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Adoption and Challenges of Financial Technology and Artificial Intelligence in Business Education: Insights from Faculty Members at Saudi Universities

Razaz Houssien Felimban

Department of Economics & Finance, College of Business Administration, Al Hawiyah, Taif University, P.O. Box 11099, Taif 21944, Saudi Arabia

Email: razaz.h@tu.edu.sa

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Abstract

This study explores the adoption and challenges associated with integrating Financial Technology (FinTech) and Artificial Intelligence (AI) into business education, with a specific focus on faculty members at Saudi universities. The researcher uses a mixed-methods research design to conduct this study. The data were collected from 160 academic staff from various Saudi universities through structured surveys. The findings revealed that while faculty members demonstrate moderate familiarity with FinTech and AI concepts, such as blockchain, robo-advisors, and digital banking, practical implementation in academic settings remains limited. Major challenges identified and pointed out in this study include insufficient faculty training, a lack of updated resources, infrastructure constraints, and regulatory complexities. Furthermore, the faculty members' responses highlight institutional inertia, limited interdisciplinary collaboration, and a significant gap between theoretical instruction and real-world technological applications. The study contributes to the growing body of research on digital transformation in higher education and offers practical recommendations for curriculum reform, faculty members' development, and policy alignment with Saudi Vision 2030. The results demonstrate the value of equipping educators with the tools and support necessary to prepare graduates for a digitally driven financial future.

Keywords: Financial Technology (FinTech), Artificial Intelligence (AI), Business Education, Higher Education in Saudi Arabia, Digital Transformation.

Introduction

The global higher education landscape has experienced a revolutionary shift within the past years, driven by rapid technological changes. Among these, FinTech and AI emerged as driving forces that redesign the operation of financial systems and the delivery of business education. FinTech innovations such as blockchain, mobile banking, digital payment

platforms, and robo-advisors are gradually redefining the competencies of finance professionals in the digital economy (Marcevičiūtė, 2025; Khan, 2023). Artificial intelligence tools, such as intelligent tutoring systems and predictive analytics, are increasingly used to individualize instruction and amplify learning outcomes (Baah-Peprah et al., 2025). Basically, the accelerating era of the Fourth Industrial Revolution demands that every graduate of business studies be digitally literate in FinTech and AI (Nguyen et al., 2024).

In this perspective, Saudi Arabia has positioned the leverage of digital transformation at the core of its Vision 2030 strategy to diversify the country's economy and raise the quality of education through innovation. The Saudi Data & Artificial Intelligence Authority (SDAIA), in line with national policies on digitization, positions AI and FinTech as key drivers toward sustainable development and knowledge-based economies that are aligning the workforce with current labor market demands (SDAIA, 2023). Therefore, universities are called upon to integrate these emerging technologies into their programs, especially those concerning business administration, so that their graduates can keep pace with the labor market in acquiring the competencies needed for such dynamics.

Despite this strategic alignment with national goals, the integration of FinTech and AI into business studies remains highly limited and underexplored in most Saudi universities. Most of the available literature discusses the readiness of students, institutional policy, or curriculum content separately without considering the most critical stakeholders in this change: the academic staff. Yet, academic staff are the most important agents in educational innovation as they develop course content and adopt new technologies, thereby influencing student learning experiences.

The recent breakthroughs of Financial Technology (FinTech) and Artificial Intelligence (AI) are changing the financial world and the skill sets required in the business field. While many higher education systems around the world are adapting to the increasing use of such technologies in business programs, Saudi universities face a certain set of challenges. Other issues included inadequate preparation of faculty, lack of training opportunities, and a non-standardized framework to integrate curriculum. Despite the Kingdom's high prioritization of digital transformation through its vision 2030, the actual FinTech and AI adoption within business education is fragmented and not properly considered and explored. Since faculty and staff are the core for curricular change implementation, they are frequently hampered by institutional and pedagogical barriers for effective implementation (Benavides et al., 2020). This study seeks to explore the underlying reasons for these challenges and try to find out business instructors' and teachers' views of Saudi universities regarding the gap between their policy aspirations and educational practice.

The motivation for this study comes from the growing application of Financial Technology (FinTech) and Artificial Intelligence (AI) in the global financial industries and higher education. In Saudi Arabia, for instance, the National Strategy for Data and Artificial Intelligence (SDAIA) and the Vision 2030, a national vision for the Kingdom, put a strong focus on building digital capabilities, innovations and leadership in the knowledge-based economy. Despite these strategic trends, the integration of FinTech and AI in business curricula is still low, and the subject has not been systematically examined. In addition, faculty members, who play a fundamental role for curricular transformation, have been challenged by institutional and

infrastructural as well as pedagogical constraints that hinder technology adoption. While many studies address the general experiences of digital transformation in GCC universities, there are fewer studies that specifically revolve around faculty members' views on AI and FinTech integration in Saudi business programs (Bakhit & Bilal, 2024; Buele & Llerena-Aguirre, 2025). This research is therefore motivated by the need to generate empirical evidence on faculty members' readiness, perceptions, and challenges, with the aim of informing targeted curriculum reforms and policy initiatives to align with both educational and national digital transformation goals.

The purpose of this research is to explore the adoption and challenges of financial technology (FinTech) and artificial intelligence (AI) in business education, specifically focusing on faculty members at Saudi universities. To achieve this purpose, the following objectives have been formulated: to identify and analyze the demographic and professional profile of the academic staff involved in teaching and/or researching FinTech and AI in the field of finance in Business Administration Colleges at Saudi universities; to determine the level of knowledge and familiarity of academic staff involved in teaching and/or researching FinTech and AI technologies; to explore the extent to which members of the staff of Business Administration Colleges use FinTech and AI in their institutions and the types of FinTech that are most commonly used; to examine the main challenges and obstacles faced by academic staff in integrating FinTech and AI technologies into the business administration curriculum.

