

Original Research Article

Financial Technology (FinTech) and the Sustainable Finance Ecosystem in the Middle East

Dr. Nahed Khabbouchi^{1*}

¹Lecturer in Finance, Accounting and Finance Department, Jazan University/College of Business

DOI: <https://doi.org/10.36348/sjbms.2026.v11i02.004>

| Received: 14.12.2025 | Accepted: 10.02.2026 | Published: 20.02.2026

*Corresponding author: Dr. Nahed Khabbouchi

Lecturer in Finance, Accounting and Finance Department, Jazan University/College of Business

Abstract

This study investigates how Financial Technology (FinTech) contributes to the development of a sustainable finance ecosystem in Middle Eastern countries with a focus on Saudi Arabia, the UAE, Qatar and Kuwait. The research uses a qualitative research design and secondary data, the study evaluates the current state of FinTech adoption, its role in advancing ESG-led financial practices and the barriers limiting effective implementation. The findings shows that strong growth in digital financial services but persistent challenges related to regulation, infrastructure and technological capability. The study concludes with policy recommendations to improve FinTech-driven sustainability and long-term financial resilience across the region.

Keywords: Financial Technology (FinTech), Sustainable finance, ESG (Environmental, Social, and Governance), Digital financial services, Middle East, Saudi Arabia.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

The Middle East has turned out to be one of the fastest-growing regions for Financial Technology (FinTech) which is accelerated by digital transformation, government-based innovation strategies and high consumer demand for digital financial services. As of 2024 the Middle East hosts over 800 active FinTech startups as compared to fewer than 150 in 2017 (Methri, 2024). This shows that there has been a growth of more than 400% within seven years. The Gulf Cooperation Council (GCC) countries particularly the United Arab Emirates, Saudi Arabia, Qatar, and Bahrain are one of the top leaders of this expansion. Saudi Arabia's FinTech sector alone increased by 79% between 2021 and 2023 and the UAE accounts for approximately 50% of total FinTech investments in the region (Alasaeed, 2022). The FinTech market is expected to grow at a rate of 21.42% between 2025 to 2023 as shown in Figure 1. The main growth areas include digital payments, blockchain-based financial services, open banking platforms and AI-based financial analysis.

Parallel to the growth of FinTech expansion there has also been the increase of sustainable finance

both globally and regionally. As per Swift (2023) the sustainable investment assets have crossed USD 30 trillion in 2022 which shows the need and demand for the recognition of environmental, social and governance (ESG) considerations in the financial decision-making. The Middle East has started to operate on the lines of these trends which is driven by national visions such as Saudi Vision 2030, UAE Net Zero 2050 and Qatar National Vision 2030 (Danish and Isaifan, 2024). The "green financing" instruments have also increased significantly such as the issuance of green and sustainability-linked bonds in the Middle East has crossed USD 22 billion by 2023. Additionally, the UAE became the first Arab nation to launch a federal-level sustainable finance framework in 2023 which shows that they are strongly committed towards the regulations (Kapyshev, 2024). The intersection of FinTech and sustainable finance is now seen as a strategic move to increase economic diversification, climate resiliency as well as mobilisation of private investment for green projects across the region. Since both the sectors continue to grow the integration is important to build a sustainable financial ecosystem in the Middle East.

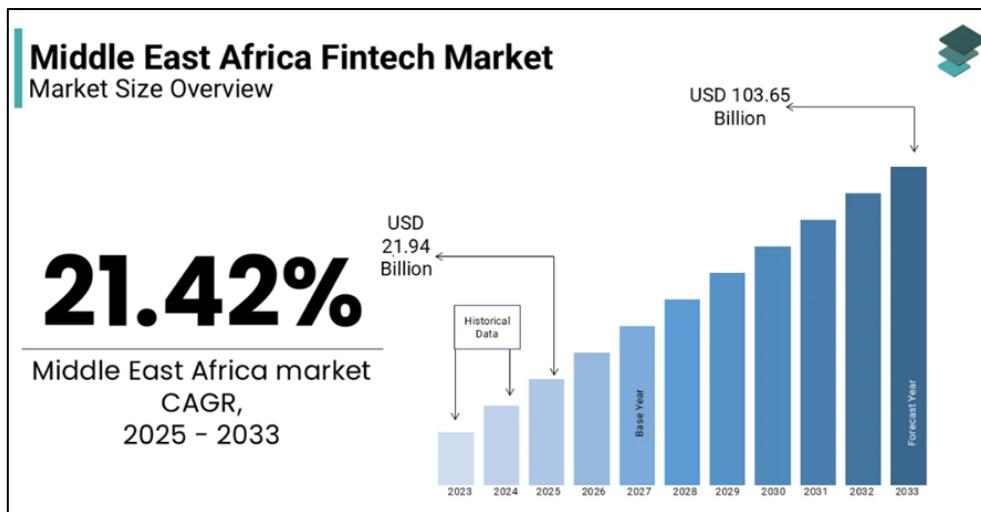


Figure 1: FinTech Market CAGR Growth
(Source: Forecast, 2024)

Problem Statement

Despite the growth of FinTech in the Middle East the integration into the sustainable finance ecosystem still remains limited and uneven across the region (Bocanet and Webb, 2025). Although countries such as the UAE and Saudi Arabia have invested heavily in digital transformation and sustainability strategies the actual flow of sustainable investments especially those supported by FinTech solutions lags behind the global benchmarks. For instance, while global sustainable investment assets exceeded USD 30 trillion in 2022 the Middle East accounts for less than 2% of this total (Daoulhadj and Hussain, 2023). This shows a significant gap in green capital mobilisation.

One major challenge lies in the weak alignment between FinTech innovation and sustainability-based financial practices. The FinTech platforms in the region still focus predominantly on payments, lending and digital banking as compared to ESG monitoring, green financing or carbon monitoring technologies (Khalaf *et al.*, 2023). As a result, the potential of digital tools such as blockchain, AI and data analytics to increase transparency, measure environmental impact and streamline green investment processes is still underutilised. Additionally, there are also inconsistencies in regulatory frameworks, ESG disclosure and low technological capacity further which further hinders the integration of FinTech with sustainable finance goals (Khan and Al-harby, 2022). This problem shows the need for deeper analysis into how FinTech can effectively support sustainable finance transitions and what barriers must be addressed to improve this relationship in the Middle East.

Research Aim & Objectives

The aim of this study is to examine how Financial Technology (FinTech) influences and supports the development of a sustainable finance ecosystem in the Middle East. It further aims to identify the key

barriers and policy measures needed to enhance FinTech-driven sustainable finance across the region.

