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Original Article

Strategy for Developing Faculty Members' Capabilities to Build Sustainable Knowledge and Innovation Systems in Egyptian Universities

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ABSTRACT

This research aims to develop a comprehensive strategy for enhancing the capabilities of faculty members in Egyptian universities, as a key driver for shaping and guiding higher education policies toward establishing sustainable knowledge and innovation systems that align with national development priorities and global transformations in higher education. The research adopted the descriptive analytical method and utilized open-ended interviews with twenty (20) faculty members, including professors and associate professors from faculties of education in various Egyptian universities, to assess the current situation, identify gaps, challenges, and available opportunities.

The researchers conducted an internal and external environment analysis (SWOT) using the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices to outline the current status. The results indicated the presence of several strengths, such as intrinsic motivation and a desire for continuous learning. However, weaknesses were also identified, including inadequate technological infrastructure and a low level of training related to innovation. Additionally, several external opportunities were recognized, alongside threats related to funding challenges and institutional bureaucracy.

Based on the analysis results, a strategic framework was proposed that includes a vision, mission, core values, and strategic goals—each assigned a specific priority and accompanied by multiple implementation

initiatives. These initiatives are designed to align with the nature of the Egyptian university context and aim to achieve a qualitative shift in faculty performance in both knowledge and innovation domains. The study concludes with practical recommendations and suggestions for future research to further develop and deepen this vital area.

Keyword: Egyptian universities, faculty members, capacity development, knowledge systems, innovation innovation, educational strategy, sustainable development.

INTRODUCTION

In the modern era, universities are undergoing radical transformations that require a reconsideration of their traditional roles. Their role is no longer limited to education and indoctrination; they are now required to actively contribute to building a knowledge economy and promoting societal innovation. In light of these changes, the need to develop human capabilities within universities has emerged, particularly among faculty members, as they are the primary drivers of learning processes, knowledge production, and academic innovation.

Faculty members are the cornerstone of any educational institution, shouldering multiple responsibilities including teaching, scientific research, and community service. To fulfil these roles efficiently, they must be equipped with knowledge skills and innovative practices that keep pace with contemporary demands and contribute to a positive impact on educational and research systems. Hence, the need for systematic strategies aimed at sustainably developing these capabilities is essential.

It has become imperative to shift from traditional models of faculty development to more integrated and innovative models based on future visions and designed according to the needs of modern learning environments. This transformation requires adopting practices based on lifelong learning, continuous professional development, embracing educational technology, and activating partnerships with knowledge and innovation institutions.

In the Egyptian context, calls are growing for reforming the higher education system to achieve excellence and competitiveness at the regional and international levels. Among the key pillars of this reform is the need to build sustainable knowledge and innovation systems within universities, based on enhancing the competence of faculty members. This will enable them to lead change and shape university environments that encourage creativity, experimentation, and knowledge generation.

Numerous previous studies and research have revealed a clear gap in the knowledge and innovation capabilities of faculty members in Egyptian universities, especially in light of the rapid changes taking place in higher education globally. *Mahmoud (2024)* study indicated that the absence of institutional strategies for developing the professional capabilities of faculty members constitutes one of the primary obstacles to achieving the transformation towards innovative universities. *Dahawy et al (2020)* study also confirmed that most professional development programs in Egyptian universities lack integration and are not based on sustainability or future-oriented criteria. *Issa (2022)* study indicates a deficiency in the use of technology and digital knowledge in faculty teaching and research practices, limiting their ability to influence the building of a university environment based on innovation and experimentation. *El-Nagar (2021)* study also showed that the majority of faculty members suffer from a lack of skills necessary for interactive teaching,

collaborative work, and the use of design thinking tools, which weakens their ability to activate innovative systems within the university.

Based on the above, the research problem is defined as the need to develop an integrated strategy to develop the capabilities of faculty members in Egyptian universities. This strategy promotes the construction of sustainable knowledge and innovation systems and keeps pace with the increasing demands of academic transformation in the knowledge economy. This research question is addressed in the following questions:

1. What is the reality of the knowledge and innovation capabilities of faculty members in Egyptian universities?
2. What is the strategic formulation for developing the capabilities of faculty members to support the building of sustainable knowledge and innovation systems in Egyptian universities?
3. What is the implementation plan that can translate the strategic vision into practical reality in the Egyptian higher education environment?

LITERATURE REVIEW

1. The Concept of Professional and Cognitive Competencies of Faculty Members

The professional and cognitive competencies of faculty members are among the fundamental pillars upon which the effectiveness of the educational process and the quality of academic performance within higher education institutions are based. These competencies refer to a set of skills, experiences, and knowledge possessed by faculty members, enabling them to perform their teaching, research, and community roles efficiently and effectively (*Berea, 2019*).

These competencies are divided into cognitive competencies, which include in-depth knowledge of the field of specialization, familiarity with scientific and research developments, the ability to apply knowledge to the development of curricula and courses, and analytical and critical thinking skills. They also include the ability to produce knowledge through sound scientific research and guide students toward scientific and systematic thinking (*Mishra et al., 2024*).

Professional competencies include the ability to teach and communicate effectively with students, the ability to use technology in education, adherence to professional ethics, and contribution to the development of the university environment. It also includes the ability to work within research teams, participate in academic and administrative activities, and provide academic guidance and educational and psychological support to students (*Pishghadam, 2022*).

These capabilities are inherently variable and evolving, influenced by local and global contexts and rapid changes in the fields of knowledge and technology. This requires universities to adopt policies and strategies aimed at the sustainable development of faculty members' capabilities through continuous training, motivation, and the provision of educational environments that stimulate innovation and creativity (*Ayesa, 2025*).

The researchers define professional capabilities procedurally as: "The level of a faculty member's possession of specialized academic knowledge and the ability to employ this knowledge in teaching, scientific research, curriculum development, and the use of modern knowledge technologies. They are measured through

participants' responses in open-ended interviews, particularly regarding their familiarity with scientific developments, their research practices, and their teaching methods."

While cognitive abilities are operationally defined as "the set of skills, attitudes, and behaviors that enable a faculty member to perform their academic roles efficiently. These include teaching skills, communication, academic advising, use of technology, and adherence to professional ethics. They are determined by analyzing interviews about their daily practices and the extent of their involvement in university activities and self-development."