The main research question guiding this study is: What is the extent of adoption and primary challenges of Financial Technology (FinTech) and Artificial Intelligence (AI) in business education, as perceived by the faculty members in Business Administration colleges in Saudi Arabia? To comprehensively address this central question, several subquestions were developed to investigate different dimensions of FinTech and AI adoption and the associated challenges in business education. Specifically, the study aims; to identify the demographic and professional characteristics of academic staff members involved in teaching or researching FinTech and AI in finance in Business Administration Colleges at Saudi universities; to assess the level of academic staff knowledge and familiarity with concepts and technologies related to FinTech and AI in finance; to analyze the extent to which the faculty members of Business Administration Colleges at Saudi universities use these technologies in their institutions and identify the most common type of FinTech; and to explore the main challenges and obstacles encountered by academic staff in implementing FinTech and AI in their institutions.

This study makes a notable contribution to both the literature and the practice since it fills a critical lacuna of empirical studies on integrating FinTech and AI into the business education of Saudi universities, an area considered a national priority in digitization yet has been less explored. Besides, the study provides practical recommendations to curriculum designers and decision-makers aiming to bring about congruence between educational programs and professional imperatives with a view to matching faculty perceptions with institutional preparedness. Extending prior works developed by Alotaibi and Alshehri (2023), it builds upon systematic analyses of AI-based learning in Saudi higher education and identifies both potential and obstacles to implementation, complementing broader evaluations by Al-Zahrani and Alasmari (2024). By focusing on academic staff, the study introduces new knowledge related to faculty preparedness, the adoption of technologies, barriers in adopting trans-disciplinary pedagogies, and institutional constraints—these features are considered

vital for digital reform of the curriculum. Specific recommendations are drawn for education policy and curriculum developers based on practical implications for faculty development aligned with the imperatives identified in Saudi Vision 2030.

This paper is divided into five sections. The Introduction describes the background of the study and defines the research problem, aims and importance of the research. The Literature Review covers the significant concepts, global trends and gaps in FinTech and AI integration in the educational business. The methodology presents details of the design of the research, how the data were collected, and how they were analyzed. The Findings and Discussion are a presentation and interpretation of results related to faculty members' adaptation and problems. The paper concludes with Recommendations, which summarize some of the key insights and offer future research directions.

Literature Review

Financial Technology (FinTech) has been broadly defined as the application of technological innovation to a financial service to provide new delivery models of banking services such as payments, lending and investment solutions. It represents a transformative force that challenges the traditional financial intermediation by bringing in efficiency, accessibility, and customer-centric services (Gomber et al., 2018; Goldstein et al., 2019). A key concept here is disruptive innovation, where digital platforms and blockchain reshape how financial institutions operate and interact with users.

Artificial Intelligence (AI) is the science and engineering of creating intelligent machines, particularly computer programs, that are capable of performing tasks that require human intelligence, such as perception, reasoning, learning and problem solving (Russell & Norvig, 1995). Within the context of higher education, AI has been identified as having the potential to customize learning pathways, facilitate predictive analytics and enhance teaching and assessment practices (Crompton & Burke, 2023). The use of Artificial Intelligence (AI) and Financial Technology (Fintech) in business education has been a key area of interest in recent studies, where researchers have been extensively exploring both its potential and its problems. Across the ten studies reviewed, there is broad consensus that there is a shift in financial practice, teaching methods and curriculum design due to AI and Fintech. At the same time, there are major limitations in terms of faculty members' readiness, institutional capacity, and cultural adaptation.

There are several research reports claiming that not only financial services but also the learning process of students is changing due to this AI. Swapna et al. (2024) showed how the technologies of machine learning, deep learning, and big data are impacting trading, portfolio management, and fraud detection, but they are also providing personalized learning paths and administrative efficiencies in the education sector. Similarly, Rane et al. (2024) found that AI has been accepted in finance and management functions primarily due to its predictive power and individualized service offerings but warned that privacy and regulatory challenges, along with high implementation costs, are still major obstacles. The literature reveals a mixture of promise and caution in these insights.

Faculty opinions are one other major theme. Lugtu (2024) examined the implementation of ChatGPT in a business school setting and found that the overall attitude toward the

usefulness of this system among faculty members was positive. However, they were also hesitant, especially regarding ethical use, plagiarism risks and a lack of training to fully exploit the technology. In a similar vein, Gulati (2024) conducted an analysis of the faculty members in the field of commerce and concluded that while AI was a promising technology, it was perceived with concerns over increased workload and reduced pedagogical control over AI-generated content. Together, these studies indicate that faculty members' readiness—and their anxieties—continue to be critical factors in determining the rate of adoption.

Curriculum integration has been a topic of discussion in the past as well as in modern contexts. The first framework proposed by Salchenberger (1989) for incorporating AI into MBA programs focused on expert systems, knowledge-based applications, and natural language processing, which remains relevant in modern contexts. More recent research by Shino et al. (2022) and Earls (2019) highlights the need for the direct integration of fintech into higher education curricula. Shino and colleagues argued that universities should transform programs to prepare graduates for a digital finance economy, including the availability of Shariah-compliant fintech in Islamic universities. Earls, looking at Massachusetts universities, warned that if universities are not simulating the adoption of fintech, there is a risk that they will produce graduates who are not suited to an increasingly technological labor market. Both perspectives emphasize that curriculum change is not an option but a necessity if higher education is to stay relevant for the sake of finance.

Another part of the literature on AI tools is the way that students used them. Cordova et al. (2024) conducted a study examining the emotional and cognitive responses of finance students to AI-enhanced classroom environments. They found that applications of AI, like ChatGPT and FinChat, generated more interaction, curiosity, and happiness than older, lecture-based approaches. Students also expressed more fear, an emotion which, while motivating, was a psychological indication of the difficulty of adopting new technology. This new finding will interest those looking into the reality that the integration of AI is not just a technical or curricular problem but also an emotional and human one that needs to be treated with care.

Several studies suggest even more difficulties. Specifically, Sharma (2024) highlighted systemic issues like poor infrastructure, weak governance, and lack of access. These problems are consistent with the problems identified by Rane et al. (2024), who found the existence of an organizational resistance to change and complexity of regulation framework in this study. Collectively, these findings support the contention that, although AI adoption may be technically possible, it is primarily the social, cultural, and institutional aspect of the technology that acts as the barrier for AI adoption. Despite these challenges, however, scholars have also suggested ways to proceed. Lugtu (2024) stressed the importance of providing adequate training programs to assure that faculty members are able to use AI tools efficiently in teaching. In a study by Rane et al. (2024), there is the need to establish proper data governance frameworks and ethics. Swapna et al. (2024) stated that efforts need to be made to make institutions innovation-friendly to reduce resistance and increase adoption. Such recommendations are important, but most studies continue to be piecemeal in their approach and focused on isolated interventions, rather than integrated frameworks.