- To establish the relationship between Financial Technology (FinTech) and the sustainable finance ecosystem in the Middle East.
- To examine the current state of FinTech development and adoption across Middle Eastern countries.
- To identify the major technological, regulatory, and operational barriers that slow down the implementation of FinTech within the region's financial ecosystem.
- To propose policy interventions and regulatory measures that Middle Eastern countries can adopt to promote sustainable finance through the integration of FinTech.
- Research Questions
- What is the relationship between Financial Technology and sustainable finance ecosystems, particularly in Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates?
- What major barriers such as political challenges, regulatory constraints, or lack of technological innovation affect the implementation of FinTech in Middle Eastern countries?
- What policy measures and regulatory strategies can Middle Eastern countries adopt to overcome these barriers and strengthen sustainable finance through FinTech?

Significance of the Study

This study is significant because it provides valuable insight into the necessity of technological innovation for the overall development of Middle East countries. This financial technology implementation ensures the achievement of economic, social, and governance goals. In the Middle East, Fintech is growing. So that companies and industries can earn a high profit and enhance their market share. Saudi Arabia

employs a fintech strategy to diversify its oil and other industries. The overall environmental impact can increase due to the use of these Fintech tools. In Saudi Arabia, many people have benefited from using digital banking and mobile banking, which enhances the acceptability of sustainable financial services. This study also highlights that Fintech promotes green finance, environmentally friendly industrialization, along with economic, social, and governance rules. Financial technology enhancement also affects the banking sector of the Middle East economy. However, some significant barriers remain, which significantly decelerate the intervention of Fintech, creating obstacles to meeting the sustainable finance ecosystem and overall growth in the Middle East economy. Many studies, however, indicate that Fintech in the Middle East is progressing. This study highlights significant problems and suggests some policies that the Middle East can take to mitigate those problems.

Structure of the Paper

The paper is structured into several parts. They include introduction, literature review, research methodology, data collection, data analysis, and policy recommendations. Under the introduction part, the objectives and research questions of this paper have been framed. According to these objectives and research questions, a descriptive literature review has been written, primarily focusing on the Fintech and sustainable finance systems in the Middle East. Next in the data collection part, secondary data has been collected. These data are secondary, and in the analysis section, they have been examined in accordance with the objectives and research questions outlined in this paper. Lastly, some policies have been recommended that may be beneficial for all Middle East countries in mitigating problems arising from Fintech barriers.

LITERATURE REVIEW

Conceptualizing FinTech

Financial Technology is a system that implements various technologies to enhance the financial system and improve financial services. It implements a tremendous amount of innovation in mobile banking and digital marketing. Applications like AI and cloud-based modern software can improve the financial system. Fintech companies are essential because they allow banks and other financial sectors to use modern, data-driven technology, which enhances their performance (Badruddin, 2022). The financial sector enhances its performance, which reduces its costs, enhances working capacity, and improves safety issues. Fintech introduces digital banking through mobile, which is highly effective in the banking business process. Business efficiency stimulates the banking sector to introduce new, innovative FinTech's, thereby increasing the overall performance speed and significantly enhancing accuracy compared to the traditional service system.

Through the implementation of financial technology, the financial sector can optimally allocate its capital across each domain, introduce methods that attract investors, and enhance the process to align with social and development goals (Chen and Hassink, 2021). Financial technology can help mitigate the external shock to the financial sector that might create systemic problems. Involvement of these systems enhances customer experience, accelerates the process, and improves the overall quality of services. This system enhances the localised supply chain in the financial sector, which encourages customers to invest and promotes sustainable development (Sarawut and Sangkaew, 2022). Due to the use of high-tech technology in Fintech, it promotes the payment process. To use such tools, Fintech users can transfer money from one place to another. The application of this technology has become increasingly diversified, promoting mobile banking systems and digitalisation over time (Arner *et al.*, 2022). Instead of traditional methods, Fintech can store data effectively, making it easier for both customers and business parties. Through this effective digitalisation, people can transfer money from home (Zhang-Zhang *et al.*, 2020). This efficiency enhances business fast and controls a big data analysis, which promotes the sustainability in the financial business

With implemented fintech systems, organisations can handle both structured and unstructured big data. The implementation of AI and cloud-based systems into financial services incorporates the analysis, detects any harm and enhances the efficiency of the financial services that optimise the utility of customers, finds the trends of customer demands, and works accordingly with those trends, which are beneficial and effective for the company (Wang *et al.*, 2024). The incorporation of big data analysis handles the management risk, optimises the portfolio management in investment and captures the customer trend.

Significant complexity also arises due to the use of Fintech, as well as the increase in implementation costs. The rules and regulations vary from country to country (Olaiya *et al.*, 2024). Some countries adopt digitalisation to enhance their performance and business to keep their position in the competitive market, whereas some financial institutions use this as a safety measure. AI and modern cloud-based blockchain systems are implemented in Fintech, making it more challenging to use globally due to the absence of specific rules and regulations with targeted dimensions in this fintech system. Regulation policies should be unique to propagate this fintech system in all countries.

Sustainable Finance: Theoretical and Practical Foundations

Sustainable finance is a unified set of environmental, social, and governance principles that inform financial decision-making, making the financial

system more efficient and enhancing its longevity, thereby working toward achieving long-term returns in the financial domain. Several key theories inform sustainable finance. According to stakeholder theory, a company adopts sustainable finance that creates an alignment of the interests of stakeholders and owners (Mahajan *et al.*, 2023). Sustainable finance operates on the principle that performance is measured and accounted for as a result of ESG considerations. It explains and describes the procedure by which a financial institution implements ESG rules and works towards achieving sustainable development goals (Dua, 2022). This approach also aligns with institutional theory, which suggests that FinTech's should adopt ESG to protect social regulations. Financial technological innovation aligns with the ESG that performs well in financial outcomes. The implementation of ESG plays a crucial role in sustainable development, as it yields long-term benefits and promotes environmentally friendly technological innovations. Through these fintech tools, the innovation company can mitigate the risk. This risk management theory explains the role of production or business in relation to ESG, highlighting how it mitigates risks (Radu *et al.*, 2023). Through these theories, sustainable finance functions properly while handling the risk of irrigation, efficiently managing irrigation, and effectively interpreting data and other portfolio programs. Based on such a theoretical foundation, sustainable finance enhances the fintech outcomes more effectively and efficiently. Such theoretical evidence shows that sustainable finance in the fintech sector enhances its compatibility.

