 1 below:

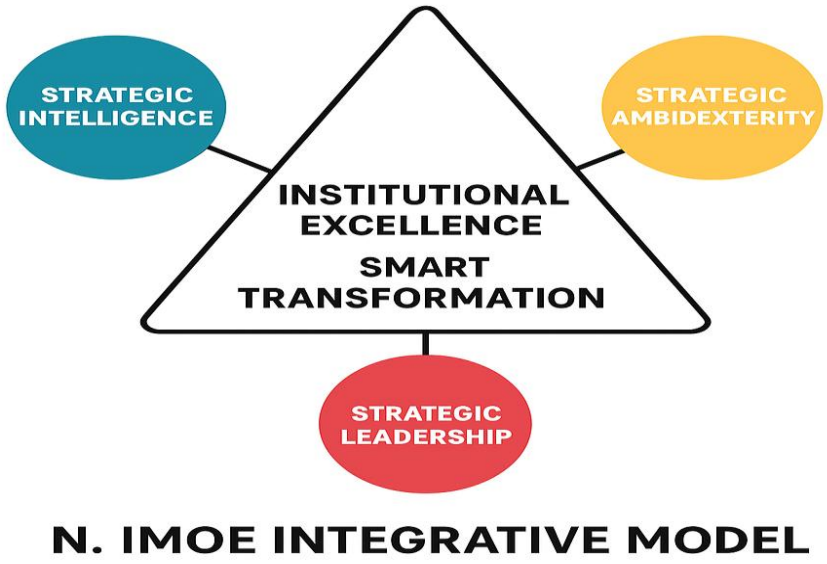

Figure 1. triangle of forces of N. IMOE model
Source : Prepared by the Researcher

Figure 1 illustrates the fundamental structure of the N. IMOE model, which places institutional excellence and smart transformation at its center as the ultimate goal, while the three sides of the triangle represent the supporting strategic pillars: strategic intelligence, strategic flexibility/agility, and strategic leadership. This design highlights the complementary relationship between the three pillars and indicates that any imbalance in one of the sides will affect the stability of the triangle and, consequently, the achievement of the desired excellence and transformation. The figure also reflects the idea that these pillars are not linear but balanced and equally important, guiding universities to work in parallel on developing their foresight, adaptability, and transformational leadership capabilities to achieve effective educational sustainability.

Challenges Facing Egyptian Universities in Implementing Sustainability Strategies in Education

Analyzing the structural and practical challenges that hinder the adoption of sustainability strategies in education is a fundamental step toward developing realistic and applicable solutions (Hassan, 26). The Nafee integrative model contributes to understanding the nature of these challenges and aligning theoretical frameworks with the specificities of the local environment, ensuring the effectiveness and sustainability of strategies (Hassan, 2025i). Egyptian universities vary in their institutional readiness, resources, and infrastructure, and organizational and cultural complexities may hinder the transition to sustainable educational practices. Mujahid & Jamaluddin (2023) identified the most prominent of these challenges as follows:

- **Varying readiness and infrastructure**: There is a noticeable gap between universities in terms of digital infrastructure availability, with some institutions enjoying advanced digital practices while others lack basic requirements such as networks, electronic platforms, and cloud computing services.
- **Weak integration between policies and components**: There is a disconnect between digital transformation strategies, talent management, and strategic intelligence activation, which hinders the implementation of integrated and comprehensive sustainability strategies.
- **Inadequate foresight and decision support mechanisms:** Some universities lack effective monitoring and forecasting systems and clear forward-looking indicators to aid in future sustainability-related decision-making.
- **Lack of staff competencies in artificial intelligence and digital learning:** There remains an urgent need for comprehensive training programs and practical competency matrices for faculty and administrators to enable them to employ modern technologies to support educational sustainability.
- **Institutional and cultural barriers**: These include resistance to change, a weak culture of innovation, and incentive systems that do not encourage experimentation or the adoption of new initiatives.

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- **Limited funding and financial sustainability**: There is a scarcity of resources allocated to digital transformation and sustainability projects and a lack of stable innovation funds to support these initiatives in the long term.
- **The gap between research and application**: Local research focuses more on theory than practical application, which reduces the production of solutions that can be adopted and generalized within the university environment.

These challenges are clearly evident in analyses of the readiness of Egyptian universities, necessitating the alignment of the Nafee model with their institutional realities and addressing gaps in integration and resource allocation to ensure the effectiveness and sustainability of sustainability strategies.