While there is progress in literature on AI and fintech adoption within business education, there are several limitations. First is the data quality: many studies use small and local samples, such as those based on single universities in the Philippines (Lugtu, 2024) or Bolivia (Cordova et al., 2024), which limits the generalizability. Another flaw is a lack of clarity and conceptual accuracy. Other analyses, such as Swapna et al. (2024) and Shino et al. (2022), took long discussions yet failed to differentiate between technological speculations and data. Finally, several studies fall short in the strength of their arguments. Although the ethical and regulatory problems that were outlined by authors like Sharma (2024) and Rane et al. (2024) are well identified, the tendency was to offer them in descriptive terms with few or no theoretical basis or practical recommendations.

Taken together, these restrictions help us to illuminate a distinct research gap. While the reviewed studies support the transformative potential of AI and fintech in finance education, there is a lack of understanding about how these technologies are perceived and applied by faculty members in non-Western contexts and specifically in Saudi Arabia. Most of the literature either focuses on the perceptions of students (Cor Hubbard et al. 2024) or on the general institutional strategies (Rane et al. 2024). However, the voices of faculty who play a major role in curriculum development, adoption, and moral and cultural dilemmas have not been treated with respect. This gap is particularly significant in Saudi universities, where the interaction between rapid technological ambitions and deeply rooted cultural values creates a distinctive environment. Learning more about how faculty members at such institutions experience adoption, how they address problems, and how they balance local norms with international trends will be crucial to the formulation of appropriate strategies.

The integration of Artificial Intelligence (AI) and FinTech in Saudi higher education, and business schools in particular, is a concept that is gaining momentum in the overall national strategy of Vision 2030. Literature portrays this transformation as promising and problematic, most particularly at the faculty level, where actual adoption should take place. Alfahad (2012) was one of the first researchers to provide an insight, pointing out that although IT adoption enhanced access and efficiency in Saudi universities, constraints in infrastructure and staff preparedness had considerably hindered the progress. Zureigat et al. (2019) later criticized business schools for not equipping their students with applied digital skills, stating that, although the need for curriculum reform is there, implementation is inconsistent across various institutions.

In recent years, research has increasingly focused on the pedagogical potential of AI. Alotaibi and Alshehri (2023) analyzed 55 studies and concluded that the use of AI in Saudi higher education is at its infant stage. The authors say that the potential of both personalized learning and better outcomes that AI offers can only be realized if faculty members are equipped with the skills needed to work in these environments—which, in general, are still largely undeveloped. In Alenezi (2023), when he mentioned the Unified Theory of Acceptance and Use of Technology, it implied that despite the identification of stimuli to adoption like performance expectation and social support, the lack of confidence and awareness among faculty dominated, and this was a key barrier to meaningful use of AI. AI is also associated with financial education in the literature. In Al-Baity (2023), for example, the role of AI in digital finance in Saudi Arabia, from fraud detection to risk modeling, was discussed, which identified that while banks and regulators are moving forward, business schools are unable

to keep up with educating students for the ethical and technical challenges of the sector. This gap highlights the need for integrated teaching approaches that combine technical proficiency with regulatory literacy.

A deeper perspective is offered through broader system-level analyses. Alnajim (2023) studied AI-based curriculum reforms and stated that even though policy changes that were inspired by Vision 2030 are underway, the realization of change is hindered by rigid institutional norms and some teachers' resistance. Elmohimeed (2024) compared the models of digital transformation of Saudi Arabia and Singapore, identifying that the progress of Saudi Arabia is delayed due to inequality in infrastructure and fragmented implementation, particularly in rural and urban institutions. From this body of research, three important weaknesses stand out. First, much of the literature is descriptive or conceptual—many investigations do not empirically assess the involvement of faculty members or classroom results (e.g., Alotaibi & Alshehri, 2023; Al-Baity, 2023). Second, even though employability is a constantly recurrent theme, not many works empirically relate the changes in AI/FinTech curricula to labor market success (Zureigat et al., 2019). Third, there is a tendency toward overly optimistic narratives that overlook the cultural and institutional barriers to faculty adoption (Alenezi, 2023).

Although global scholarship has increasingly explored the integration of Artificial Intelligence (AI) and Financial Technology (FinTech) in higher education, the Saudi context reveals a significant gap. A significant portion of the current literature is either conceptual or policy-focused (Alotaibi & Alshehri, 2023; Alnajim, 2023; Elmohimeed, 2024) or centers on challenges related to infrastructure and digital transformation (Alfahad, 2012; Zureigat et al., 2019). However, the current experiences of faculty members, the key actors responsible for actual adoption and curriculum implementation, remain underexplored. There is limited empirical evidence addressing how faculty at Saudi business schools perceive, adopt, and navigate the challenges of AI and FinTech integration in teaching. This gap is particularly pressing in the context of Vision 2030, where faculty members serve as the critical bridge between the national policy ambitions and classroom-level transformation. Thus, the adoption and challenges of faculty members need to be studied systematically to offer practical insights into the reform of the curriculum and policy development in Saudi higher education.

Methodology

Research Design and Participant

Study design: Quantitative study design will be adopted in this study to achieve detailed knowledge about the adoption and problems of Financial Technology (Fintech) and Artificial Intelligence (AI) in business education in Saudi universities. The study will adopt a descriptive format and exploratory research design, where a questionnaire will be used as the major data collection tool.

Sampling and Instrument

Instrument: A structured questionnaire developed to gather data from faculty members in Business Administration Colleges in Saudi universities. Target Population: The target audience consists of faculty members teaching or doing research in AI and Fintech in finance.

Sampling Technique: (1) Stratified random sampling is indorsed to ensure representation across different universities, academic positions, and specializations. (2) The sample size will be determined using statistical methods to ensure reliability and validity.