Along with theoretical practices, sustainable finance incorporates various practical foundations, including the integration of ESG, proper monitoring of negative aspects, thematic investigation, and effective regulation of fintech strategies, as significant aspects for sustainability. Fintech incorporates ESG data into decision-making (Radu *et al.*, 2023). It enhances the working capacity of each financial decision-maker. Along with ESG integration, financial analysis is optimised. With proper sustainability, a finance company can exclude specific investments that are considered a negative output. With high collaboration from ESG companies, achieve an authentic and positive output (Dua, 2022). Properly evaluating the social impact and understanding the investment impact, financial inclusion can lead to a positive impact. Correct reporting and the innovation of AI make fintech a sustainable industry. This sustainable approach correctly evaluates and analyzes data. The enhancement of this transferability and traceability optimizes the sources. The data restoration process might be effective in financial stability. Through proper data evaluation, the final structure of the data might be improved. ESG also considers various opportunities, introducing a data structure that is powerful in this segment (Radu *et al.*, 2023). The innovation of such technology ensures protection from the duality of the structure. The

involvement of financial technology aims to enhance the dimensions properly.

Middle East Financial Ecosystem

The Middle East financial ecosystem is in the midst of a significant transformation, evolving from a resource-dependent structure to a diversified, innovative-driven fintech structure. For decades, the region's financial systems were closely tied to hydrocarbon revenues. In this region, banking activities are primarily focused on trade finance, government-backed infrastructure, and public sector lending. This dependence created a relatively narrow financial base for the Middle East region countries, which are vulnerable to oil price volatility. However, in recent years, different strategic national visions have diversified economies. Such as Saudi Arabia's Vision 2030, the UAE's Centennial 2071, and Qatar's National Vision 2030, reduce reliance on oil, and foster sustainable growth that will ultimately create a diverse financial situation for the region. These kinds of initiatives have expanded the scope of financial services to include tourism, logistics, renewable energy, and technology sectors, ultimately creating new opportunities for banks, capital markets, and investment firms in these regions.

The banking sector has been at the forefront of this technology-driven transformation (Khalaf, 2023). With the help of a young, digitally literate population, financial institutions are rapidly adopting fintech solutions, mobile banking platforms, and AI-powered advisory services (Razavi *et al.*, 2024). This digital era jump is not only improving operational efficiency but also enhancing financial inclusion, particularly among underserved populations. As highlighted in the Review of Middle East Economics and Finance, the integration of technology into banking services is reshaping customer engagement models and enabling more personalized, data-driven financial products (Hacioglu *et al.*, 2021). Capital markets in the Middle East have also grown considerably. Stock exchanges in Saudi Arabia, the UAE, and Qatar have seen increased listings, greater liquidity, and stronger participation from both domestic and international investors, which further shows the potential of this region. Sovereign wealth funds (SWFs), such as the Abu Dhabi Investment Authority, have expanded their portfolios into alternative assets. Saudi Arabia's Public Investment Fund also expanded its portfolio into alternative assets, which include private equity, infrastructure, and green finance.

Regulatory reforms have been instrumental in strengthening the financial ecosystem. Financial free zones such as the Dubai International Financial Centre (DIFC) and Abu Dhabi Global Market (ADGM) have established internationally recognized legal systems, transparent governance structures, and investor-friendly policies. These hubs have attracted multinational banks, asset managers, and fintech firms over here. This reinforces the Middle East's role as a bridge between

Asian, African, and European markets. Despite having these advancements, challenges are also there. Geopolitical tensions and fluctuating oil prices are some of the major problems that have remained active in this region for a very long period of time. Another important thing is that the gap in financial literacy continues to pose risks. However, academic research suggests that the region's commitment to digital transformation, sustainable investment, and cross-border collaboration will ensure resilience and competitiveness in the decades ahead (Zauro *et al.*, 2024). The Middle East's financial ecosystem is no longer defined solely by its natural resources like hydrocarbons. It is becoming a dynamic, technology-enabled, and globally integrated system poised for long-term growth.

Intersection of FinTech and Sustainable Finance

Inspection of sustainable finance reveals a firm and confident relationship, which can serve as a crucial and significant goal in banking and other financial sectors. Implementing this FinTech facility enhances efficiency and accuracy and expands access to green investment. FinTech enables crowdfunding, allowing energy initiatives and micro-enterprises to expand. This expansion helps small and medium-sized industries handle financial constraints (Radu *et al.*, 2023). Implementing modern, innovative high-tech solutions enhances operational capacity in green finance. AI tools and modern robotics systems reduce environmental risk by employing high-quality decision-making capabilities. The risk of unnecessary loans, which are assembled with green technologies, is mitigated through innovation. (Dua, 2022). Through the proper innovation of blockchain investment, it becomes sustainable, which can handle the risk of "greenwashing" (Dua, 2022). FinTech incorporates the analysis of environmental,

social, and governance (ESG) factors, taking these factors into account in the analysis. A properly structured decision-making process holds up the accession of the thematic system.

The key factor that cumulates the variation apps sustainably take into account (Mahajan *et al.*, 2023). The rapid expansion of FinTech is taken into account. It enhances the working capacity of each financial decision-maker. Along with ESG integration, financial analysis is optimised. With proper sustainability, a finance company can exclude specific investments that yield a negative return. Through high collaboration, an ESG company can establish a genuine position in its output (Dua, 2022). Properly evaluating the social impact and thoroughly investigating the output can enhance financial inclusion. Significant complexity also arises due to the use of FinTech, as well as an increase in the cost of implementation. The rules and regulations vary from country to country. Some countries adopt digitalization to enhance their performance and business to keep their position in the competitive market, whereas some financial institutions use this as a safety measure. AI and modern cloud-based blockchain systems are implemented in the FinTech so that it becomes more challenging to use in all countries due to the absence of particular rules and regulations with proper targeted dimensions in this fintech system (Irianto *et al.*, 2025). Regulatory policies should be tailored to promote the global adoption of this fintech system. Regulatory uncertainty and poor internet connections are the problems. Some proper digitalization should be taken into account to mitigate these problems.

Common Themes and Gaps in Existing Research

Table 1: Themes from Literature and Supporting Studies

Theme	Description	Supporting Studies
FinTech Innovation	Expansion of digital payments, blockchain, AI and mobile banking enhancing financial efficiency.	ALBlooshi (2022); Arner <i>et al.</i> (2022); Kashif <i>et al.</i> (2023)
Sustainable Finance Growth	Increasing focus on ESG integration, green bonds and responsible investment practices.	Dua (2022); Danish & Isaifan (2024); Daoulhadj & Hussain (2023)
FinTech-ESG Integration	Use of digital tools for transparency, carbon tracking and sustainability reporting.	Radu <i>et al.</i> (2023); Mahajan <i>et al.</i> (2023); Bocanet & Webb (2025)
Barriers & Challenges	Regulatory gaps, data privacy concerns and lack of technological infrastructure in the Middle East.	Khan & Al-Harby (2022); Olaiya <i>et al.</i> (2024); Abuamsha (2025)
Policy & Regulatory Needs	Need for unified regulations, ESG alignment and government support to scale FinTech.	Noreen (2024); Macchiavello & Siri (2022); Alqudah <i>et al.</i> (2024)

(Source: Self-Created)

The current study has focused on several concepts and terminologies related to FinTech evolution and how to utilize it in a sustainable manner in the global markets. However, the existing research has certain limitations due to lack of specific and accurate data based on Middle East countries. Data relevant to the current study is disorganized and thus the research gap exists. Most of the studies focus on and investigate the general adoption of sustainable finance by firms and corporates.