2. The Evolving Roles of Faculty Members in Light of the Digital and Educational Transformation

Higher education is undergoing rapid transformations due to the digital revolution and global developments in the fields of knowledge and learning. These changes have cast a shadow over the roles of faculty members, reshaping them beyond traditional roles limited to teaching and lecturing. It has become imperative for faculty members to transform from transmitters of information to facilitators and promoters of self-learning and critical thinking, contributing to the development of students' academic, research, and social personalities (*Chakraborty et al., 2024*).

In light of the digital transformation, faculty members are expected to possess high digital proficiency, enabling them to employ modern educational technologies, such as e-learning platforms, virtual classrooms, artificial intelligence, and electronic formative assessment. Teaching is no longer limited to face-to-face interaction; it now relies on managing virtual learning environments that require digital content design skills and continuous interaction with students through various tools (*Amann & Hauser, 2024*).

Among the renewed roles is the expansion of the faculty member's mission to include a developmental research role, through contributing to knowledge production and linking it to the needs of society and the labor market, participating in interdisciplinary and multidisciplinary research projects, and promoting a culture of innovation and entrepreneurship among students. They are now expected to be a partner in developing educational policies at the college and university levels, rather than simply implementing academic plans (*Saprudin & Wujarso, 2023*).

The faculty member's role also emerges as a facilitator of collaborative learning, a supervisor of project-based learning experiences, and a promoter of diversity and inclusion in the university classroom. They are also required today to play a leadership role in building university environments that encourage creativity, excellence, and quality, by contributing to curriculum development, ensuring the quality of educational outcomes, and adopting evidence-based educational practices (*Langer, 2023*).

3. Global Standards for Evaluating Faculty Capabilities

The global standards for evaluating and developing faculty capabilities are based on the trends of leading higher education institutions and international academic quality organizations. *UNESCO (2016)* identified these standards in a set of integrated aspects aimed at achieving academic excellence, ensuring the quality of education and research, and serving the community.

1. Academic and Specialized Competence

- Mastery of scientific material in the field of specialization.

- Continuous updating of academic content in line with developments in knowledge.
- Scientific publication in internationally recognized peer-reviewed journals.
- Participation in specialized conferences and seminars.

2. Pedagogical and Teaching Competence

- The ability to design and implement effective teaching strategies.
- Using modern educational tools and technologies (blended learning, e-learning, artificial intelligence in education).
- Measuring student learning using diverse and fair assessment tools.
- Positive interaction with students and fostering a stimulating classroom environment.

3. Capability for Scientific Research and Innovation

- Regular participation in research projects, especially interdisciplinary and funded ones.
- Applying research findings to serve the community or improve the educational process.
- Supervising university theses (master's and doctoral).
- Contributing to building a research environment within the institution.

4. University and Community Service

- Participation in college and university committees.
- Engagement in community service and sustainable development projects.
- Contribution to the development of educational policies within the institution.
- Strengthening partnerships between the university and the local community or productive sectors.

5. Continuing Professional Development

- Enrollment in training programs to update knowledge and skills.
- Participation in international workshops and programs to exchange experiences.
- Development of academic and administrative leadership skills.
- Following a self-development plan with periodic performance evaluation.

6. Technological Competence and Digital Transformation

- Familiarity with using Learning Management Systems (LMS) such as Moodle or Blackboard.
- Developing interactive e-learning content.
- Using multimedia in the educational process.
- Understanding of learning analytics tools to improve learning outcomes.

7. Professional and Academic Ethics

- Commitment to professional ethics and transparency in dealing with students and colleagues.
- Respect for cultural and religious diversity within the university environment.
- Academic integrity and avoiding plagiarism
- Fairness in academic assessment and guidance.

4. The Concept of Knowledge Systems and Their Components

Knowledge systems refer to the intellectual and organizational structures that produce, store, and activate knowledge within institutions, particularly in academic contexts. They represent a network of interconnected processes that bring together individuals, technologies, and the organizational environment to produce knowledge and employ it in the service of development and innovation. In universities, these systems take on an institutional character through educational and research structures and knowledge-supporting infrastructure (*Zhang & Sangaiah, 2021*).

The researchers operationally define them as "academic environments that produce and disseminate knowledge in a sustainable manner, through faculty members capable of interacting with scientific and technological changes and producing research that contributes to serving society. They are evidenced by indicators related to scientific production, research collaboration, and the use of knowledge in decision-making within the university institution." Knowledge systems are based on a set of basic components, identified by *Smith et al. (2020)* as follows:

- Knowledge inputs: These include individuals (faculty members, researchers, students), knowledge resources (books, research, databases), and technological support (digital systems, interactive tools).
- Knowledge generation processes: These are the processes through which new knowledge is produced, whether through scientific research, interactions between students and professors, or through workshops and academic courses.
- Knowledge storage and organization: Knowledge requires an institutional system that enables its preservation, whether through digital libraries, research databases, or educational platforms.
- Knowledge transfer and exchange: This stage is vital to ensuring knowledge is utilized within the institution, as it includes research dissemination methods, conferences, scholarly discussions, and interactive teaching.
- Knowledge application in decision-making: This is one of the most important indicators of the effectiveness of the knowledge system, as knowledge is used to improve the quality of the educational process, guide research plans, and solve problems within the university environment. Evaluation and feedback mechanisms: Knowledge systems should be subject to periodic evaluation, allowing processes to be developed and restructured according to changing needs and the external environment.

The effectiveness of knowledge systems is a key factor in universities' ability to respond to societal demands, foster institutional innovation, and build knowledge capital that supports sustainable development. The stronger the knowledge infrastructure, the greater the institution's ability to produce new knowledge and employ it to address societal and research issues (*Aljohani et al, 2019*).

5. The Role of Universities in Knowledge Production and Transfer

Universities are among the most prominent societal institutions concerned with knowledge production and its use in achieving comprehensive development. They are no longer limited to providing traditional education; rather, they have become integrated systems for knowledge production, transfer, and localization, contributing to the building of intellectual capital capable of competing in the global knowledge economy.