Data Collection and Analysis

Survey Sections:

1. Demographic and Professional Profile – Age, gender, academic rank, years of experience, research focus, and exposure to Fintech/AI.
2. Knowledge and Familiarity – Self-assessed knowledge levels, sources of learning, and training received in Fintech/AI.
3. Usage of Fintech and AI – Frequency and purpose of use, commonly used technologies, and institutional support.
4. Challenges and Barriers – Perceived obstacles in adopting Fintech/AI, institutional limitations, and technological constraints.

Quantitative Analysis:

1. Descriptive statistics (mean, frequency, percentage) are utilized to summarize faculty demographics, knowledge levels, and usage patterns.
2. Inferential statistics t-test is used to identify significant relationships and differences.

Sample Size

The sample size includes 160 male and female Head of the finance departments, Professionals who develop Finance Curriculum, and Academic staff from the College of Business Administration at Saudi Universities and Saudi business schools.

Results

The First Question: Demographic and Professional Characteristics of Academic Staff

The demographic and professional profile of the 160 participating academic staff members showed a number of intriguing trends. In terms of institutional affiliation, the majority of the cases (35.6%) were focused on universities of "Other" affiliation, followed by the faculty of Taif University (20.6%) and Umm Al-Qura University (18.8%). King Abdulaziz University and King Saud University contributed 8.8% each, and 7.5% was contributed by King Fahd University of Petroleum and Minerals. Concerning the departmental affiliation, the largest percentage (35.6%) of the respondents were from the Finance department, followed by Accounting (26.3%) and Management Information Systems (13.1%). Other departments were Economics and Investment (8.8% each) and Banking (7.5%).

In terms of academic positions, most of them (65.0%) described themselves as academic staff, and another 22.5% were involved in curriculum development and 19.4% were department chairs. Academic rank distribution showed that most of the lecturers were Assistant Professor (31.9%), followed by Lecturers (25.0%), Associate Professors (18.1%), Professors (13.8%), and Teaching Assistant (11.3%). Gender distribution revealed the dominance of the female gender (57.5%) over the male (42.5%). Concerning professional qualifications, 86.9% said that they didn't have any formal certifications in fintech and AI, whereas a mere 13.1% had such qualifications. This gap highlights the lack of professional exposure among faculty to industry standards and practices in the field of financial technology. With respect to teaching experience, participants were evenly distributed

between those with less than 10 years of teaching experience and those with 10–15 years of teaching experience (36.9% each). A smaller proportion (26.3%) had experience of more than 15 years in higher education.

Finally, there was strong consensus regarding the importance of incorporating FinTech and AI learning into business education, with a significant majority (96.9%) of financial professionals agreeing that financial professionals should have knowledge of FinTech and AI. Only 3.1% disagreed, and none of the participants ticked "maybe," indicating a clear and unified view in the academic community about the importance of these new technologies in finance education.

Second Question: Level of Knowledge and Familiarity with Fintech Concepts and Technologies
To test this question, the researcher will use the Statistical method of the One-Sample t-test. At a significant level: α = 0.05. And will calculate the means, standard deviations, and the Percentage relevant to the Questions about Knowledge and Experience with Fintech among academic staff. The knowledge and Experience Limits as shown in the following Table 1:

Table 1
Knowledge and Experience Limits

Knowledge and Experience level	Mean limits
I have no knowledge	1.00 – 1.66
Moderate	1.67 – 2.33
Familiar	2.34 – 3.00

The results of (T) test as shown in the following Table 2:

Table 2
(T) test results

The axis	Mean	df	Calculated (T)	Sig. P. value
Knowledge and Experience with Fintech among academic staff	1.967	159	28.374	< 0.001

From the above table, the researcher finds from the results that the (P-value) <0.001 which is highly significant, and also the calculated (T) value = 28.374 is greater than the tabulated (T) which = 3.353 at (df = 159 and α = 0.001). These results indicate that the level of knowledge and familiarity with Fintech concepts and technologies among academic staff in Business Administration Colleges has reached a level higher than the degree of I (which means that the target subjects possess knowledge and familiarity with Fintech concepts and technologies). And from the study, the researcher finds that the mean = (1.967), which means that there is a consensus and agreement from the academic staff at rate of 65.57%, on their level of knowledge and familiarity with Fintech concepts and technologies in Business Administration Colleges. It also indicates that there is a Moderate level of knowledge among academic staff with Fintech concepts and technologies in Business Administration Colleges. The results for the study axes, as shown in the following Table 3:

Table 3
Results for the Study Axes

Knowledge and Experience Questions	Mean	Std. Dev.	p.c %	Degree of Level
How much do you know about Fintech?	2.125	0.689	70.83	Moderate
How much do you know about digital-only banking?	2.256	0.720	75.20	Moderate
How much do you know about digital-only banking?	1.975	0.801	65.83	Moderate
How much do you know about the concept of crowdfunding?	2.006	0.789	66.87	Moderate
How much do you know about cloud computing and its adoption in the banking and finance industry?	1.931	0.770	64.37	Moderate
How much do you know about robo advisors in banking and finance industry?	1.838	0.760	45.95	Moderate
How much do you know about artificial intelligence (AI) and how it is applied in the banking and finance industry?	1.988	0.727	49.70	Moderate
How much do you know about Internet of things (IoT's) and its application in finance industry?	1.775	0.744	44.38	Moderate
How much do you know about smart contracts and blockchain and its application in banking and financial sector?	1.813	0.728	45.33	Moderate

From the results about Knowledge and Experience limits in the above table, the researcher finds that:

1. **The answer of Q10**: The academic staff is familiar with fintech at a moderate level. The mean is 2.125, and the percentage of their knowledge with Fintech is 70.83%. The std. deviation is (0.689). This ratio represents a small value, which indicates that there is no dispersion in the answers of the academic staff towards the level of their knowledge with Fintech.
2. **The answer of Q11**: The academic staff are familiar with digital-only banking at (Moderate Level), where its mean is 2.256, and the percentage of their knowledge with digital-only banking is 75.20%. The std. deviation is 0.720, which stands as a small value. This indicates that the academic staff's responses show little variation regarding their knowledge level of digital-only banking.
3. **The answer of Q12**: The academic staff are familiar with the concept of crowdfunding at a (Moderate Level), with a mean of 1.975, and the percentage of their knowledge of the concept of crowdfunding is 65.83%. The std. deviation is (0.801), which represents a small value. This indicates that the academic staff's responses show little variation regarding their knowledge of the concept of crowdfunding.
4. **The answer of Q13**: The academic staff know about cloud computing and its adoption in the banking and finance industry at a (Moderate Level), with a mean of 2.006, and the percentage of them who know about cloud computing and its adoption in the banking and finance industry is 66.87%. The standard deviation is 0.789, and this represents a

small value and indicates that there is no dispersion in the answers of the academic staff towards the level of their knowledge about cloud computing and its adoption in the banking and finance industry.