Limited studies develop information and knowledge regarding FinTech adoption and its network capabilities in the global market for economies of Middle Eastern countries.

Furthermore, there is a lack of understanding of different policies, laws, and institutional reforms with respect to sustainable FinTech and other tools to measure financial operation in the global ecosystems.

Furthermore, there are several challenges that need to be identified for the adoption of finance-based ecosystems. Identification of challenges will ensure mitigation strategies and thus implementation of financial tools will be achieved on a global scale (Kumar and Shankar, 2024). There are most of the challenges that are specific to the regions of Middle East countries such as Qatar, Saudi Arabia and the UAE. Additionally, the extent of effectiveness of the policies, laws, and initiatives of financial institutions need more in-depth research to make steps to improve sustainable finance in the long term.

Theoretical Framework

There are multiple theories and framework that are used to understand the relationship of the determinants responsible for FinTech implementation in the Middle Eastern countries. According to the “Technology-Organization-Environment (TOE)” model that examines the technological capabilities that reinforce workflows of organizations and influence external market factors (Hadwer *et al.*, 2021). For technology-enabled firms it is important that better use of advanced technologies can increases the chances of sustenance in the external markets as this is helpful in the creation of new ideas and innovative strategies to achieve competitive advantage.

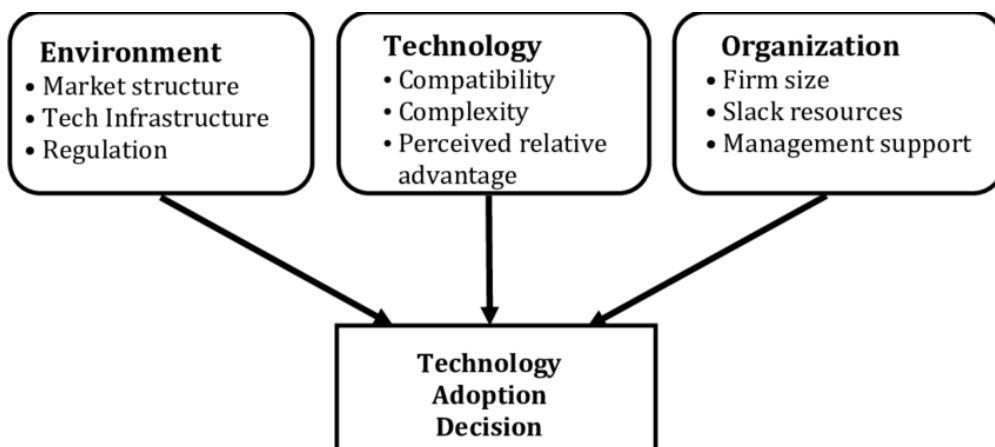


Figure 2: TOE Model
(Source: Yong, 2023)

Furthermore, an organization's role in integrating digital financial tools in the business models to trade internationally depends on the management teams and its perception towards technology adoption. Depending on the internal capabilities such as number of skilled employees and their interest towards enabling digital financial tools in the workflows. The external environmental conditions such as political, legal, and

economic factors are involved influencing the firm's eligibility to respond to market dynamics.

According to “Innovation Diffusion Theory (IDT)” which highlights the significance of how any innovation is transmitted through different modes with respect to time to the individuals within any network or firm (Ho, 2021). There are various characteristics that are associated with innovation such as the advantages, impacts, difficulty level, and disadvantages.

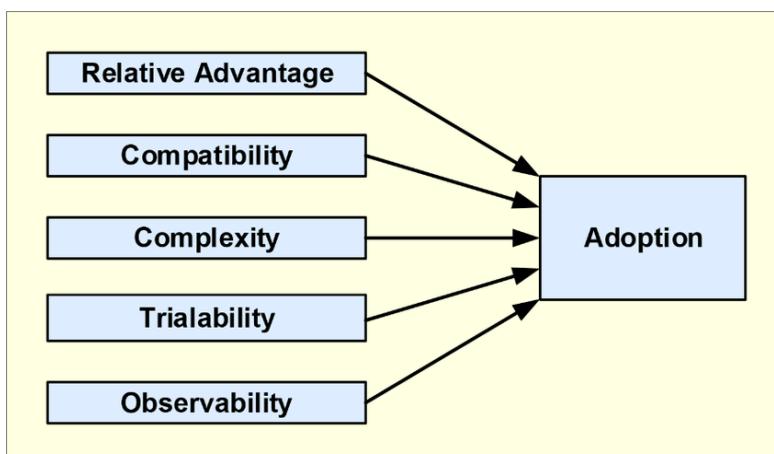


Figure 3: Innovation Diffusion Theory
(Source: Al Hadwer *et al.*, 2021)

However, with innovation there are main points that must be investigated to check its feasibility and influence on the person adopting it. With innovation and its adoption in the workflow, the decision-making process is conducted based on knowledge and information. The decision-making capability is necessary to comprehend whether the innovation is beneficial or not as per the conditions. It is important to note that innovation before applied in the process needs

confirmation of all the associated members to whom it is intended for.

METHODOLOGY

Research Philosophy

The methodology chapter is based on Saundar's Research Onion where the different layers of the framework correspond to the different parts of the methodology as shown in Figure 4.