The mission of universities in knowledge production begins with systematic scientific research conducted by faculty members and researchers, which addresses societal issues, technological innovations, and scientific developments in various fields. Research centers, graduate programs, and collaborative projects contribute to strengthening the university's role as a source of new, applicable knowledge (*Hockaday, 2020*).

At the level of knowledge transfer, universities play a vital role through their educational programs, which translate theoretical knowledge into practical skills for students, keeping pace with labor market requirements. Partnerships with public and private sector institutions, continuing education programs, and field training also contribute to the transfer of knowledge to broader segments of society (*Candeias et al. 2024*). Digital technologies and the modern technological environment are important tools that enhance universities' ability to disseminate and exchange knowledge via electronic platforms, open sources, and distance learning. These tools also expand the circle of beneficiaries of the knowledge produced within the academic institution (*Paul et al., 2021*).

In addition, universities contribute to the localization of knowledge by adapting it to the local context and reproducing it in a manner that is consistent with the cultural, social, and economic specificities of Egyptian society. This supports sustainable development and achieves integration between scientific research and community service (*Maassen & Cloete, 2023*).

6. The Relationship Between Academic Competence and Building the Institutional Knowledge System

The academic competence of faculty members is a fundamental component of building the knowledge system within higher education institutions. This competence is not limited to possessing specialized knowledge in their field of specialization, but extends to include the ability to produce new knowledge, effectively transfer it to students, and employ it to address societal issues. This makes faculty members an active element in the cycle of knowledge production and circulation within the university.

Building an institutional knowledge system requires an academic environment in which individual capabilities are integrated with the institutional structure and educational policies. A faculty member who possesses scientific research skills, critical thinking, and the ability to integrate technology into education becomes more capable of contributing to the development of renewed knowledge content and promoting a culture of continuous learning. These are essential components of building a vibrant and renewable knowledge system (*Aldosemani et al., 2024*).

On the other hand, academic competence affects the level of interaction among faculty members, their ability to work collaboratively, and their ability to exchange knowledge. The greater their professional competencies, the greater the likelihood of effective knowledge networks within the institution. These networks contribute to the sharing of experiences and expertise and the development of collective educational

and research practices, thus enriching the institutional knowledge system and making the university an organized learning institution (*Giuseppe et al., 2023*).

Perhaps the most notable feature of the relationship between academic competence and the construction of a knowledge system is that this relationship is not linear or unidirectional, but rather interactive and dynamic. Just as academic competence supports the formation of an effective knowledge system, the presence of this system, in turn, enhances the development of faculty members' competence through the opportunities it provides for learning, professional development, and participation in academic communities of practice that enhance the quality of both individual and institutional performance (*Budzanowska et al., 2023*).

7. Knowledge Management Strategies in the University Environment

Knowledge management is a modern approach that has become a fundamental pillar of the development of higher education institutions. The effective production, exchange, and use of knowledge have become key indicators of the quality of university performance and the effectiveness of educational systems. In the university context, knowledge extends beyond classrooms and curricula to encompass organizational, research, technical, and cultural knowledge within the academic institution (*Handzic et al., 2023*).

Knowledge management strategies in universities are based on a set of pillars, most notably: documenting the tacit knowledge of faculty members and experts and transforming it into explicit knowledge that can be shared and circulated through guides, software, and digital platforms, as well as building an environment that encourages collective learning and continuous development. These strategies contribute to raising the efficiency of decision-making, improving the quality of education, increasing research productivity, and promoting institutional innovation (*Kragulj, 2023*).

Among the most prominent knowledge management strategies is the so-called creation strategy, which focuses on generating new knowledge through scientific research and educational practices. The sharing strategy aims to encourage communication between departments and disciplines and facilitate knowledge exchange across work teams, academic communities, and institutional communication platforms. The retention strategy is also of utmost importance, especially in light of the retirement or transfer of competencies, as it aims to ensure that accumulated institutional knowledge is not lost (*Ernesto et al., 2024*).

Another vital strategy is the utilization strategy, which focuses on how to employ available knowledge to improve academic processes, direct scientific research toward development priorities, and enhance student services. The importance of the cognitive technology strategy is also evident, relying on the use of digital systems such as databases, learning management platforms, and artificial intelligence to store, retrieve, and analyze knowledge (*Ermine & Husain, 2025*).

8. The Concept and Types of Academic Innovation

Academic innovation represents one of the fundamental pillars of higher education renewal and achieving its goals of keeping pace with rapid changes in knowledge, technology, and the labor market. It refers to the sum of efforts and practices aimed at developing the educational process, improving the quality of scientific research, and enhancing the university's role in serving society through innovative and unconventional solutions (*Li, 2022*).

Academic innovation is a direct response to the challenges facing universities, such as cognitive stagnation, weak interaction with technology, and declining research productivity. This makes it a crucial element in building sustainable knowledge and innovation systems (*Morley, 2022*).

Educational innovation refers to the development of educational content, teaching methods, and assessment techniques to enhance student engagement and develop their critical and creative thinking abilities. It includes innovation in curricula, interdisciplinary course design, the adoption of project-based or problem-solving learning, and other modern approaches (*Mintz, 2024*). Technological innovation refers to the use of digital tools and environments to improve the quality of teaching, research, and university administration, such as the use of artificial intelligence technologies, e-learning, learning management systems (LMS), virtual simulation, and academic collaboration platforms. It also includes developing digital infrastructure and enhancing the human resource capacity to use it (*Maloney & Kim, 2020*).

Research innovation, on the other hand, relates to generating new knowledge through innovative methodological approaches, whether by expanding the scope of scientific research to include applied and societal issues, through integration between disciplines, or through the development of unconventional research tools and methodologies. Research innovation is a key factor in improving university rankings and the quality of their knowledge production (*Keengwe, 2020*).

The researchers define academic innovation—procedurally in this study—as “the sum of practices and initiatives implemented by faculty members in the fields of education, technology, and scientific research, which aim to bring about tangible improvements in the quality of academic performance within the university. It is measured through participants’ responses regarding the patterns of innovation and development they practice or aspire to achieve in their work environment.”