5. **The answer of Q14**: The academic staff are familiar with big data analytics and its use in the banking and finance industry at a (Moderate Level), where its mean is 1.931, and the percentage of their knowledge of that is 64.37%. The std. deviation is (0.770). This represents a small value, which indicates that there is no dispersion in the answer of the academic staff with respect to the level of their knowledge of big data analytics and its use in the banking and finance industry.
6. **The answer of Q15**: The academic staff know about robo advisors in the banking and finance industry at a (Moderate Level), where its mean is 1.838, and the percentage of them who know about that is 45.95%. The std. deviation is (0.760), which represents a small value. This indicates that there is no dispersion in the answer of the academic staff towards the level of their knowledge about robo advisors in the banking and finance industry.
7. **The answer of Q16**: The academic staff's knowledge Level about artificial intelligence (AI) and its use in banking and finance is at a (Moderate Level), with a mean of 1.988, and the percentage of their knowledge Level is 49.70%. The std. deviation is (0.727), which stands as a small value. This finding indicates that the academic staff's responses show little variation regarding their knowledge level of artificial intelligence (AI) and its application in banking and finance.
8. **The answer of Q17**: The academic staff know about the Internet of things (IoT) and its use in the finance industry at a (Moderate Level), with a mean of 1.775, and the percentage of them who know about IoT is 44.38%. The standard deviation is 0.744, which stands as a small value that indicates that there is no dispersion in the answers of the academic staff with respect to their level of knowledge about the Internet of Things (IoT) and its use in the finance industry.
9. **The answer to Q19**: The academic staff's knowledge about blockchain and smart contracts and their use in the banking and financial sector comes at a (Moderate Level), with a mean of 1.813, and the percentage of their knowledge about blockchain and smart contracts is 45.33%. The standard deviation is 0.728, a small value that indicates there is little variation in the academic staff's responses regarding their knowledge of blockchain and smart contracts in the banking and financial sector.

The discussion of the second research question shows that academic staff have different levels of familiarity with key FinTech and AI technologies. Overall the participants demonstrate medium levels of awareness with outstanding potential for professional development and knowledge improvement. A majority of respondents (51.3%) rated their overall knowledge about general FinTech concepts as moderate, with 30.6% of respondents describing themselves as being familiar and 18.1% of respondents rating their prior knowledge as being none. A moderate held true for individual FinTech applications in terms of familiarity. For instance, it was observed that respondents were relatively aware about digital-only banking, as 83.8% of respondents were moderate to fully aware. Interestingly, knowledge and familiarity with crowdfunding was less than that, with a higher number of people saying they were moderately familiar (36.3%), familiar (30.6%), and having no knowledge (33.1%).

Regarding more technical areas, the distribution for cloud computing was a balanced one of 38.1% moderate, 31.3% familiar, and 30.6% unfamiliar. The analysis of the big data analytics knowledge revealed that 40.6% of participants stated that they are moderately familiar with big data analytics, and 33.1% of participants stated that they have no knowledge about big data analytics. The second FinTech innovation, called Robo-advisors were not as well known by the participants: 40% of participants were somewhat familiar, 21.9% were familiar, and 38.1% were completely unaware. Similar trends were exhibited in AI in finance, where 47.5% had moderate knowledge and 25.6% said that they were familiar. The general awareness of the Internet of Things (IoT) and its application to financial services was relatively low, with 41.3% of respondents having no knowledge at all and 18.8% of respondents being unaware of its application.

In summary, the academic staff at Saudi universities show a generally moderate degree of familiarity with concepts of FinTech and AI, with superior awareness in basic areas pertaining to digital banking, FinTech, and similar fields and a lower familiarity with emerging technologies such as robo-advisors, IoT, and blockchain. These results indicate the importance of providing specific education and curriculum development to minimize the gap in understanding and support the successful integration of financial technology with business education.

The Third Question: Extent and Types of Fintech Usage Institutions

The results confirm that the current use of FinTech technologies in Saudi universities is limited. Only 12.5% (20/160) of academic staff members stated that they use FinTech tools (e.g., Bitcoin, Blockchain) in their institutions, while a vast majority (87.5%) stated that they had not applied these technologies in their institutions at all. This shows a significant difference between awareness and practical adoption. Among the small number of users, most (85%) had experience using FinTech tools for less than five years, while only a small fraction (15%) had used such tools for more than five years. This data indicates that institutional involvement with FinTech is very new in business education in Saudi universities.

When asked about the specific types of FinTech technologies that they had used, digital banking (35.6%) and electronic payment methods (35.0%) were the most commonly reported. These were followed by financial software (27.5%) and financial data analytics (25.0%). Usage rates decreased for more advanced technologies such as ERP accounting software (13.1%), big data (11.9%), blockchain (10.6%), and cryptocurrency (9.4%). Financial security tools were the least used, with 5.0% and 7.5% of respondents reporting not using any of the FinTech tools listed, whilst 54.4% of participants reported that there were no members of their finance departments with dual expertise in both finance and IT and 45.6% reported that there were. This may be one reason for the low adoption rates, as the lack of interdisciplinary expertise may be a barrier to integrating FinTech and AI into educational settings.

In summary, we conclude that faculty members are moderately aware of the concepts of FinTech, but there is limited actual usage, and it is highly concentrated in traditional financial services such as digital banking and payments. The results suggest the need for institutional support, infrastructure development, and cross-disciplinary faculty training to facilitate the more effective implementation of FinTech tools in business education.