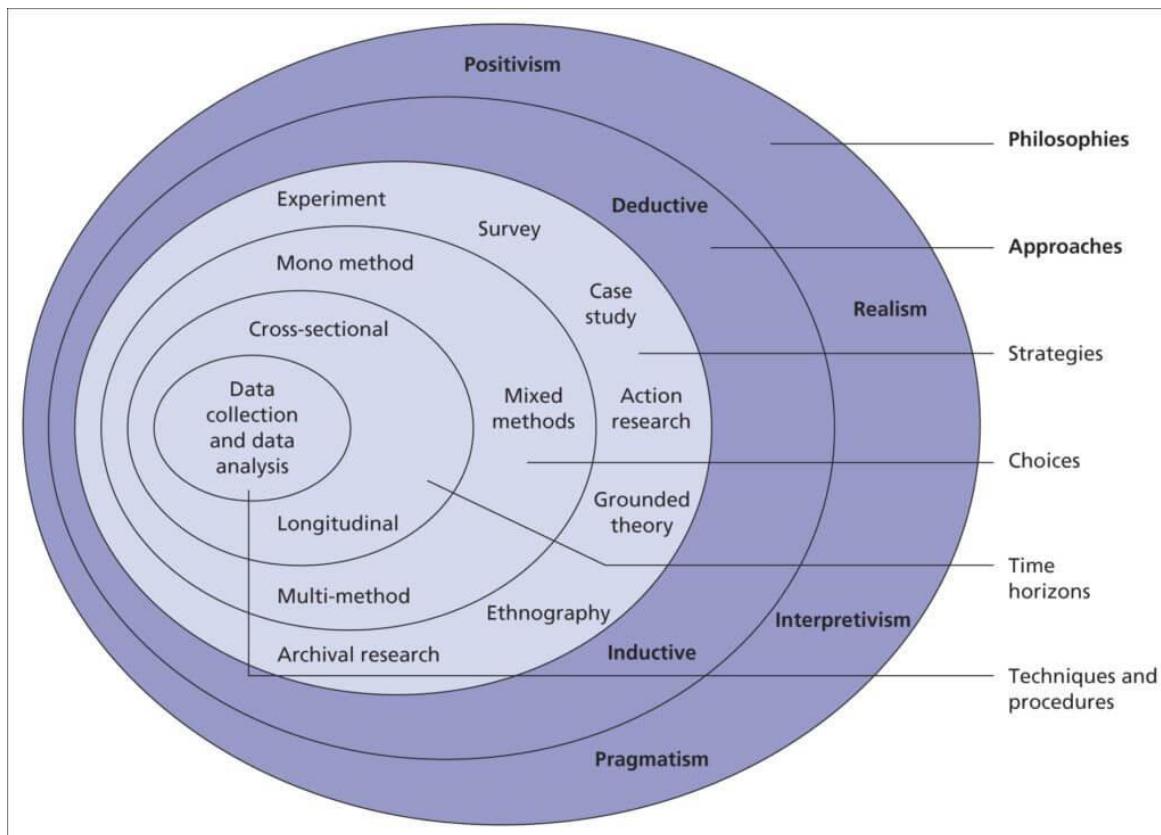


Figure 4: Research Onion
(Source: Admin, 2025)

However, with innovation there are main points that must be investigated to check its feasibility and influence on the person adopting it. With innovation and its adoption in the workflow, the decision-making process is conducted based on knowledge and information. The decision-making capability is necessary to comprehend whether the innovation is beneficial or not as per the conditions. It is important to note that innovation before applied in the process needs confirmation of all the associated members to whom it is intended for.

The current research study examines the research objectives based on interpretivist philosophy. It is noticed that interpretivist research philosophy is the most relevant research study that enables the researcher's ability to analyze the different dimensions of the research topic. Alongside, it adds interest in the research topic (Assadpour *et al.*, 2023). The evaluation of different sections of the research study in the context of FinTech

ecosystems will develop the conditions prevailing in the Middle Eastern countries and their adoption to technology enabled Fintech platforms.

There are three types of research philosophy that are used for research purposes. This includes Interpretivist, Positivism, and Pragmatism approach (Mbanaso, Abrahams and Okafor, 2023). Positivism deals with the knowledge and the information that is obtained from evidence-based studies and scientific calculations. On the other hand, the Pragmatism approach is based on knowledge that is based on collecting experience and analyzing it by conducting experiments. For the current study interpretivism study is suitable as it explores data relevant to the Middle Eastern countries to determine their status of adoption of FinTech services in their business tools.

Research Approach

In this study, the research approach that is used is dependent on the qualitative analysis of data to determine the extent of effectiveness of FinTech services and its sustainability in the Middle East countries. Alongside, the determination of the development of FinTech services in the current market conditions and how it impacts sustainability in the overall ecosystem at the global scale. It is taken into consideration that the main technological barriers that are affecting the implementation process of the services assisted by the FinTech tools particularly in the Middle East countries are examined.

There are multiple approaches to derive the research objectives including Surveys, Interview responses, Observations, Existing case studies, and statistical evaluation and analysis (Taherdoost, 2022). According to the research objectives the best and suitable approach is based on existing case studies that can be beneficial to check the effectiveness of policies and legal regulations that must be implemented in the middle east countries to foster finance related tools and services in sustainable terms.

Research Strategy

As part of the current study, the research strategy is the qualitative methodology based on collection of secondary data sources to examine and investigate different aspects related to the research topic. It explores in-depth knowledge of how digital platforms will be beneficial to facilitate trade on a global scale. It is noticed that cross-border payments and transactions are not possible due to lack of technological infrastructure. Thus, with the adoption of fintech tools and services, business operations can be conducted without any interruption on a global scale.

There are multiple classifications of research strategies such as survey research, simulation,

observation, and experimentation (Johannesson and Perjons, 2021). However, the most suitable one is the existing case studies that can answer the research questions and identify the gaps in the existing studies for future research purposes.

Research Design

For this study, the secondary qualitative research design has been used to analyze secondary data sources such as case studies, articles, and research papers. Data analysis through these case studies is helpful to determine the research questions and objectives. Adoption of the FinTech platforms by the Middle Eastern countries and their ease of business activities are developed by existing case studies that highlight the importance of digital transactions and payments in cross-borders.

It is noticed that there are three categories of research design which include qualitative, quantitative, and mixed methods (Takona, 2023). The framework used for the research design collects data from different sources and then analyses in a structured format. This part of the research methodology is essential to identify the relevant and targeted approach for answering research questions. This acts as a potential solution to perform the understanding of the research work.

Data Collection

The data collected for the current study is focused on secondary qualitative data sources that are selected from the academic database and in a systematic manner to comprehend the study. While collecting data, it was ensured that all the articles and research papers are relevant and credible (Taherdoost, 2021). Furthermore, they are in accordance with the research and objectives. It is taken into consideration that inclusion and exclusion procedures are maintained to differentiate the data based on relevancy and applicability with the research objectives. The inclusion and exclusion is as follows:

Table 2: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Time Frame	Studies from 2021 onwards	Studies before 2021
Region	Middle Eastern countries	Non-Middle East regions
Topic	FinTech, sustainable finance, ESG	Topics unrelated to FinTech or sustainability
Source Type	Peer-reviewed articles, reports, case studies	Blogs, opinions, unverified sources
Quality	Clear methodology and reliable data	Poorly defined methods or unreliable data
Language	English	Non-English

(Source: Self-Created)

The academic databases used for data collection include Google Scholar, Science Direct, and Research Gate. Additionally, industrial reports and data are collected particularly with reference to Middle East countries.