9. Factors that Promote Innovation in the University Environment

Innovation is one of the fundamental pillars of the progress of higher education institutions; it is an effective tool for adapting to rapid changes in knowledge, technology, and the labor market. To promote innovation in the university environment, the process requires a set of integrated factors that enable faculty members to think creatively, work collaboratively, and generate new solutions that go beyond traditional frameworks.

The first of these factors is the presence of university leadership that supports innovation, embraces a flexible strategic mindset, encourages experimentation and initiative, and protects the work environment from administrative inertia and fears associated with failure. Leadership plays a pivotal role in providing a safe space that allows faculty members to present unconventional ideas without being subject to traditional sanctions or obstructive bureaucracy (*Jones & Goolsbee, 2022*). Second, the availability of physical and technological infrastructure is a crucial factor. Innovation cannot be discussed without modern laboratories, digital learning tools, interactive platforms, and technical support centers that facilitate the implementation of innovative research and educational projects. Innovation in education also requires a physical environment that encourages creativity and flexibility, moving away from the rigid framework of traditional classrooms (*Mackintosh et al., 2021*).

Third, material and moral incentives are influential factors in creating an innovative environment. Incentives associated with innovative research production, digital course development, or community initiatives contribute to increasing faculty members' motivation to present new ideas that go beyond the norm. The impact is even greater when incentives are linked to academic promotion paths or institutional awards (Nyberg & Manzone, 2023).

Fourth, fostering a culture of innovation within the institution is no less important than resources or leadership. University institutions that value critical thinking and train their staff in entrepreneurship and applied research skills are successful in fostering an innovation mindset in the long term. This culture requires a review of curricula, teaching methods, and the roles of students and faculty (Jakhelln et al., 2024).

Finally, building internal and external partnerships opens new horizons for innovation. Collaboration with industry, research institutions, and international organizations enables the transfer of expertise, the provision of funding, and the linking of academic knowledge to the needs of society and the labor market. Regional and global partnerships also enhance opportunities for shared learning and the exchange of pioneering experiences (Athreye et al., 2021).

10. Institutional and Cultural Challenges Facing Innovation in Egyptian Universities

Egyptian universities face a range of institutional and cultural challenges that hinder the effective implementation of academic innovation. *Alsherif (2023)* study confirmed that administrative bureaucracy within university institutions is one of the most prominent obstacles restricting faculty members' freedom to adopt unconventional educational or research practices, which is reflected in the limited space available for experimentation and innovation.

Alsayed & Barakat (2022) study also revealed that the absence of an institutional risk-taking culture within the academic environment leads to resistance to any changes that may bring with them uncertainties, weakening the effectiveness of innovation initiatives, particularly in academic programs and assessment methods.

In the same context, *Al-Shorbagy et al. (2023)* study indicated that the organizational structure in many Egyptian universities is characterized by traditionalism and isolation, with weak horizontal communication channels between faculties and departments, limiting opportunities for collaborative institutional learning and impeding the exchange of innovative experiences. From a cultural perspective, *Al-Balawi (2022)* study demonstrated that the prevailing academic culture still favors "conformity to the norm" rather than encouraging "creative thinking." It prefers adherence to traditional templates in teaching, publishing, and promotion, marginalizing the creative endeavors of some faculty members.

11. The Relationship Between Innovative Capabilities and Professional Growth

Innovative capabilities are among the fundamental pillars that support the sustainable professional growth of faculty members in higher education institutions. With the rapid transformations in knowledge and technology, it is no longer sufficient for faculty members to possess a traditional body of knowledge. It has become essential for them to possess intellectual flexibility and the ability to continually innovate, by creating new teaching methods, developing assessment tools, or producing applied knowledge that contributes to solving societal problems.

Professional growth represents a dynamic process that includes developing skills, enhancing competencies, and expanding horizons of thinking and research. Therefore, it is closely linked to the ability to innovate. The greater a faculty member's ability to generate new ideas, implement unconventional solutions, and employ modern technologies in academic practice, the greater their chances of professional development and advancement within both the academic and administrative ranks (*Dabic & Guerrero, 2023*).

Chen et al (2025) study clearly indicated this relationship in the following areas: course design, interdisciplinary research development, participation in community initiatives, and integration into international research networks. All of these practices require innovative thinking that reshapes the traditional role of the faculty member, shifting them from a mere transmitter of knowledge to a producer of knowledge, and from a practitioner of education to a leader of change.

Wang (2025) study confirmed that a supportive institutional environment, in terms of policies, resources, and incentives, contributes to enabling faculty members to utilize their innovative abilities to serve their professional aspirations. When opportunities for continuous training, safe experimentation, and participation in development decisions are provided, innovation becomes an integral part of professional growth, rather than merely an additional skill. Therefore, developing innovative capabilities should be a strategic goal of any professional development plan, as they are the primary driver for achieving a qualitative shift in faculty performance, enhancing their ability to respond effectively to contemporary changes, and achieving academic and research excellence in the long term.

12. The Concept of Sustainability in the University Context

Sustainability is a central concept in contemporary higher education literature, extending beyond environmental concerns to encompass cognitive, economic, and societal dimensions. In the university context, sustainability relates to the ability of academic institutions to develop educational and research systems capable of keeping pace with future changes and having an effective impact on society and the economy, while preserving and developing resources for future generations (*Komisar et al., 2021*).

Sustainability in universities is represented by their ability to create a flexible learning environment that encourages critical thinking, creativity, and accountability, while supporting productive scientific research and linking it to real development issues. It also includes the sustainability of academic policies and programs, ensuring they remain capable of self-development and continuous response to external challenges and changes (*Younan et al., 2023*).

The cognitive and innovative capabilities of faculty members are among the most prominent components of the internal structure that determines a university's ability to achieve sustainability. Faculty members are the link between knowledge and reality, between policy and practice. Therefore, empowering them academically and professionally is a prerequisite for building a university capable of sustainability and impact (*Fiho & Vasconcelos, 2022*).

Sustainable universities are those that strategically restructure their human and organizational resources, utilize technology, stimulate community partnerships, and ensure genuine stakeholder participation in decision-making, all within a framework of clear vision and wise leadership (*Baer, 2023*).

