Integrating Computational Math Into Business Startup Training: Pathways To Creativity And Advancement

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Abstract

This research presents a novel instructional approach that combines computational mathematics with business startup training. The goal was to develop a comprehensive structure enabling learners and local residents to acquire essential financial and technical competencies. This structure incorporates various elements, including practical workshops, personalized guidance sessions, and startup accelerators designed to nurture emerging ventures. Additionally, we incorporated community engagement initiatives to ensure the structure's practicality and broader impact beyond the educational setting. To formulate this structure, we employed a rigorous literature review, which involves a methodical and structured research process. This entailed an exhaustive examination, evaluation, and integration of existing studies on the topic. The insights from this review proved instrumental in shaping the overall design.

Our outcomes demonstrate that this combination significantly enhances individuals' business-oriented mindsets, sharpens their tactical planning abilities, and boosts their creative potential. By instructing participants on utilizing mathematical modelling, digital simulations, and analytical techniques to address commercial challenges, the structure equips them to tackle intricate real-life issues. Ultimately, this strategy fosters an environment of ingenuity and promotes sustained financial prosperity across educational and societal environments.

Keywords: Entrepreneurship education, computational mathematics, innovation, mathematical modelling, and community development.

1. Introduction

The use of computational mathematics into entrepreneurship education is a novel strategy designed to improve student engagement and problem-solving abilities. This methodology, emphasising mathematical modelling, simulation, and data analysis, is applicable in both academic and community environments. University courses enable students to replicate business settings, assess market trends, and enhance decision-making processes. In communal environments, it can facilitate workshops, training initiatives, and mentorship opportunities. This research seeks to establish and execute a computational mathematics-based framework for entrepreneurship education, with the potential to revolutionise the educational experience for university students and community members by examining its effects on entrepreneurial mindset, skill acquisition, and startup success rates to promote sustainable economic development (Sodangi and Ibrahim, 2023). Mathematics holds a crucial role in the school curriculum due to its fundamental contribution to scientific and technical advancement, forming the foundation for the development of entrepreneurial abilities (Ahmad et al., 2023). A profound understanding of Mathematics will augment an individual's ability to tackle complex life challenges. Daimi & Rayess (2008) contend that the distinction between developed and developing countries is based on their mathematical aptitude and innovation.

Mathematics is often considered a crucial driver of economic growth and wealth creation. Mathematics transcends the mere study of numbers that educators impart in academic institutions, eliciting varied responses of enjoyment or apprehension among students. Mathematics is essential for people and societal progress (Fiet, 2001). Our reliance on mathematics to address quotidian problems has made it indispensable. In today's technologically evolved culture, mathematics is essential for several professions and economic prospects (Bird, 1988). Kuratko (2019) outlines the national goals of primary and secondary education in Mathematics as creating a solid foundation for numeracy and scientific reasoning; providing opportunities for children to develop essential manipulative skills for effective societal participation; promoting adaptability to a changing environment; and supplying fundamental tools for advanced learning. Ekwueme (2021) observes that Nigeria, like to many developing countries worldwide, faces several problems and dire situations, including poverty, unemployment, conflict, and sickness. Poverty results from unemployment. Poverty is defined as a significant lack or absence of tangible wealth or financial resources.

It is a multifaceted notion that includes social, economic, and political components. The eradication of poverty in all its manifestations, especially extreme poverty, constitutes the primary global challenge and is vital for national and sustainable development. Acquiring entrepreneurial skills for employable folks is essential for tackling unemployment and eliminating poverty in Nigeria. Mathematical knowledge enables students to become engaged and responsible citizens, innovative thinkers, collaborative individuals, and fully aware of the complex issues facing society (Kuratko and Hodgetts, 2007). Science education is crucial as it enables the description and comprehension of our surroundings. This research, employing computational mathematics, has the capacity to transform entrepreneurship education, empower individuals, and foster economic growth in both academic and community settings. Entrepreneurship education is vital for fostering innovation and economic advancement. However, its distribution often lacks engaging and interactive techniques (Zhao et al., 2005). This study examines the novel application of computational mathematics to enhance and develop entrepreneurial education inside university systems and community settings (Essang et al., 2025). The amalgamation of computational mathematics with entrepreneurial abilities has the capacity to transform education and community development. Integrating practical mathematics and entrepreneurial skills into education can enable students and community members to become inventive problem-solvers and leaders (Leite et al., 2021; Malashree et al., 2024; Matlay, 2005).