Appropriate methods for applying the integrated "Nafee" model in analyzing sustainability strategies at Egyptian universities

Transforming an integrated theoretical model into an analytical mechanism that can be applied in the field requires a clear methodology and measurable implementation tools. This includes diagnostic steps and local adaptation, as well as adopting a preliminary experimental approach based on the active participation of stakeholders and linking the implementation stages to an integrated system of monitoring, evaluation, and performance indicators. It is therefore necessary to adopt a practical and systematic approach that enables universities to test the model, modify it, and expand its application in a deliberate and disciplined manner.

Based on this, a gradual methodological approach is proposed, based on a research methodology that combines quantitative and qualitative methods (mixed methods) in an iterative design, using phased measurement tools that allow for gradual clarity in implementation. This framework includes the following steps:

1. Initial diagnosis: This includes exploratory reading, preparing digital readiness maps, gap analysis, and assessing artificial intelligence and talent management capabilities, using research tools such as questionnaires, leadership interviews, and infrastructure surveys.
2. Local adaptation: Aligning the components of the **N. IMOE** model with the university's priorities in line with local policies, resources, and environment.
3. Phased planning: Adopt the **Nafee 3/6** model to divide implementation into sequential phases (abandonment → adoption → adaptation → … → digital transformation) with specific success indicators for each phase.
4. Pilot implementation: Implement initial projects on a limited scale (e.g., a faculty or laboratory) to measure impact, such as adaptive learning or smart assessment, before gradual expansion.
5. Measurement mechanisms and indicators: Design a balanced scorecard linking N. IMOE components to educational, environmental, social, and financial sustainability indicators.

6. Advanced analytical tools, such as scenario analysis to predict feedback loops and predictive analytics to monitor leakage risks or failure probabilities.
7. Governance and stakeholder engagement: Establish specialized units or committees such as a strategic intelligence unit, talent management, or artificial intelligence center, while strengthening partnerships with industry and community sectors.
8. Follow-up and institutional learning: Adopt an integrated monitoring and evaluation (M&E) cycle, including progress reports, annual reviews, and continuous improvement mechanisms based on evaluation results.

The proposed conceptual framework for sustainability strategies in education at Egyptian universities, based on the Nafee integrative model

Formulate a conceptual framework that links sustainability strategies to the components of the Nafee integrative model, enabling researchers and decision-makers to gain a comprehensive view of the causal and operational relationships between inputs, processes, outputs, and outcomes. The framework should clarify how smart governance, curricula, digital infrastructure, AI capabilities, talent management, and innovation can be integrated to achieve measurable institutional excellence in line with sustainable development goals. This introduction aims to clarify the purpose of building an integrated conceptual framework that contributes to guiding policies and interventions at the level of Egyptian universities.

Key elements of the conceptual framework

1. Smart governance & strategic intelligence

Role: Develop a vision aligned with the Sustainable Development Goals (SDGs), policies, and indicators.

Expected outputs: An institutional roadmap for sustainability and measurable indicators.

2. Curriculum and Learning (Innovative Horizons for Digital Learning)

Role: Integrate sustainability content, adaptive learning practices, and smart assessment into curricula.

Outputs: Integrated courses, project-based learning experiences, and micro-credentials.

3. Digital Infrastructure and AI Capabilities

Role: Enabling smart learning, impact measurement, and efficient resource management (energy/waste/transportation).

Outputs: Smart learning platforms, dashboard indicators, and consumption monitoring systems.

4. Talent Management & Capacity Building

Role: Training faculty and administrators on sustainability and AI skills.

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Outputs: Competency matrix, professional development programs, incentive mechanisms.

5. Innovation and applied research

Role: Directing research towards sustainable local solutions and linking results to society and industry.

Outputs: Applied projects, innovation centers, solution incubators.

6. Partnerships and community engagement.

Role: Ensuring social/economic impact and collaborating on the financing and implementation of sustainability initiatives.

Outputs: Local/international partnership agreements, community service programs.

7. Indicators and financing

Role: Measure performance and ensure sustainability of financial resources (green funds, funded partnerships).

Outputs: KPI dashboard, sustainable business model for campus projects.