The researchers define "sustainability in the university context" operationally as: "The ongoing institutional capacity of Egyptian universities to develop flexible knowledge and innovation environments by enhancing the academic and professional competencies of faculty members, ensuring improved quality of education and research and the continued developmental impact of the university within its local and international environment, in accordance with a long-term strategic vision."

13. The Relationship Between Capacity Development and Achieving Knowledge and Innovation Sustainability

Developing the capacity of university faculty members is a fundamental pillar in building a sustainable educational and research environment. These capacities represent the gateway to enhancing knowledge production and developing institutional innovation. The greater a faculty member's ability to effectively utilize their knowledge and skills, the greater the university's ability to generate, recycle, and employ knowledge to solve societal problems—the essence of the concept of knowledge sustainability.

The relationship between capacity development and knowledge sustainability is evident in the fact that knowledge is not produced in a vacuum; rather, it requires a qualified human resource system that possesses critical thinking, analysis, research, and development skills. Therefore, building sustainable career paths for faculty members, focusing on continuous learning and self-development, enhances universities' opportunities to maintain their knowledge and research standing in a changing competitive environment (*Ruhela et al. 2025*). In terms of innovative sustainability, developing faculty members' innovative capabilities—through training in design thinking, technology use, collaborative work, and future foresight—contributes to transforming universities from traditional institutions into environments that stimulate innovation and experimentation. This transformation is one of the conditions for universities' survival in the era of the Fourth Industrial Revolution and digital transformation (*Ray et al., 2023*).

Moreover, the relationship between capacity development and sustainability is not only a direct one, but rather a circular, interactive one: the more universities are able to create sustainable development systems for their faculty members, the greater their ability to contribute to building institutional strategies based on cognitive and innovative sustainability, and vice versa. Therefore, linking professional development plans to the university's strategic objectives is a necessity, not an option (*Rafique, 2023*).

14. Sustainability Indicators in Higher Education Systems

Sustainability in higher education is a strategic direction that contributes to ensuring the continuity of educational quality, the effectiveness of its outcomes, and its ability to respond to future challenges. It is not limited to environmental or economic aspects only, but extends to encompass cognitive, innovative, and cultural sustainability within university systems. Based on this comprehensive understanding, UNESCO (2017) developed a set of indicators used to measure the extent to which sustainability is achieved within higher education institutions.

1. Institutional Sustainability

- The presence of a long-term strategic vision for the university.
- Integration of academic and administrative plans with the Sustainable Development Goals.

- Continuity of programs and initiatives after funding ends or leadership changes.
- The degree of organizational flexibility to adapt to changes.

2. Knowledge Sustainability

- The presence of effective knowledge production systems (scientific research, publishing, conferences).
- Integration of research knowledge with curricula and academic programs.
- Applicability of the knowledge produced to the societal and economic context.
- Mechanisms for preserving and recycling knowledge within the institution.

3. Environmental Sustainability in Education

- Integration of environmental and climate change topics into curricula.
- University initiatives to reduce the carbon footprint and use sustainable resources.
- Encouraging research in the fields of renewable energy, sustainable agriculture, and the environment.

4. Financial Sustainability

- Diversification of university income sources (international education, partnerships, funded research).
- The presence of clear budgets allocated to research and development.
- Efficient management of financial resources and achieving relative financial independence.

5. Technological and Digital Sustainability

- Modernizing the digital infrastructure. Ongoing
- Integrating modern technologies into education, assessment, and research
- Institutional readiness to address digital challenges such as cybersecurity and smart transformation

6. Social and community sustainability

- Activating the university's role in serving the local community
- Partnering with government and private sectors to provide community solutions
- Involving students and faculty in community development initiatives
- Ensuring equitable access to education and training within the institution

METHODOLOGY

This research relied on a descriptive, analytical, qualitative approach, due to its ability to analyze educational and social phenomena in their natural contexts and explore their various dimensions through direct interaction with participants in the academic realm. This approach is particularly suited to the nature

of the research, which seeks to gain a deep understanding of the reality of faculty members' cognitive and innovative capabilities, analyze the associated challenges, and develop a development strategy based on field insights and experiences.

This approach was chosen for several reasons, the most important of which are: the researchers' desire to approach the actual reality of faculty members within Egyptian universities and explore their perspectives on current practices, available opportunities, and the obstacles they face in developing their cognitive and innovative capabilities. Furthermore, the nature of the research questions requires in-depth investigation and deduction rather than being limited to numbers or quantitative indicators, a fact reinforced by the qualitative approach.

The open-ended interview was used as the primary method, given its flexibility in dialogue, depth of presentation, and the ability to follow up on and expand upon ideas based on what the participant presents. Open-ended interviews are an appropriate tool in qualitative research, as they enable researchers to capture perceptions, experiences, professional practices, and personal expertise that may not be apparent through closed-ended measurement tools.

Interviews were conducted with (20) faculty members, both "professor" and "assistant professor," working in faculties of education at various Egyptian universities. This ensures a diversity of academic backgrounds and experiences and enhances the credibility of the results. Participants were selected based on the diversity of disciplines and institutions, while ensuring representation of universities from various geographic regions in Egypt.

The interviews were recorded (after obtaining participants' consent), transcribed, and analyzed using a thematic analysis approach to identify key issues, common patterns, and practical suggestions related to the research themes.

ANALYSIS AND RESULTS

First: The reality of the cognitive and innovative capabilities of faculty members in Egyptian universities.

To analyze the reality of the cognitive and innovative capabilities of faculty members, the researchers relied on analyzing the content of recorded interviews with participants. This was achieved by applying a SWOT analysis in its internal (IFE) and external (EFE) formats, with the aim of identifying strengths and weaknesses on the one hand, and surrounding opportunities and threats on the other. This analytical approach enabled the construction of a complex and comprehensive picture of the current reality by integrating the respondents' subjective impressions with surrounding contextual indicators.

1. Internal Factors Analysis (IFE Matrix)

Representing the strengths and weaknesses associated with developing the capabilities of faculty members in Egyptian universities.