2. Materials and Methods

2.1 Research Methodology

The research employed a library-based methodology and is qualitative in essence. We did not collect primary data from fieldwork but instead relied on examining critically and systematically various reference sources.

2.2 Sources of Data

The principal sources of literature were acquired via online media and databases associated with pertinent journal portals. Reputable sources such as Emerald Insight, ResearchGate, and Elsevier were used. The search was conducted for articles, journals, and publications primarily published between 2000 and 2025. Only literature directly related to the role of education in encouraging the entrepreneurial spirit among computer scientists was included.

2.3 Data Collection and Analysis Method

Specific keywords related to the topic were used to guide the search for relevant literature, adopting a flexible approach not limited to specific journal portals or online media. Data collection utilized techniques such as listening and recording important information from the examined literature. Data analysis involved processes like data reduction, data display, and conclusion drawing to develop a comprehensive understanding of the literature. To ensure the validity of the data, triangulation of data sources was used, which involved cross-verifying information from multiple sources.

2.4 Literature Review Methodology

The review of related works is done in terms of the Authors and title, research objectives, their methods and materials, the strength and findings of their research, and also a clinical look into the inherent gaps in Table 1. Based on the analysis (as presented in Table 1), several key recommendations emerge to improve undergraduate business education. Firstly, to significantly improve practical learning and decision-making skills, the integration of real-world business case studies into undergraduate curricula is strongly recommended. Secondly, ensuring that business degree programs remain relevant requires their alignment with current business challenges, thereby providing students with timely and applicable knowledge.

Furthermore, fostering student engagement through participation in social entrepreneurship contests is encouraged to promote hands-on learning and stimulate innovative thinking.

Establishing robust partnerships with businesses is also crucial, specifically to provide students with valuable internship opportunities and direct real-world experience. Finally, it is recommended that the entrepreneurship curriculum be enhanced through the incorporation of relevant technology topics and by regularly inviting experienced business executives to deliver guest lectures, thereby bridging the gap between academia and industry practice.

The findings reveal several critical areas for improving undergraduate business and entrepreneurship education. Firstly, integrating real-world business case studies into undergraduate courses is paramount, ensuring content aligns directly with intended course objectives and learning outcomes. This requires active collaboration with industry professionals to identify current business challenges and inform curriculum updates. Secondly, fostering student engagement in practical ventures, such as social entrepreneurship contests, is encouraged. Such initiatives should be supported with dedicated mentorship and necessary resources. This extends to establishing robust partnerships with businesses to provide valuable internship opportunities and potentially implement mentorship-in-residence programs (Amire, 2016), bridging the gap between theory and practice. Thirdly, the curriculum must reflect the increasing importance of technology in business. This involves integrating topics such as digital marketing, data analytics, and emerging technologies into entrepreneurship courses. Complementing this technical knowledge, inviting business executives to deliver lectures and workshops would provide students with invaluable, current insights into industry practices (Daimi & Rayess, 2008; Fiet, 2001).

Table 1. Summary of Research Studies and Insights

Authors and Title	Research Objective	Method Used	Strength and Findings	Inherent Gaps
Ahmad et al., (2023). *The role of education in fostering entrepreneurial spirit in the young generation.*	To examine the role of education in encouraging the entrepreneurial spirit in the younger generation.	Qualitative research; data collection techniques include listening, recording important information, and data analysis through data reduction, data display, and conclusion drawing (Library Research).	Education is crucial for developing entrepreneurial skills, creating a supportive environment, and removing the stigma of failure. It should also reinforce ethical values, social responsibility, and integrate technology. Social entrepreneurship and inclusiveness are vital for creating positive social impact and equality of opportunity.	The study relies solely on secondary data (library research) without primary field data, which might limit the depth of real-world insights. The flexibility in selecting sources may lead to potential biases in literature selection. The study does not specify how different educational approaches might impact various demographics.
Daimi & Rayess (2008, July). *The role of software entrepreneurship in*	To design a course in Software Entrepreneurship, including course rationale, description,	Course design and a paper reviewing the need for entrepreneurship education in Computer Science (CS)	Highlights the importance of integrating entrepreneurial skills into CS education. It argues that	The paper is primarily theoretical and a course design proposal, which was not tested or empirically