Figure 2 below presents the integrated Nafee framework as an operational mechanism linking the components of the institutional model and the six-stage transformation cycle (abandonment → adoption → adaptation → excellence → competition → smart transformation). As illustrated:

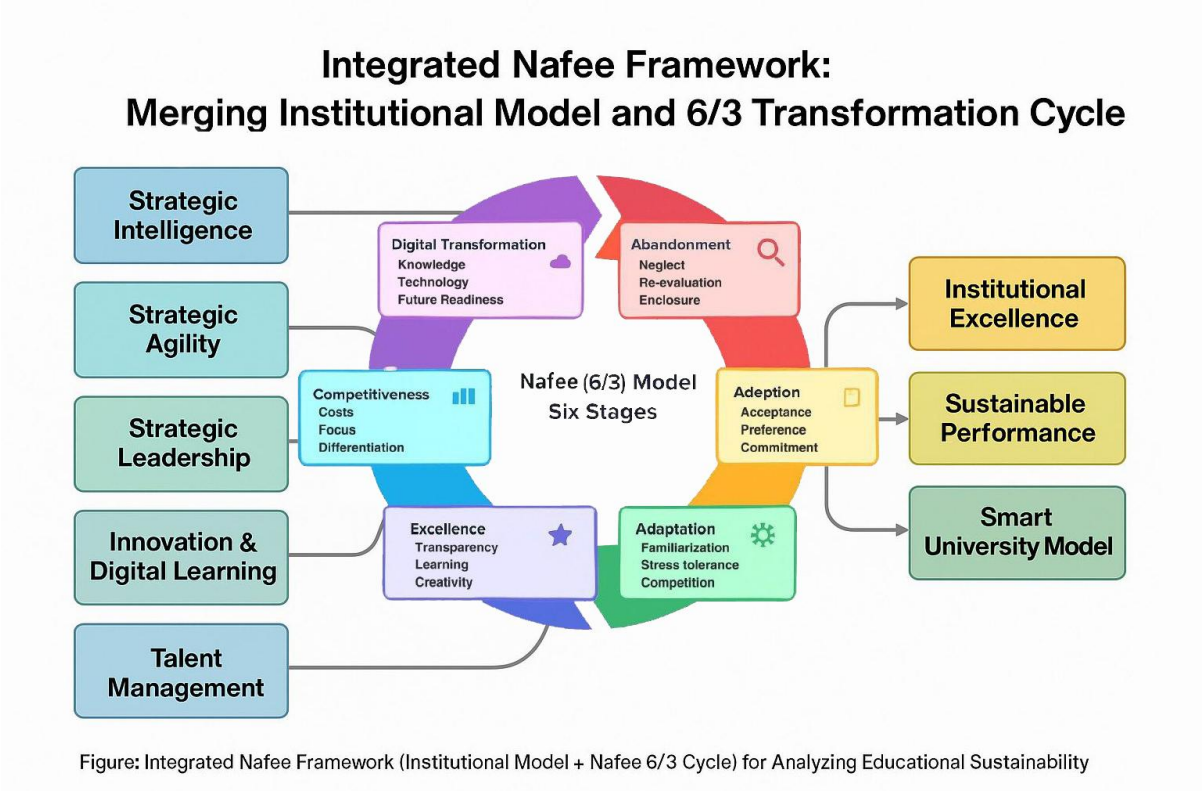

Figure 2. Integrated Nafee Framework — Integrating institutional components with the Nafee 6/3 cycle to achieve educational sustainability and institutional excellence strategies.

Source : Prepared by the Researcher,

Figure 2 shows a simplified integration of the Nafee Integrative Model (N. IMOE) with the transformation cycle (Nafee 6/3). On the left are the six core components (strategic intelligence, strategic dexterity, leadership, innovation management and digital learning, artificial intelligence capabilities, and talent management) that feed into the cycle loops in the middle (abandonment → adoption → adaptation → excellence → competition → smart transformation). The arrows show that each component contributes to propelling the university through the stages, but with varying weight and priority depending on the stage. Ultimately, the systematic passage through these stages leads to practical outcomes on the right, such as institutional excellence, sustainable performance, and the smart university model. In simple terms, the components are sources of strength and potential, and the cycle is the practical way to transform this potential into measurable results and application in universities.

Recommendations

1. Institutional Policies and Governance
   - Restructure university policies to ensure that sustainability strategies are integrated into institutional plans and academic accreditations on a mandatory basis.
   - Develop measurement mechanisms and performance indicators to link the components of the integrated model to tangible results in education, the environment, society, and the economy.
2. Digital Infrastructure
   - Strengthen digital infrastructure by creating cloud platforms and smart systems to monitor performance and enable flexible learning patterns.
   - Launch pilot projects related to sustainability and smart transformation, with the possibility of gradually rolling them out across different faculties.
3. Human resource development
   - Build the capacities of faculty and administrators through ongoing training programs focused on artificial intelligence competencies and sustainability principles.
4. Funding and financial support
   - Allocate stable financial resources by establishing sustainability funds and financing green innovation initiatives within universities.
5. Partnerships and collaboration
   - Expand community and international partnerships to support sustainability initiatives and exchange experiences and best practices.

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