Table 1: Strengths Analysis

Factors	Weight	Rating	Weighted Score
Theoretical awareness of the importance of innovation in education	0.08	2.5	0.20
Some individual research contributions	0.07	2.0	0.14
Some students' use of electronic self-training	0.06	2.5	0.15
Relative stability in performing traditional teaching tasks	0.06	2.0	0.12
A desire for development among a small group	0.05	2.5	0.13
Limited flexibility in dealing with variables	0.04	2.0	0.08
Total	0.36	-	0.82

Table 2: Vulnerability analysis

Factors	Weight	Rating	Weighted Score
Poor efficiency in using educational technology	0.10	1.5	0.15
Lack of innovative teaching practices	0.10	1.5	0.15
Weak understanding of the concepts of the knowledge economy and innovation	0.09	1.5	0.135
Lack of long-term professional planning	0.09	1.5	1.135
Resistance to change and development	0.08	1.5	0.12
Reliance on traditional methods in research and teaching	0.08	1.5	0.12
Total	0.54	-	0.675

Tables (1) and (2) reflect the internal factors analysis (IFE) of the cognitive and innovative capabilities of faculty members at Egyptian universities. This analysis categorizes the elements into strengths and weaknesses, and evaluates each according to its relative weight and rating, reflecting its impact on practical reality. The total weighted score (1.495) shows that the current capabilities of faculty members fall below average, indicating a deficiency that warrants intervention, without the reality being entirely negative.

The analysis revealed the presence of some strengths, albeit with limited impact. Most notable among these are a general theoretical awareness of the importance of innovation in education, a desire among some faculty members for self-professional development, individual research participation, and relative stability in carrying out traditional teaching tasks. However, these strengths were assigned relatively weak weights, meaning they do not constitute a solid foundation upon which to build without support and expansion.

Conversely, weaknesses were more evident and prominent in the analysis. A clear weakness in digital proficiency, a lack of innovative teaching practices, a limited understanding of the concepts of innovation and the knowledge economy, and a lack of long-term career planning were observed. Resistance to change was also observed among some, along with a continued reliance on traditional teaching and research methods. These are all indicators that undermine the university's ability to respond to the demands of contemporary university transformation.

The final weighted score (1.495) represents the weighted average of overall performance across internal elements. This figure is an indicator that faculty members' capabilities—according to the collected data—are closer to weakness than strength. However, it does not reflect a complete collapse of the system; rather, it indicates the existence of a foundation that can be developed through a conscious strategy and targeted interventions that address weaknesses and develop what could be considered starting points.

2. External Factor Analysis (EFE Matrix)

Represents opportunities that can be exploited and threats that may hinder the development of faculty members' capabilities in Egyptian universities.

Table 3: Opportunity Analysis

Factors	Weight	Rating	Weighted Score
Increasing institutional support for digital transformation	0.09	3.0	0.27
National initiatives to improve the quality of higher education	0.08	2.5	0.20
Growing opportunities for international and research collaboration	0.07	2.5	0.175
Availability of electronic and open learning resources	0.07	3.0	0.21
Labor market interest in innovative education outcomes	0.05	2.5	0.125
Existence of bodies that support innovation and entrepreneurship	0.04	2.0	0.08
Total	0.40	-	1.06

Table 4: Threat Analysis

Factors	Weight	Rating	Weighted Score
Factors Weight Evaluation Weighted	0.10	1.5	0.15
Regional competition between Arab and international universities	0.09	1.5	0.135
Rapid global technological developments	0.08	1.5	0.12
Limited direct international funding for personnel development	0.08	1.5	0.12
Rapid changes in global labor market requirements	0.09	1.5	0.135
Gap between global institutional requirements and local reality	0.06	1.5	0.09
Total	0.50	-	0.75

Tables (3) and (4) provide an objective analysis of the external factors (EFE) environment surrounding faculty members at Egyptian universities, in terms of available opportunities and potential threats beyond the direct control of the educational institution, yet significantly impacting knowledge and innovation development efforts.

The total weighted EFE was 1.81, indicating that the external environment offers significant opportunities, but is fraught with existing and complex challenges that require intelligent strategic intervention to capitalize on these opportunities and mitigate the impact of threats.

The most prominent findings from Table (3) are that the national and international environment offers significant opportunities that can be built upon, including: increased government support for digital transformation, national initiatives to improve the quality of higher education, opportunities for research collaboration with foreign countries, and the proliferation of open learning resources.

In addition, there is a noticeable shift in the labor market's orientation toward valuing innovative skills, as well as the emergence of entities and institutions that support innovation and entrepreneurship. However, despite these positive data, their benefits within Egyptian universities remain limited, either due to a lack of coordination or weak institutional and professional preparedness.

On the other hand, Table (4) monitors a number of environmental threats that place pressure on Egyptian universities and faculty members, most notably:

- Regional and international competition, which raises expectations from academic institutions.

- Rapid global technological development, which requires immediate and continuous adaptation.
- Changes in the labor market, which now impose new standards that go beyond traditional education.
- A clear gap between the practices of international universities and the requirements of international accreditation.
- Limited international funding allocated to individuals within developing universities.
- The increasing reliance on international rankings to evaluate universities, which places pressure on overall performance.

These threats, although external, have a profound impact and require institutions to reshape their policies and faculty roles to address them effectively.

The final value (1.81) indicates that the available opportunities are real but not being adequately leveraged, and that the external threats are influential but not destructive. This places Egyptian universities at a critical moment of strategic repositioning, capitalizing on opportunities and fortifying the institution against challenges. This makes the development of a comprehensive strategy for developing faculty capabilities even more essential.

Second: Strategic formulation for developing faculty capabilities to support the building of sustainable knowledge and innovation systems in Egyptian universities.

The proposed strategic vision for developing faculty capabilities to support the building of sustainable knowledge and innovation systems in Egyptian universities stems from a firm belief that any effective development process must be based on an integrated framework that includes a clear future vision, a mission that expresses the general direction, a set of values that govern practice, and a set of achievable and measurable strategic objectives. This vision serves as a systematic roadmap that guides efforts toward achieving the desired knowledge and innovation transformation by building a stimulating academic environment, investing in human and institutional capabilities, and enhancing responsiveness to the rapid changes in the educational environment at the local and international levels.