Data Analysis

Thematic analysis has been used to analyze the data and build suggestions and recommendations based

on existing research gaps. It is noticed that several theoretical frameworks and concepts which are relevant to Fintech services are conceptualized, and thematic patterns and extractions are considered. Throughout the research data analysis method, it is ensured that analysis with initial coding and development of themes are used to make the research validated and reliable (Taherdoost, 2022). This is helpful to code research objectives and develop themes accordingly. In the current study, this

will be done, for instance, the generation of codes according to the relevant objectives like “Digital Transformation in FinTech services” and “Cross-border Transactions”.

Reliability and Validity

The data collected from different sources is reliable and validated. It is ensured that all the data is from credible academic sources. All the data used are from 2021 onwards to address the status of the fintech platforms and services within the Middle East countries. Furthermore, all the concepts and terminologies that are used in general terms such as digital transformations in banking and business activities are aligned with the theoretical models and frameworks. Some industrial reports have been used to strengthen the research process by numerical and quantitative datasets. It is considered that no non-reliable datasets are used for research purposes.

Ethical Considerations

The ethical considerations have been maintained while conducting the research process. The case studies used are for research purposes only, and there is misuse of the collected data. Major ethical considerations are used while collecting data by primary methods. This involves the consent of the participants who are involved in the research process (Laryeafio and Ogbewe, 2023). It is assured that their data will be kept private and confidential. However, secondary data sources are used by the researcher for study purposes only and there is no misrepresentation of the results throughout the research process.

RESULTS AND FINDINGS

Data Extraction

Table 3: Data extraction Table

S/N	Author	Year	Methodology	Case in Research	Study Outcomes
1	ALBlooshi	2022	Secondary qualitative	Exploration of various factors of Financial Technology in industries and firms in middle east countries.	FinTech efforts are commendable as it has empowered the sustainable ecosystem for finance services.
2	Bocanet and Webb	2025	Case studies from UAE region	Role of technology in reshaping financial services.	Transformation brought due to FinTech in developing and implementing global trade.
3	Faten Ben Bouheni	2025	Peer reviewed articles.	Examination of sustainable economy facilitated by technology-driven financing.	Different policies and measures by the Gulf Cooperation Council to empower the economy in a sustainable manner.
4	Bakir Illahi Dar, Badwan and Kumar	2024	665 papers reviewed.	Network analysis conducted to gain knowledge of the progression made in sustainable Fintech services.	“Green Finance” has a key role in boosting the economy in the long term.
5	Kashif <i>et al.</i>	2023	Recent Papers used for study based on random sampling from 89 countries.	Investigating the impact of financial technology on providing sustainable financial services.	Extensive use of technological tools has been useful and beneficial in moving towards a sustainable future by incorporating the circular economy model.
6	Urikova <i>et al.</i>	2025	Specification based on industrial reports and regional insights.	Role of digitalization in restructuring traditional financial practices.	Incorporation of ESG frameworks and CSR to promote sustainable development.
7	Abuamsha	2025	Quantitative analysis of firms based in Saudi Arabia, UAE, and Qatar using “Financial Index for sustainability”	Stability and sustainability by analyzing performance, risk management, and market share.	Financial stability is achieved through sustainability measures.

S/N	Author	Year	Methodology	Case in Research	Study Outcomes
8	Alqudah, Sierra-García and María Antonia García-Benau	2024	Structural equation modeling.	Impact of ESG framework to improve financial stability and performance for different countries in Jordon	The relevance of sustainable financial practices in finance-related operations and providing information to policymakers to establish responsible practices.
9	Noreen	2024	Secondary data sources such as institutional websites and portals.	Examined the contribution of Financial Technology in achieving SDG goals in Saudi Arabia.	Venture capital funding and other fintech initiatives in different countries across the globe.
10	Abdelrhman Meero <i>et al.</i>	2025	A study conducted through experience of high-income and developed economic nations.	Investigation of the impact of FinTech and financing on renewable energy to achieve sustainable development goals.	GCC (Gulf Cooperation Council) countries are progressing towards SDG7 to avail affordable and clean energy sources to all individuals.
11	Abdulrahman <i>et al.</i>	2025	Survey of 152 Saudi Banks employees using regression tool.	Influence of green finance to improve performance in a sustainable manner.	The relationship between green finance and sustainable development was positive and thus there is a significant effectiveness of financial technology development and adoption by firms and industries.
12	Kashif <i>et al.</i>	2025	Quantitative analysis	Robustness of Fintech services for stability and impact on sustainable finance ecosystems.	Financial stability is achieved by green financing initiatives and efforts.

(Source: Self-Created)

Themes and Sub-Themes

Table 4: Theme and Sub-theme development

Themes	Sub-themes
Theme 1: Role of Financial Technology to empower sustainable ecosystems for finance services.	1.1 Fintech development and adoption help in providing green finance services and initiatives. 1.2 With the adoption of digitalization, the firms can perform transparent business operations. 1.3 Digital platforms ensure contribution to SDGs and support circular economy.
Theme 2: Present status of FinTech services in the Middle east countries.	2.1 There is progressive growth in adopting digital technologies in financial services. 2.2 Evolution of finance platforms in UAE and venture capital for new firms and startups. 2.3 Traditional financial setups transformed to technology-driven systems in different sectors and industries.
Theme 3: Obstacles that arise in the implementation of sustainable ecosystems for finance services.	3.1 Challenges related to limited technology usage and infrastructure. 3.2 Social, economic, legal, and political barriers in some industries and firms. 3.3 Limited skilled employees and resistance to modern financial platforms.
Theme 4: Inclusion of policies, reforms and regulatory compliance to promote sustainable finance ecosystems.	4.1 Unified and standard legitimate procedures and protocols to ensure data security and privacy. 4.2 Incentives towards adopting renewable energy sources. 4.3 Government support and funding initiatives to improve fintech capabilities.

(Source: Self-Created)

Analysis

Role of Financial Technology to Empower Sustainable Ecosystems for Finance Services

According to Theme 1, FinTech services have been significantly expanding in different sectors and industries. With the inclusion of ESG frameworks, business activities are conducted in an extensive manner to achieve sustainable goals. In the context of Saudi Arabia and other Middle Eastern countries, it has been noticed that the usage of technology in financial services has enabled organizations to perform operations in a resilient and responsible manner. After the COVID-19 pandemic, the firms faced several issues and challenges that hindered FinTech operations (ALBlooshi, 2022). Emerging technologies and digitalization can be beneficial to promote trade and financing on a global scale. There is an increase in "Green Financing", "Big Data Analytics", and "External environmental conditions" specifically after the COVID-19 period.