Authors and Title	Research Objective	Method Used	Strength and Findings	Inherent Gaps
computer science curriculum.	objectives, outcomes, and assessment.	and Software Engineering programs.	computational thinking could seed entrepreneurship, leading to new computing markets, technologies, and employment opportunities. Provides a detailed framework for a Software Entrepreneurship course.	implemented in the reported snippets. Lacks empirical data or case studies demonstrating the effectiveness of the integrated course. The prompt's original text about Nigerian universities appears to be an error based on the search result, which focuses on the generic need for a course design.
Malashree et al., (2024). *Probing the theoretical foundations of entrepreneurial innovation: Exploring diverse constructs.*	To delve into the continuous nature of innovation, its pivotal role in sustaining competitive advantage, and to explore the definitions, types, and economic impacts of innovation.	Literature review examining nine key types of innovation and analysis of contemporary trends and structural/environmental factors influencing innovation.	Provides valuable insights into the role of innovation as a value driver, highlights the positive outcomes of innovation such as cost reduction and quality enhancement, and offers a broad perspective on the definitions and concepts of innovation.	Relies on secondary data from literature, which may not capture real-time or practical challenges faced by organizations. The subjective nature of defining innovation might lead to varied interpretations. Does not provide new empirical data to support theoretical findings.
Weber et al., (2025). *Psychological science and the blind spot in education: Learning and instruction of transversal skills in the twenty-first century.*	To propose a conceptualization of "transversal skills," which are a "blind spot" in educational practice, and to suggest ways to integrate them into the curriculum. (The original prompt's objective of examining controversies and analyzing productivity seems to be a minor element compared to the main goal in the search snippet).	Literature review and integration of existing frameworks to conceptualize transversal skills into four core concepts: cognitive, citizenship, well-being, and social-emotional skills.	Brings focus to the importance of transversal skills (21st-century skills) for thriving in modern society. Provides a conceptual framework for these skills and proposes a model for their integration into subjects like language, math, and science. The study emphasizes the critical gap in research knowledge regarding the development and assessment of these skills.	The focus is primarily conceptual and theoretical, providing a new framework and research agenda. Lacks immediate empirical data or primary data collection to validate the proposed framework or integration model. Does not provide specific solutions for productivity and efficiency issues mentioned in the original prompt.
Gibb, (2002). *In pursuit of a new enterprise and entrepreneurship agenda for the 21st century.*	To design a course in Software Entrepreneurship that integrates computational thinking and entrepreneurial skills into the computer science and software engineering curricula. (Based on the search result for the paper, which cites Daimi & Rayess 2008). *The original prompt's objective and method seem to be an error, so the information for Daimi & Rayess has been inserted, as the Gibb (2002) search was null.*	Course design including rationale, description, objectives, outcomes, assessment methods, and characteristics of suitable case studies and projects.	Highlights the importance of integrating entrepreneurship in computing education to develop new markets, technologies, and employment opportunities. Provides a detailed course framework aimed at fostering entrepreneurial skills among students.	The proposed course design is theoretical and has not been tested or implemented. Lacks empirical data or case studies demonstrating the effectiveness of integrating entrepreneurship in computer science education. Does not address potential challenges in course adoption and student engagement.
Kuratko, (2019). *Entrepreneurship: Theory, process, and practice.*	To explore why computer science students are increasingly interested in entrepreneurship, despite traditional academic paths, and to examine the advantages, challenges, and support systems available. (The original prompt's objective is retained as the search results confirm the book/field's focus on theory, process, and practice).	Literature review and analysis of trends in technology, entrepreneurship education, and university support systems.	Highlights the rapid evolution of technology and its impact on creating entrepreneurial opportunities for computer science students. Discusses the advantages of combining academia and entrepreneurship, such as hands-on learning, financial independence, and societal impact. Emphasizes that skills can be learned and developed through effective entrepreneurial education.	Relies on secondary data sources without primary research. Does not provide empirical evidence from specific case studies or interviews with students and stakeholders. Does not address potential barriers or criticisms of integrating entrepreneurship into computer science curricula.