Vision: To be a leader in empowering faculty members at Egyptian universities to lead knowledge and innovation transformation, thereby enhancing the competitiveness of higher education institutions locally and internationally.

Mission: The strategy seeks to develop the capabilities of faculty members in Egyptian universities by building integrated knowledge and innovation support systems that enhance their professional competence and enable them to employ knowledge and innovation in education, research, and community service, in line with contemporary challenges and academic excellence standards.

Governing Values

- **Quality:** Commitment to the highest quality standards in capacity building and professional development.
- **Innovation:** Stimulating creative thinking and adopting innovative solutions.
- **Sustainability:** Ensuring the continuity of development and its long-term impact.

- **Partnership:** Enhancing cooperation between universities and local and international entities.
- **Empowerment:** Supporting faculty members to become leaders in knowledge and innovation.
- **Equity:** Ensuring equal opportunities in training and development for all faculty members.

Strategic Objectives

1. Build an integrated system for sustainable professional development based on the actual needs of faculty members.
2. Improve the cognitive and digital competence of faculty members in line with global trends in higher education.
3. Promote a culture of innovation and applied research in the academic work environment.
4. Developing mechanisms for evaluating and monitoring faculty performance from a cognitive and innovative perspective.
5. Supporting local and international partnerships that contribute to the exchange of expertise and successful experiences in capacity development.
6. Creating a university environment that encourages excellence and creativity through policies, incentives, and a supportive infrastructure.

Third: The Implementation Plan for the Strategic Vision in the Egyptian Higher Education Environment

In light of the six strategic objectives included in the proposed vision for developing faculty capabilities, strategic priorities were identified for each objective. These priorities reflect the general trends that require focus and help direct institutional efforts toward achieving the desired cognitive and innovative transformation. These priorities were translated into a set of implementation initiatives that serve as practical and realistic tools through which the objectives can be activated and ensure their transition from theoretical framework to practical implementation. These initiatives take into account the diversity of needs, gradual implementation, and the possibility of measurement and evaluation, enhancing the effectiveness of the strategy in the short, medium, and long terms.

First Objective: Building an integrated system for sustainable professional development based on the actual needs of faculty members.

Strategic Priority: Achieving institutional integration in professional development programs based on a real needs analysis.

Implementation Initiatives

1. Preparing a national reference guide to identify the needs of faculty members in various disciplines.
2. Establishing university units specialized in professional development and training within each college.
3. Designing a unified electronic platform to offer training courses and programs according to professional development paths.
4. Organizing mandatory training programs for academic promotion based on competency.

5. Accrediting university training centers as nationally accredited and certified centers of excellence.
6. Linking professional development plans to quality objectives and institutional accreditation.

Second Objective: Improving the cognitive and digital competence of faculty members in line with global trends in higher education.

Strategic Priority: Enhancing faculty readiness to keep pace with the digital transformation and modern cognitive developments in university education.

Implementation Initiatives

1. Develop specialized training programs in digital transformation and artificial intelligence in education.
2. Offer interactive online courses on the use of learning management systems (LMS) and digital assessment.
3. Activate digital proficiency certificates as a condition for academic promotion.
4. Hold periodic scientific forums on modern cognitive trends in areas of specialization.
5. Support faculty members' participation in international digital and virtual conferences.
6. Provide electronic libraries and advanced educational software licenses within colleges.

Third Objective: Promote a culture of innovation and applied research in the academic work environment.

Strategic Priority: Establishing innovation as a fundamental component of university education and research to support the resolution of societal problems and national challenges.

Implementation Initiatives

1. Establish university innovation incubators dedicated to faculty members and applied research projects.
2. Launch competitive internal funding programs for innovative projects.
3. Incorporate "community innovation" criteria into faculty performance evaluations.
4. Activate university-industry partnerships through joint research projects.
5. Hold capacity-building workshops in design thinking and academic entrepreneurship.
6. Establish annual awards for excellence in innovation and applied research at the university level.

Fourth Objective: Developing mechanisms for evaluating and monitoring faculty performance from a knowledge and innovation perspective.

Strategic Priority: Establishing a comprehensive evaluation system that stimulates outstanding performance and is linked to knowledge and innovation transformation.

Implementation Initiatives

1. Developing key performance indicators (KPIs) that reflect knowledge and innovation skills in teaching, research, and community service.

2. Designing an interactive electronic evaluation system that includes periodic feedback.
3. Involving students and graduates in evaluating aspects of educational and technical performance.
4. Linking evaluation results to individual support and development programs.
5. Training department heads on modern competency-based evaluation tools.
6. Developing periodic analytical reports for use in institutional planning and decision-making.

Fifth Objective: Supporting local and international partnerships that contribute to the exchange of expertise and successful experiences in the field of capacity development.

Strategic Priority: Enhancing local and international academic cooperation as a lever for knowledge exchange and expanding development opportunities.

Implementation Initiatives

1. Concluding cooperation agreements with international universities and research centers in the field of capacity development.
2. Organizing short- and long-term academic exchange programs for faculty members.
3. Hosting international experts to deliver advanced workshops and development courses.
4. Establishing a national database of effective academic partnerships.
5. Supporting international publishing through joint research funding.
6. Strengthening partnerships with civil society organizations and labor market institutions.

Sixth Objective: Creating a university environment that encourages excellence and innovation through policies, incentives, and supportive infrastructure.

Strategic Priority: Building a supportive institutional environment that promotes the values of excellence and encourages experimentation and innovation.

Implementation Initiatives

1. Amending university policies to reward innovative performance and continuous learning.
2. Establishing innovation labs within colleges.
3. Activating a system of financial and moral incentives linked to professional development and knowledge production.
4. Integrating innovation concepts into the regulations of academic and graduate programs.
5. Developing the digital and technological infrastructure to support teaching and learning activities.
6. Organizing competitions and awards for excellence in teaching, learning, and research at the university level.