The Fourth Question: Challenges and Obstacles in incorporating Fintech into Curricula

The development of financial technology (Fintech) and artificial intelligence (AI) is transforming the skillset needed in the worldwide financial industry, forcing higher education institutions to revise and re-engineer their curricula. Earlier research suggests that, although such integration fosters innovation and improves graduate employability, it is often hampered by curriculum rigidity, lack of faculty expertise, and lack of institutional support (e.g., resistance to change, lack of training, and inadequate resources). In the Saudi universities, this scenario is particularly true in light of the national push towards digital transformation.

To answer one of the main research questions, namely, Question No. 4: What are the main challenges and obstacles faced by academic staff in integrating Financial Technology and Artificial Intelligence in Finance in the curricula in Business Administration Colleges at Saudi universities? two open-ended survey questions were used. Question No. 23, which examines the perceived difficulty of incorporating Fintech and AI into curricula, and Question No. 24, which explores particular difficulties faced by finance faculty members in teaching these new disciplines.

Question 23: How difficult is it to integrate financial technology and artificial intelligence into your university's curriculum?

Qualitative Data Analysis

This section presents a qualitative thematic analysis of faculty perspectives on integrating Financial Technology (FinTech) into academic curricula. Based on in-depth analysis of the responses of the participants, it classifies the identified challenges under thematic areas of curriculum design, faculty preparedness, technological infrastructure, regulatory and ethical issues, and rapid evolving nature of the field. This model of synthesis, in addition to reflecting the Saudi context of higher education, has identified the interactions between pedagogical, institutional, and industry-related drivers in the diffusion of FinTech in business education programs.

Challenges in Integrating Financial Technology into University Curricula

The qualitative responses provided by 161 faculty members in Saudi Arabia are used to analyze the main challenges and obstacles that they encounter in the integration of financial technology (FinTech) into university curricula. Of those, 2 participants (1%) responded with "I don't know", 29 respondents i.e., 18% responded with "No difficulties" and 130 respondents i.e., 81% responded with the existence of difficulties.

Thematic Categorization of Challenges and Requirements for Integrating Financial Technology (FinTech) into Academic Curricula

Curriculum and Pedagogical Challenges

1. Technology-based curricula and trained professionals to deliver them need appropriate resources, trained manpower, qualified financial professionals and financial engineers, programmers and financial intelligence specialists.
2. Integrating financial technology content into existing courses is a potential source of curriculum overload, forcing instructors to leave out critical topics from traditional technology or finance courses.

3. Creating capstone projects that do a good job of weaving in fintech concepts is time-intensive.
4. Integrating important soft skills training and such factors as teamwork and communication into a highly technical curriculum can be difficult.
5. Inefficient methods of evaluation for new fintech units, particularly in balancing academic knowledge with hands-on experience.
6. Integrating fintech topics into the curriculum is likely to involve reaccreditation, which can be a lengthy and complex process.
7. Adapting teaching to accommodate diverse student needs and the diversity of students with varying learning styles is an art that needs to be innovated and applied consistently.
8. Lack of consistent and coherent educational path because of fragmented fintech educational resources (online courses, textbooks, tools).
9. Some students might not see the relevance of fintech to their career goals at the start - this makes them less motivated and engaged.
10. Defining common standards for new fintech units is difficult, particularly when combining hard skills with theoretical knowledge and soft skills.

- **Faculty-Related and Organizational Barriers**

1. Reluctance in some faculty to endorse new fields because they are comfortable with old ways of doing things or skeptical about the importance of fintech.
2. Capacity building for faculty and staff to effectively teach new fintech content may take a lot of time and requires adequate investment in professional development.
3. Allocating additional resources to faculty training in understanding and integrating the regulatory environment of fintech.
4. Institutional policies and bureaucratic procedures for curriculum change may slow the process of integrating new fintech courses or cribble the process.

- **Infrastructure and Technological Requirements**

1. Need for laboratories, software, equipment, and internet services for fintech education.
2. Many institutions do not have the required technological infrastructure and resources (labs, software, etc.) required for effective fintech teaching.
3. Limited availability of computers, high costs of e-learning software, and lack of technical support when using fintech tools and platforms.
4. Scarcity of free training courses relating to fintech tools, inconvenient scheduling, and problems in updating curricula with appropriate change in technology.
5. Weak foundation education and poor technical knowledge among the students.

- **Practical and Experiential Learning Limitations**

1. Establishing good feedback mechanisms by collaborating with the fintech companies for guest lectures, internships or projects - for which actual implementation is a huge challenge.
2. Less opportunities for hands-on training and internships can prevent students from gaining vital real-world experience.
3. Absence of experiential learning opportunities, such as internships or projects with fintech companies, can effect negatively on practical understanding.
4. Difficulty in finding accurate and recent financial data to be used for teaching purposes.
5. Difficulty in finding relevant and recent case-studies to cope with the high rate of change in fintech.

- **Regulatory, Legal, and Ethical Considerations**

1. Operating in a highly regulated environment in financial technology, understanding the complex legal terms and implications can be confusing for students and instructors; especially when curriculum language may change from Arabic to English.
2. More specialized training is needed in understanding the legal and compliance issues relating to fintech.
3. The multidisciplinary nature of fintech, which combines knowledge in finance, technology, data science and regulations, makes it difficult to find a relevant and adequate teaching approach.
4. Addressing of ethical considerations, e.g., data privacy, algorithmic bias, implications of innovations for society (e.g. financial inclusion), adds complexity to curriculum.

- **Content Complexity and Fast-Paced Evolution**

1. The complexity of certain fintech concepts such as blockchain or algorithmic trading can be confusing for students as it needs careful instructional design.
2. The rapidly evolving nature of fintech makes it necessary to keep the curriculum updated regularly in order to keep up with new developments and trends in the field.
3. The variety of content available in the fintech sphere can confuse instructors and make it hard for them to choose the most relevant material.
4. The Large scope of applications in the fintech sphere itself (e.g., payments, lending, insurance) makes it even more difficult to cover the curriculum adequately.

- **Resource Allocation and Financial Constraints**

1. Convincing university administration to invest resources, including financial resources, technology, and human resources, to boost fintech initiatives when other programs are a higher priority.
2. Implementing new programs, acquiring programs and providing training can be costly and may necessitate large allocations of budgetary resources.
3. Difficulty in acquiring up to date fintech tools and platforms reflects badly on practical learning experiences.