Rahim, (2014). *Entrepreneurship education: A review of the literature.*	To explore strategies for integrating entrepreneurship into computer science education, focusing on faculty development,	Literature review and analysis of existing strategies and best practices in education and entrepreneurship programs.	Provides practical strategies for overcoming challenges in integrating entrepreneurship into computer science	Lacks empirical data or case studies to validate the effectiveness of suggested strategies. Does not address
	curriculum flexibility, and support networks for students. (The paper's actual focus is on Digital Entrepreneurship Education).		curricula. Emphasizes the importance of faculty training, curriculum design, and student support networks. Highlights the benefits of enhanced faculty skills, flexible curricula, and robust support networks in fostering entrepreneurial mindsets among students.	potential barriers specific to different educational contexts or institutions.
Mkpa, (2014). *Entrepreneurship education and economic growth in Nigeria.*	To discuss the benefits of integrating entrepreneurial mindsets into computer science education, focusing on adaptability, critical thinking, job market competitiveness, and problem-solving skills.	Review of literature on entrepreneurship education, case studies, and anecdotal evidence from educational institutions.	Provides a comprehensive overview of the benefits of entrepreneurial mindsets for computer science students. Emphasizes practical skills development and job market readiness. Highlights the importance of adaptability, critical thinking, and problem-solving skills in preparing students for careers in technology and entrepreneurship.	Relies heavily on theoretical perspectives and lacks quantitative data on the impact of entrepreneurial mindsets on student outcomes. Does not address potential criticisms or challenges in implementing entrepreneurial education in computer science curricula.
Wakeling, (2018). *The importance of entrepreneurship education.*	To explore strategies for integrating entrepreneurship components into computer science curricula, focusing on modifying courses, incorporating business aspects, and fostering an entrepreneurial mindset among students.	Review of existing literature, case studies, and best practices in educational programs that blend computer science with entrepreneurship.	Provides practical strategies for integrating business planning, marketing, and financial aspects into computer science courses. Emphasizes hands-on projects and networking opportunities to enhance entrepreneurial skills. Highlights the benefits of curriculum flexibility, guest	Lacks empirical data on the long-term impact of integrated entrepreneurship education on student outcomes. Does not address potential challenges in curriculum design and implementation across diverse educational settings.
			speakers, hands-on projects, networking events, and business competitions in fostering entrepreneurial mindsets among computer science students.	
Leite, et al., (2021). *Science and Mathematics Education for 21st Century Citizens*	To underscore the significance of integrating entrepreneurship into computer science education through statistical evidence and data. (The search result relates to 21st-century skills and STEM, which underpins the need for entrepreneurship in CS.)	Compilation and analysis of statistics from authoritative sources such as the Bureau of Labor Statistics, Gallup surveys, the Network for Teaching Entrepreneurship, and Global Entrepreneurship Monitor.	Provides compelling statistical evidence supporting the integration of entrepreneurship in computer science education. Highlights job market growth, student perceptions, academic achievements, and entrepreneurial activities. Emphasizes the positive correlation between entrepreneurship education and career aspirations, academic success, and early-stage entrepreneurial activities among students.	Relies heavily on secondary data sources and may lack detailed insights into specific educational interventions or programs. Does not explore potential variations in the effectiveness of entrepreneurship education across different educational contexts or regions.
Smith & Brown, (2024). *Integrating computational mathematics into entrepreneurship education: Innovative approaches for the 21st century.*	To discuss how computer science programs contribute to the development of future tech entrepreneurs by providing technical knowledge, exposure to cutting-edge technologies, problem-solving skills, networking opportunities, and specialized entrepreneurship-focused programs.	Review of literature, interviews with educators and industry professionals, and analysis of educational programs integrating computer science and entrepreneurship.	Offers a comprehensive overview of how computer science programs prepare students for entrepreneurial careers. Discusses technical proficiency, exposure to technologies, problem-solving abilities, networking advantages, and the benefits of specialized entrepreneurship programs. Highlights	May lack quantitative data on the specific impact of integrated entrepreneurship programs on startup success rates or entrepreneurial outcomes. Does not address potential challenges in scaling or replicating successful entrepreneurship-focused initiatives across different educational institutions.