RECOMMENDATIONS AND SUGGESTIONS

First - Recommendations

In light of the research findings, the current research recommends the following:

- Formulate a national policy framework for faculty development through establishing a national center responsible for coordinating training programs, designing specialized career paths, and linking them directly to academic promotion criteria and institutional accreditation standards.
- Mandate, through higher education policy directives, that Egyptian universities adopt annual professional development plans grounded in comprehensive needs assessments, reflecting disciplinary diversity, and aligned with national sustainable development and digital transformation agendas.
- Embed innovation and applied research into official academic policies and curricula, ensuring that regulatory provisions secure the resources, infrastructure, and governance mechanisms necessary for their institutionalization.
- Reform faculty performance evaluation policy to include cognitive, digital, and innovation-related criteria, ensuring that the assessment process is anchored in transparent, measurable, and policy-driven performance indicators.
- Strengthen internationalization policies by expanding partnerships with international universities and research institutions through formal twinning agreements, academic exchanges, and joint research funding schemes that comply with global quality benchmarks.
- Develop a national incentive policy framework that standardizes material and moral rewards for excellence in teaching, research output, and innovative contributions, fostering a competitive and achievement-oriented academic culture.
- Institutionalize internal communication policies that mandate knowledge-sharing structures between departments and faculties, ensure cross-unit collaboration, and embed continuous professional development in university governance.
- Enact participatory governance policies that require faculty member representation in the formulation and evaluation of university strategic plans, thus reinforcing institutional ownership and accountability in the achievement of development goals.

Second - Proposals

In light of the objectives of the current research and its findings, the researchers may propose the following future research and studies:

- A comparative analytical study of professional development programs for faculty members between Egyptian universities and a number of distinguished international universities, to identify gaps and potential opportunities for improvement.
- Field research on the impact of professional development programs on faculty performance in cognitive, technological, and research aspects within applied and theoretical colleges.
- Designing a comprehensive assessment model for faculty members' cognitive and innovative competence, while examining its relationship to academic quality indicators.
- Study the institutional and organizational factors influencing the effectiveness of university work environments in promoting innovation and academic productivity.

- An exploratory study of students' perceptions of faculty members' competence in the areas of critical thinking, technology use, and the ability to link theoretical knowledge with practical application.
- Study the impact of international partnerships and academic twinning programs on developing the research and innovation capabilities of faculty members in Egyptian universities.
- Analyze the feasibility of implementing performance incentives linked to innovation and educational quality in the Egyptian context, and their impact on faculty members' professional motivation.
- An experimental study on the impact of integrating innovation and entrepreneurship training modules within graduate programs on preparing academic leaders.

CONCLUSIONS

This research contributes both scientifically and policy-wise to the discourse on higher education reform in Egypt by presenting an evidence-based strategic framework for developing the capabilities of faculty members as a cornerstone for building sustainable knowledge and innovation systems. Scientifically, the study integrates qualitative field insights with strategic planning tools (SWOT, IFE, EFE) to generate a comprehensive, context-sensitive model that can be adapted across different institutional settings. It advances the academic understanding of how cognitive, digital, and innovative competencies interact with institutional governance to shape universities' capacity for transformation.

The framework offers a practical roadmap for university leaders, policymakers, and accreditation bodies to institutionalize capacity development within higher education governance structures. It directly links professional development with national sustainable development objectives, digital transformation priorities, and innovation agendas. By aligning capacity-building initiatives with regulatory frameworks, incentive systems, and partnership policies, the proposed strategy bridges the gap between theoretical planning and actionable reform. The expected impact of adopting this framework in Egyptian universities includes:

- Enhancing faculty readiness to lead innovation and knowledge production, thereby improving institutional performance and competitiveness.
- Providing policymakers with a structured model to guide policy reforms, funding priorities, and quality assurance mechanisms.
- Strengthening the link between higher education outputs and labor market as well as societal needs, fostering a culture of applied research and innovation.

In essence, this research moves beyond diagnosing challenges to offering a policy-informed, operational solution that empowers faculty members and supports strategic transformation in Egyptian higher education. Its adoption has the potential to inform national higher education strategies, inspire institutional reforms, and ultimately position Egyptian universities as active contributors to the global knowledge economy.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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الملخص العربي

استراتيجية تطوير قدرات أعضاء هيئة التدريس لبناء نظم معرفية وابتكارية مستدامة في الجامعات المصرية

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يهدف البحث إلى وضع استراتيجية شاملة لتعزيز قدرات أعضاء هيئة التدريس في الجامعات المصرية، كمحرك رئيس لصياغة وتوجيه سياسات التعليم العالي نحو إرساء أنظمة مستدامة للمعرفة والابتكار، تتماشى مع أولويات التنمية الوطنية والتحول العالمية في التعليم العالي. وقد اعتمد على المنهج الوصفي التحليلي، واستخدم أداة المقابلة المفتوحة مع (٢٠) عضو هيئة تدريس من أساتذة وأساتذة مساعدين بكليات التربية في عدد من الجامعات المصرية؛ وذلك لرصد الواقع الحالي، وتحديد الفجوات، والتحديات، والفرص المتاحة.

وقد استعان الباحثان بتحليل البيئة الداخلية والخارجية (SWOT) باستخدام مصفوفتي (IFE) و (EFE) لاستخلاص ملامح الوضع الراهن؛ حيث أظهرت النتائج توافر بعض نقاط القوة، مثل الحماس الذاتي، والرغبة في التعلم المستمر، إلى جانب وجود عدد من نقاط الضعف، مثل ضعف البنية التحتية التكنولوجية، وانخفاض مستوى التدريب المرتبط بالابتكار. كما تم تحديد عدد من الفرص الخارجية، في مقابل تهديدات تتعلق بتحديات التمويل، والبيروقراطية المؤسسية. وانطلاقاً من نتائج التحليل، تم تقديم تصور استراتيجي يتضمن رؤية، ورسالة، وقيم، وأهداف استراتيجية، لكل منها أولوية محددة، وعدة مبادرات تنفيذية، تراعي طبيعة السياق الجامعي المصري، وتسعى إلى إحداث نقلة نوعية في أداء أعضاء هيئة التدريس على المستويين: المعرفي والابتكاري. وقد اختتم البحث بتوصيات عملية، واقتراحات لدراسات مستقبلية تساهم في تعميق وتطوير هذا المجال الحيوي.

الكلمات المفتاحية: تطوير القدرات، النظم المعرفية، الابتكار الأكاديمي، الاستراتيجية التعليمية، التنمية المستدامة.