Industries and firms from different sectors are making progress to enable FinTech platforms and services to ensure sustainability in their business models. Saudi Arabia has ranked second in the list of market share, where it contributes \$3.22 billion of the total shares. The country has achieved dominance among the Middle East countries, and it has been a leader in the issuance of the bonds for sustainability in 2025. Furthermore, the country's sustainable bond issuance has increased to reach approximately \$6.25 billion, and it accounted for a total of 7.6% of the total finance market for green and sustainable initiatives (Othman, 2025). This figure is significantly greater than last year's growth for green financing. The country has missions to achieve growing finance with other top countries under the vision of SDG 2030. The country's government's remarkable issuance of sustainable bonds is captivated by contributions from private firms and industries. Financial Technology enhances services through the inclusion of modern operations and green financing, and thus reduces the dependency on the traditional modes of banking processes (Bocanet and Webb, 2025). Sustainable financing provides an environment that includes social, environmental, and governance factors to make decisions related to financial services.

Present Status of Fintech Services in the Middle Eastern Countries

Statistics and reports reveal that the market size of sustainable financing will increase in the upcoming years. Particularly for Middle East countries, the revenue will grow to about US\$114,155.2 million by 2030. The compound growth rate of 11.5% is expected on a yearly basis for sustainable finance ecosystems between 2025 to 2030. In 2024, the Middle East countries captured a total revenue of USD 57,527.5 million. Multi-asset segmentation was used in the fast-growing market for the overall market activities (Faten Ben Bouheni, 2025). According to Theme 2, it can be stated that the present status of the Middle East countries has been progressive

and thus in the upcoming times the financial services will showcase better and sustainable performance. With the technology-driven models, the banking services are improved, and operational resilience and efficiency are achieved by the firms. Digital literacy is responsible for broadening the scope of financial activities on a global level. This includes the regional restructuring of the financial systems to generate revenues from clean and green energy resources.

Infrastructure capabilities provided by government, investors, creditors, and private sector institutions reinforce the revenue generation in the sustainability of energy demands. Inclusion of financing from renewable sources reduces dependency on single sources of revenue generation (Bakir Illahi Dar, Badwan and Kumar, 2024). For Middle East countries, the main source of revenue generation is from oil exports. However, due to geopolitical instability and economic fluctuations, the supply chain management gets disrupted, and thus, there is an imbalance in the trade procedures with foreign countries. It is evident that in the past few years, the Middle East countries have strategized their business activities and strengthened their portfolios to overcome issues such as price volatility in oil exports. The countries' vision has been broadened to include sustainable financing ecosystems in economic growth and the nation's development (Urikova *et al.*, 2025). The visionaries and initiatives are empowering the business outlets of the Gulf countries.

Obstacles in the implementation of Sustainable Ecosystems for Finance Services

There are certain implementation challenges that limit the scope of financial and banking services to create an impact in renewable energy and technological capabilities in the Middle East countries. On one hand, the diversification of economic models has opened new opportunities for firms and industries, but there are gaps and a lack of infrastructure development to seize new opportunities in achieving sustainable goals by the firms. Financial institutions, government funding, and the private sector have significantly contributed to and supported the growth of sustainable financial ecosystems through venture capital, investments, and lending (Kashif *et al.*, 2023). However, without the formulation of efficient policies, legal laws, and procedures, the efforts are less significant. Data-related concerns are more prevalent in the marketplace, such as data privacy and security, for ensuring responsible and efficient performance within the workflows of the organizations. Technology has been impactful for economic growth and financing systems, as it is reported that Middle East economies have been boosted by the integration of digitalization into the financial services. Customers get more personalized and relevant products by adopting modern technologies such as Artificial Intelligence and Predictive Analytics. In this way, digitalization would enable the industries not just to achieve higher operational excellence but also to improve customer

engagement and retention. The products will be based on data-driven analysis according to customer needs and preferences.

It is noticed that there has been sometimes the firm's narrow support for the employees can result in less adoption of technology-driven business models. SMEs do not have the ability to supervise their employees to enhance digital literacy. This creates barriers and hindrances in technology adoption by firms and thus does not utilize the benefit of technology-driven tools to perform business activities (Abuamsha, 2025). Furthermore, some employees show reluctance to adopt new technologies, which creates a potential barrier to transition to modern financial services.

Inclusion of Policies, Reforms and Regulatory Compliance to Promote Sustainable Finance Ecosystems

Major reforms and restructuring must be strictly applied for the firms and industries to include structured and systematic policies, legal laws, and governance management support to comply with the regulatory measures. There are several existing policies formed by SDGs and ESG for the inclusion of environmental, social, and governance measures for corporates and firms to maintain their operations performance and excellence (Alqudah, Sierra-García and María Antonia García-Benau, 2024). The sustainable goals development mission and vision are to provide financial services in an affordable manner. Firms and industries from various sectors are utilizing the incentives and funds provided by the government to facilitate the circular economy in their business operations (Noreen, 2024). Alongside, it has been noticed that regulatory policies play a dominant role in strengthening sustainable financial ecosystems. Various financial institutions in the Gulf Cooperation Council have established legal procedures and systems that are on a global level to promote financial performance and ensure better governance measures. The policies are friendly for investors and thus, Middle Eastern countries have become hubs to attract foreign market investors.

DISCUSSION

Research Questions based discussion

- **RQ 1:** What is the relationship between Financial Technology and sustainable finance ecosystems, particularly in Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates?

Sustainable ecosystems for fintech services and platforms have been significantly improving across different sectors and industries, as per reports that suggest that Gulf countries, especially Saudi Arabia, Dubai, and Abu Dhabi, have continuously expanded their shares in the global markets. It has been noticed that these Middle East countries have been in the listings in terms of higher liquidity and international business practices (Abdelrhman Meero *et al.*, 2025). Their

continuous participation in domestic as well as international markets has been evident to check their growth in foreign investments. It can be stated that with modern technologies and improved banking services, the firms and industries have expanded their portfolios to attract foreign investors and moved their business operations to substitution assets, includes private shares, green financing and infrastructure facilities.