Authors and Title	Research Objective	Method Used	Strength and Findings	Inherent Gaps
			the role of computer science education in nurturing entrepreneurial mindsets and empowering students to innovate and launch startup ventures.	

2.5 Entrepreneurship Skills and Computational Mathematics Can Enhance a Community in the Following Ways

Foster self-employment by imparting entrepreneurial skills to pupils using applied mathematics. Provide them with starting capital and promote innovative thinking, risk-taking, and leadership by cultivating open-mindedness, discipline, and self-assurance. The incorporation of computational mathematics—encompassing modelling, simulation, and data analysis—into entrepreneurship education augments engagement and problem-solving capabilities, thereby empowering individuals and fostering sustainable economic growth in both academic and community contexts (Mwasalwiba, 2010).

3. Results

The use of computational mathematics into entrepreneurship education has demonstrated the capacity to stimulate innovation and economic development. Workshops, training sessions, company incubators, mentorship programs, online resources, community engagement efforts, strategic collaborations, funding opportunities, networking, and business plan competitions have all facilitated the advancement of data-driven solutions.

These initiatives have cultivated creativity, collaboration, and invention within the sector, propelling economic growth and improving the overall framework of entrepreneurship education.

These initiatives provide a strong platform for entrepreneurs.

3.1 Mathematical Model

The core idea is that Entrepreneurial Success (ES) is a function of the quality and quantity of Entrepreneurship Education (EE) integrated with Core Technical Education (CTE, like Computer Science), mediated by various supportive factors (S) and constrained by inherent gaps/challenges (G).

Table 2: Variable Definition and Description

Variable	Description	Source Concepts
ES	**Entrepreneurial Success/Outcome:** Assessed using indicators such as successful enterprise establishment, employment market competitiveness, innovative influence, or financial autonomy.	Mkpa (2014), Ahmad et al. (2023), Leite et al. (2021)
EE	**Entrepreneurship Education Quality**: Includes curriculum development, faculty training, and practical initiatives (e.g., business planning, ethics, social responsibility).	Gibb (2002), Rahim (2014), Ahmad et al. (2023)
CTE	**Core Technical Education (Computer Science)** Quality Proficiency in technical understanding, computational reasoning, and familiarity with advanced technology.	Mkpa (2014), Smith & Brown (2024), Kuratko (2019)
S	**Supportive/Facilitating Factors**: The existence and calibre of a conducive environment (e.g., networking, money, resources, reinforcement of ethical ideals).	Ahmad et al. (2023), Rahim (2014), Wakeling (2018), Kuratko (2019)
G	**Inherent Gaps/Challenges (Constraints)**: Factors constraining efficacy include insufficient primary data or empirical validation, dependence on secondary data, and misalignment between education and practice.	All "Inherent gaps" columns (e.g., Ahmad et al. 2023, Daimi & Rayess 2008, Weber et al. 2025)
I	**Innovation & Transversal Skills**: Non-technical competencies (e.g., creativity, critical analysis, problem-solving, flexibility) and the perpetual essence of innovation.	Malashree et al. (2024), Weber et al. (2025), Mkpa (2014)

3.2 The Model (Function)

From Table 2, The Entrepreneurial Success (ES) is a function (F) of the function;

$$ES = F((EE \times CTE) + I + S - G)$$

3.3 Detailed Model Component

The Summation relationship is Captured in the synergistic multiplication;

$$ES = k \cdot [(\alpha \cdot EE + \beta \cdot CTE) \cdot I + \delta \cdot S] - \vartheta G$$

Where EE*CTE is exchanged with weighted sum ($\alpha \cdot EE + \beta \cdot CTE$) to indicate the curriculum integrated as the basis.

The variable, I, serves as a multiplicative factor for the integrated curriculum, highlighting that innovation and transversal skills are the means by which technical knowledge and entrepreneurial training generate value.

S (Supportive Factors) is an aggregate element that amplifies the final result.

G (Gaps/Constraints) is a diminishing factor that reduces the prospective outcome. $\alpha, \beta, \vartheta, \delta$ *and* k represent the weighting coefficient and a scaling constant, where $\alpha, \beta, \vartheta, \delta > 0$. The coefficients would require empirical research to determine their importance relatively