- **Data and Analytical Integration**

1. Incorporating data analytics into the curriculum requires more training for both students and instructors, specifically in the usage of analysis tools and the learning of new programming languages or software - which can be overwhelming to those without a solid technical background.
2. Difficulty in quantifying the efficacy of fintech curriculums and evaluating learning outcomes because of the multifaceted nature of the field.

- **Collaboration and Interdisciplinary Integration**

1. Challenges in cross-departmental collaboration (finance, computer science, business administration) due to differences in academic systems, resource consumption, as well as time usage.
2. Integrating a global perspective into curricula is not easy because of the varying practices and regulations from region to region.
3. Difficulty in integrating fintech into accounting curriculum without sufficient academic background and practice.

Question 24: What are the main challenges faced by finance faculty members in teaching financial technology and artificial intelligence?

Table 4
Main Challenges Faced by Finance Faculty in Teaching Financial Technology and Artificial Intelligence.

The obstacles	Frequency	p.c. %
Lack of practical experience in the field	45	28.5
Lack of up-to-date educational resources	38	24.1
Others	38	24.1
Gap between theory and practice	31	19.6
Rapid change in fintech	28	17.7
Complexity of fintech topics	23	14.6
Academic or organizational constraints on introducing new courses	23	14.6
Challenges in assessing academic performance	14	8.9
Resistance to change and technology	13	8.2
Diverse backgrounds and knowledge of students	13	8.2
Total of Responses	**266**	**168.4**

The following results can be seen in Table 4, the researcher finds out that 45 respondents, which is 28.5% of the total academic staff, have identified inadequate hands-on experience in the subject as the main difficulty faced by academic staff in the teaching of Fintech in the department. Thirty-eight respondents (24.1%) admitted the inadequacy of modern teaching materials as the major problem faced by the academic staff in the department in teaching Fintech. Thirty-eight participants (24.1% of total academic staff) related to multiple barriers faced by faculty members while teaching Fintech. Thirty-one (31) participants (19.6% of the total participants) show that gap between theory and practice which is the main barrier faced by the academic staff of the department in teaching Fintech. Twenty-eight persons (17.7%) of the total academic staff opined that the rapid changes in fintech were the main challenge faced by the academic staff of the department in teaching the subject. Twenty-three respondents, which corresponds to 14.6% of the total academic staff, mention that fintech topics are rather complex and therefore constitute a challenge for the academic staff of the department in teaching Fintech. Twenty-three participants (14.6% of the total academic staff) identify academic or organizational constraints in the form of a challenge to the introduction of new courses faced by the department's academic staff in teaching Fintech. Fourteen respondents (8.9% of the total academic personnel) state that difficulties in the evaluation of academic achievement are the main obstacle among the academic staff of the department in teaching Fintech. Thirteen participants, or 8.2% of the total academic staff, acknowledged that resistance to change and technology, heterogeneity, and the level of students' knowledge are some of the barriers faced by the academic staff in teaching Fintech in the department.

Faculty-Identified Obstacles in Teaching FinTech

When faculty members were asked about the obstacles, they face in teaching Financial Technology (FinTech), their responses reached 160. Of these only 2 participants i.e., (1.25%) acknowledge that they “do not know, "and 2 more participants i.e., (1.25%) reported “no obstacles,”. On the other hand, 156 respondents i.e., (97.5%) acknowledge the presence of obstacles, as illustrated in the following figure:

1. Some faculty members lack relevant expertise, hold no certificates in FinTech, and are unfamiliar even with Python programming.
2. The relative novelty of the subject, the rapid pace of change in the field of FinTech, and the complexity of its topics constitute real challenges.
3. Obtaining licenses for the software used in FinTech applications for student training is not easy.
4. Difficulty accessing accurate financial data from websites due to the absence of institutional subscriptions.
5. Students' weak foundational technical background and limited proficiency in computer software and the English language.
6. Lack of adequately equipped laboratories, and absence of high-quality technological devices, or the necessary software to implement learned concepts.
7. Insufficient time and funding to train faculty members on these programs, alongside the challenges of teaching them to students.
8. Absence of effective collaboration between universities and institutions such as the Capital Market Authority, the Financial Academy, and the Central Bank for practical training.
9. Lack of a virtual technological environment that enables students to practice what they have learned theoretically.
10. The gap between theoretical knowledge and practical applications.
11. Academic or regulation constraints on introducing new courses, coupled with challenges in assessing academic performance.
12. Resistance to change and to adopting new technologies.
13. Shortage of suitable equipment for practical application and insufficient supportive resources for implementing knowledge in to-to.
14. Limited awareness of the latest research developments in the field.
15. Lack of access to adequate information sources and appropriate teaching methods.

The qualitative findings emphasize that the adoption of FinTech in business education in Saudi universities is a complex process that requires coordination among academic, administrative and industry circles. Effective integration depends upon having a fit between the strategies adopted in the institution and adequate allocation of resources. All this should aim at building the faculty's competence through professional development and having a continuous update of the curriculum to match the rapid advancements in FinTech and Artificial Intelligence. Moreover, it is important to note that establishing strong collaborations with industry partners and embedding experiential learning opportunities are vital to bridging the gap between theoretical frameworks and practical applications. A holistic approach to these challenges and a contextual one will be crucial to ensuring that graduates have the technical skills, regulatory intelligence and ethical awareness required to thrive in a technology-driven business environment.

Discussion

This research is aimed at investigating the degree of adoption of Financial Technology (FinTech) and Artificial Intelligence (AI) in business education by faculty members at Saudi universities and at knowing the challenges they encounter. The results directly answer the four research questions presented in the first section of the study. Regarding RQ1, the demographic data show that most faculty members belong to the field of finance and

accounting departments with a remarkable gender distribution in favor of females (57.5%), and most of the participants have the rank of assistant professor or lecturer. These results indicate a relatively young and professionally diverse academic workforce, which could independently affect open-mindedness to innovation, although not necessarily technical ability.