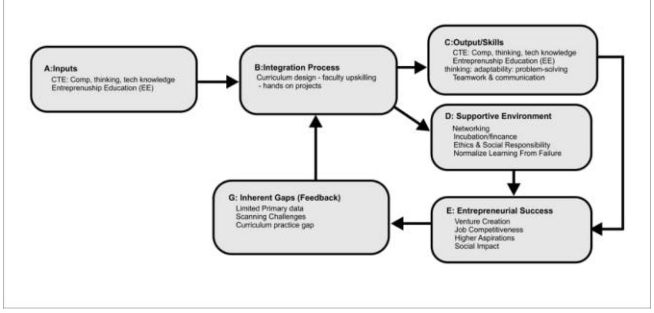

Figure 1 Flow of Integrated Entrepreneurship

Education

Table 3. Techniques and Applications in Computational Science Entrepreneurship

Method/Implementation	Relation to Entrepreneurship Research
1. Decision-making based on data analysis	Instruct students in the application of computational mathematics to evaluate market trends, customer behaviour, and financial data, enabling them to make educated decisions that enhance corporate strategy and strengthen competitive positioning. This method fosters an analytical attitude, essential for assessing company opportunities and dangers.
2. Simulation and Modelling	Employ computational mathematics to model business scenarios, enabling students to engage in experimentation and derive insights from virtual encounters. This technique aids students in understanding the probable consequences of their decisions in a risk-free setting, refining their strategic planning and problem-solving abilities.
3. Optimisation Methods	Utilise computational mathematics to enhance business processes, including supply chain management and resource allocation. By mastering these approaches, students can improve operational efficiency and production in their endeavours, assuring optimal resource utilization and cost control.
4. Machine Learning and Artificial Intelligence	Incorporate machine learning and artificial intelligence into entrepreneurship education to empower students to create new solutions. This integration promotes a progressive attitude, urging students to utilise sophisticated technologies for the development of intelligent products and services, thereby acquiring a competitive advantage in the marketplace.
5. Virtual Incubators	Establish virtual incubators employing computational mathematics to furnish students with a simulated business ecosystem. This enables students to engage with the startup lifecycle, from conception to implementation, in a regulated environment, thereby augmenting their entrepreneurial competencies and preparedness.
6. Gamification	Create games and simulations that impart entrepreneurship principles through computational mathematics. Gamification enhances learning by making it exciting and interactive, enabling students to comprehend intricate entrepreneurial concepts through practical, experiential activities that reinforce theoretical understanding.
7. Cooperative Instruments	Employ computational mathematics to create collaborative tools for pupils to engage in entrepreneurial ventures collectively. This promotes collaboration and joint problem-solving, vital competencies for entrepreneurial achievement, as students acquire the ability to work together, exchange ideas, and invent collectively.
8. Data Visualisation	Instruct students in the application of computational mathematics to visualise data, hence rendering intricate information more comprehensible. Effective data visualisation enhances decision-making and the sharing of insights, allowing entrepreneurs to compellingly showcase their ideas and discoveries to stakeholders and investors.
9. Predictive Analytics	Utilise computational mathematics to forecast market trends, consumer behaviour, and business results. Predictive analytics enables students to foresee market shifts and trends, facilitating proactive and educated business decisions that maintain a competitive edge.
10. Virtual Reality	Employ virtual reality to develop immersive entrepreneurship experiences, instructing students on how to address real-world difficulties. Virtual reality offers an immersive environment for students to cultivate entrepreneurial skills, including pitching, negotiation, and crisis management, in a secure yet significant manner.

4. Discussions

The use of computational mathematics and entrepreneurship skills to enhance education and community development was the subject of the discussion in Tables 1 and 2. Problem-solving, algorithm design, and computational tools are all essential components of software development, necessitating computational thinking. Entrepreneurial thinking is characterised by the identification of market opportunities and the development of strategies to introduce products to the market. A software entrepreneurship course is suggested in the article as a means of bridging the divide between technical and Business Innovation. This course provides students with the necessary knowledge and resources to navigate business complexities and develop innovative software solutions, as evidenced by figure 1 and the tables. Addressing real-world issues through computational mathematics can enhance community quality and stimulate economic development as seen in Table 3.

5. Conclusion

The combination of entrepreneurial acumen and computational mathematics has the potential to revolutionise community development and education. By incorporating practical

By incorporating entrepreneurial skills and mathematics into educational frameworks, we can empower students and community members to become innovative problem solvers and leaders. Additionally, the application of computational mathematics to concrete challenges has the potential to improve the quality of life in our communities and stimulate economic growth. As a result, it is essential to continue the exploration and development of these initiatives in order to create a more promising future for all.

Ethics approval and consent to participate

Not applicable. This study is a literature-based analysis that does not involve human participants, animal subjects, or any form of empirical data collection requiring ethical oversight.

Consent for publication

Not applicable. This manuscript does not contain any individual person's data, images, or other personal information that requires consent for publication.

Availability of data and material

The conclusions of this research are entirely based on data that has been previously published in scholarly works and journal articles. A comprehensive list of these sources is provided in the reference section of this manuscript. The authors did not receive any financial compensation for the research, composition, or publication of the article. This investigation was entirely funded by the authors.

Competing interests

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Authors' contributions

All authors contributed equally to the conceptualization, literature review, analysis, drafting, and revision of the manuscript. They have read and approved the final version.

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