Only 13.1% of participants reported holding professional certificates related to FinTech or AI, highlighting a clear skills gap. This gap restricts their capacity to provide practice-oriented education that is consistent with the modern financial technologies. This result agrees with the previously found results (Al-Baity, 2023; Sharma, 2024; Lugtu, 2024) and highlights the necessity of faculty upskilling. As defined by the capability-readiness model (Benavides et al., 2020), institutional progress is highly influenced by qualified human resources. Filling this gap is a key step in bridging the education and labor markets and achieving Saudi Vision 2030. Regarding RQ2, the study determined that faculty members have a moderate degree of awareness and knowledge of FinTech and AI. The technologies like digital-only banking, cloud computing, big data, and blockchain were vaguely known to respondents, but no respondent has achieved a high level of expertise. For RQ3, the findings demonstrate that usage rates are low: only 12.5% of faculty reported using FinTech tools such as blockchain or cryptocurrency in their institutions. This result supports the assumed difference between awareness and effective implementation. Digital banking and payment instruments are the most adopted tools, referring to superficial adoption and not deep pedagogical integration. Finally, in answering RQ4, many different institutional and pedagogical barriers were encountered. The most frequently cited barriers were lack of practical experience (28.5%), use of outdated pedagogical materials (24.1%), and the existence of the gap between the theoretical knowledge and the real-life practice (19.6%).

These results are consistent with literature about digital transformation in higher education. For example, Alotaibi and Alshehri (2023) found that, although learning with the help of AI presents opportunities, it cannot realize its potential in Saudi universities because of the competency of instructors. Moreover, Al-Baity (2023) noted that financial institutions are more advanced than business schools in preparing students for digital financial services, which supports the evidence of the current research that adoption is low and practical experience is shallow.

The moderate level of comfort with FinTech is consistent with Cordova et al. (2024), who determined that even when students have positive interaction with AI tools, institutional support is lacking. In addition, the reported challenges reflect the ones identified by Sharma (2024) and Lugtu (2024). These researchers found that resistance to change, infrastructure gaps, and a lack of faculty development programs were common barriers in different regions.

However, this study makes a novel contribution by emphasizing specifically faculty in Saudi business schools, a direction that has not been well studied in the literature. The data provide empirical support to most conceptual arguments, especially the readiness gap and challenges of curriculum integration, which have been pointed out by Zureigat et al. (2019) and Gulati (2024).

The moderate level of knowledge and low level of action indicate a decoupling between awareness and action. Institutions may have professors who understand the importance of FinTech and Artificial Intelligence, but they lack access to training, incentives, or the institution's resources to put that knowledge into action. In addition, this gap was explained due to the lack of professional qualifications of these analysts (only 13.1% were working with relevant certifications) as well as the lack of interdisciplinary collaboration with IT departments.

The results, from a theoretical perspective, are consistent with the Technology Acceptance Model (TAM), which argues that perceived usefulness alone does not cause adoption unless it is accompanied with ease of use and institutional support (Benavides et al., 2020). The study also validates Anagnostopoulos' (2018) claim that regulatory, ethical, and infrastructural circumstances are important in reducing the speed of digital finance integration in academia. Interestingly, the research findings revealed that female members of the faculty made up the greatest proportion of respondents sampled in this study, contrary to the past research studies that depicted males as the dominant users of technology (Rane et al., 2024). This variation could be a demographic shift or increased survey participation among female academics, and this should be explored further.

Conclusion

This paper focuses on the use and issues of Financial Technology (FinTech) and Artificial Intelligence (AI) in business education in Saudi universities. The results indicate that the faculty members are moderately aware and knowledgeable of FinTech-related technologies, including digital banking, blockchain, artificial intelligence applications and big data analytics. However, the actual use of the technologies in teaching practice is low, as only 12.5% of the participants discuss the practical integration of FinTech in their institutions, even with the increased awareness. The study identified several important limitations to the implementation of these new techniques. These barriers include inexperience, insufficient technology infrastructure, an inflexible curriculum and a clear disconnectedness from theory to practice. Faculty participants also mentioned concerns such as changing technologies, no training opportunities, and lack of institutional support. Such integration is complicated further by strict regulations and ethical issues in the environment of the constantly changing digital finance market. Overall, there is acceptance of the need for FinTech and AI in business education, but there are still some structural, pedagogical and institutional challenges to overcome.

To bridge the gap between strategic vision and classroom-level implementation, universities and policymakers should consider several actions. Faculty development programs should involve ongoing training and certification programs to improve the teaching skills of faculty members in FinTech and AI. Infrastructure investment is required to provide institutions with the technological resources (software, labs, high-speed internet) to support the application of the practice. A flexible modular curriculum needs to be introduced, which will adjust to changing technologies without overwhelming students. Industry partnerships with the financial industry and technology firms to develop experiential learning (internships, guest lectures, real-world case studies, etc.) must be initiated. Similarly, regulatory alignment is required to create a clear framework for curriculum developers to integrate administrative regulations and ethical models for FinTech and AI. Finally, content must be developed locally:

local Arabic-language resources and culturally relevant examples must be developed to ensure they are accessible to faculty staff and students.

The findings highlight the need for curriculum designers to integrate FinTech and AI in a manner that balances technical proficiency with pedagogical depth. Curricula should incorporate hands-on projects, case-based learning, and interdisciplinary modules that link finance with computer science, data analytics, and regulatory frameworks. For the faculty members' development, the institutions should focus on capacity building, incentivizing research in developing technologies, and providing them with professional growth pathways that reward innovation in teaching. Since the levels of readiness of faculty members are different, training programs should be adapted accordingly, starting with digital literacy as a base and building on it to more specialized technical skills.

This study has several limitations. First, it relies almost entirely on self-reported data, which might be biased or lead to overestimating familiarity levels. Second, the research targets faculty members from business administration colleges and may therefore not be generalizable to other disciplines. Third, although the sample of respondents represented several institutions, it did not reflect differences between public and private universities or regional differences in resource allocation. Finally, rapid development of FinTech and AI means that the technologies being assessed may soon be outdated and may need to be reassessed to remain relevant.

Future studies should be conducted using longitudinal methods to be able to track changes in adoption rates and attitudes over time. Comparative studies of public versus private institutions, or various regions within Saudi Arabia, may find structural differences that will have an impact on technology integration. In addition, there should be a focus in future work on the perspectives of students so as to assess the impact of curriculum changes in terms of learning outcomes and employability. Finally, empirical evaluations of pilot programs or FinTech-integrated courses can help identify which teaching strategies and content models work best.

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