As noticed in the COVID-19 period, there were several issues and challenges faced by corporate firms. Before COVID-19, there was less focus on business activities to use digital transformation for payments and transactions (Abdulrahman *et al.*, 2025). Post COVID-19, the firms have transformed their traditional banking services and moved to modern technologies to achieve sustainability in the financial ecosystems. *This is in alignment with the "Technology-Organization-Environment" model* that reinforces the use of technology-driven business layouts and decision-making for businesses. The organizational factors are moderated by external environmental conditions. Firms utilizing the benefits of innovative technologies and modern ideas ensure their dominance in the competitive market landscape. With the country's major contribution to sustainable bonds and green financing, it has continuously made its step forward towards the achievement of balance in financial ecosystems. It is noted that with the inclusion of ESG and CSR frameworks, the industries ensure that their financial services and accounting measures are backed by the following governance structures. It is important that firms make improvements in financing systems towards sustainability and renewable resources. This will be helpful to achieve national development through local responsiveness and global development through foreign investments and bond issuances.

- **RQ2:** What major barriers such as political challenges, regulatory constraints, or lack of technological innovation affect the implementation of FinTech in Middle Eastern countries?

It is evident that whenever there are some major transformations, there are challenges associated with them. The challenges and barriers often limit the scope and capabilities of financial and banking services to make an impact on renewable energy sources. This includes limited technology usage and infrastructure. In the context of Middle East countries, the main industries and firms have diversified their business portfolios and layouts to achieve higher economic growth and better national development. This type of diversification has opened up new opportunities in the marketplace. However, due to certain gaps and a lack of infrastructure provision, the plans to achieve sustainable development do not take place in the firms on a global scale. Thus, it becomes essential for the financial institutions, government funding, and private sectors to contribute and support the fintech services to maintain their

existence in sustainable ecosystems. The support to the firms can be provided by foreign investments, venture capital, and lending options.

It is noticed that with significant transformation and restructuring of business layouts, Middle East countries have been innovative in their fintech capabilities and services. The idea and innovation back by technology has been impactful to include transformation in Gulf countries, but with effective measures and efficacy shown by the firms, their target to achieve sustained financial ecosystems can be achieved. *The "Innovation Diffusion Theory"* is in alignment with the current research topic, which focuses on the characteristics of any firm to determine the advantages, compatibility and impacts of any modern technology adopted by the business owners. It is based on the decision-making capabilities and comprehends the knowledge based on the information provided. With checking and confirmation that acts as a benchmark according to the suitability of the members who may be affected by the innovation.

- **RQ3:** What policy measures and regulatory strategies can Middle Eastern countries adopt to overcome these barriers and strengthen sustainable finance through FinTech?

The inclusion of policies and major reforms applied to the firms in the form of legal laws and governance structure helps to maintain and promote sustainable finance ecosystems. In the context of Middle East countries, their financial ecosystem is supported by government funding and private sector investments. Their visions, such as "Arabia's Vision 2030" and "Qatar Vision 2030," have promoted their business activities apart from oil exports and trading. Furthermore, regulatory measures and compliance have played a key role in fostering their financial services and operational excellence in global development. Free zones, including "Dubai International Financial Centre" and "Abu Dhabi Global Market", have made legal procedures and regulations that are recognized at the international level and provide transparency and accountability in the financial services provided to foreign investors and clients (Macchiavello and Siri, 2022). It has been seen that international policies are beneficial to attract foreign investors and thus the policies are responsible for establishing better opportunities in the local regions and on a global scale (Dhouha Nefla and Jellouli, 2025). However, due to geopolitical conflicts and economic instabilities, countries trading on a global scale face disruptions in the supply chain systems and a lack of collaboration with the stakeholders. Thus, with the adoption of digital platforms and technologies, cross-border transactions can be facilitated, and the firms can achieve sustainable financial ecosystems.

As per different studies conducted by the researchers, it is evident that although there are

advancements and excellence associated with the technologies, their active usage is still dependent on the commitments made by the firms and industries to incorporate them in their business activities (Pria, Al Rubaie and Prasad, 2025). Due to a lack of digital adaptability, the role of digital transformation and sustainable ecosystems remains less significant. However, the firms that strive to include innovation and technologies achieve a competitive advantage and build resilience to prepare for times of uncertainty and crisis.

CONCLUSION AND RECOMMENDATION

Overall Conclusion

The research study has discussed the major concepts and factors associated with fintech services and their adoption by the Middle East countries. From the study, it can be stated that there has been a significant increase in the digitization of financial platforms to facilitate cross-border transactions and payments to boost the nation's development and economy. Case studies based on UAE regional industries and other firms based in Saudi Arabia and Qatar helped to understand how risk management and operational excellence can be achieved by a sustainable finance ecosystem. Moreover, financial stability and sustainability are analyzed to establish the impact of ESG and CSR frameworks in different firms and industries. The use of secondary data sources has been influential in developing insights based on industrial trends and reports. This has enabled the researcher to examine the contribution of venture capital, funding, and investments in different countries across the globe. Comparison with the high-income countries and developed countries has made the research conducted in a correct direction and developed ideas to fill the current research gaps. In conclusion, it can be stated that the influence of green financing and renewable sources would help the firm to improve its performance in a sustainable manner and would result in maintaining stability and sustenance in the finance ecosystems.

Recommendation

The recommendation for the current study is mainly with respect to the adoption of more advanced and innovative technologies in the finance systems to avoid existing discrepancies, such as data privacy and security concerns. Trading and financing with foreign countries need advanced systems that can ensure the privacy and confidentiality of customers' data. This is essential to foster international business practices and promote the status of countries on a global scale. It is also important to diversify business portfolios by the firms and empower their economies with multiple opportunities (Offiong, Szopik-Depczyńska and Ioppolo, 2025). A systematic approach towards technological intervention would ensure better use of data-driven decisions by firms based on the implementation of AI and cloud computing. This will ensure the analysis of data before decision-making by the firms for providing financial services to the customers. This will increase customers' adaptability towards digitalization, and with

increasing demands, the firms can achieve a highly competitive advantage (Tanchangya *et al.*, 2025). Furthermore, with the adoption of big data analytics and blockchain technology, firms can manage risks and better manage their business activities to attract foreign investors and include local customers. The analysis will help to capture the historical trends of customers and will be beneficial in achieving better customer satisfaction.

Practical and Academic Implications of Research

The practical and academic implications of the current research include that with the rise of fintech services, the transformation has been brought in, reshaping traditional financial practices. With the implementation of technologies and digital tools, cross-border business activities are carried out in a sustainable manner (Ajouz *et al.*, 2023). In the context of the Middle East countries, it has been noticed that financial performance and stability have been achieved with sustainability measures and thus resulted in maintaining balanced ecosystems. Case studies and reports are used to examine the practical implications, and research papers are used to strengthen academic knowledge and information on terminologies associated with finance systems and services.

Limitations of Research

There are certain limitations of the current research study that are related to financial services inclusion in the banking services, particularly for the Middle East countries. There are certain industrial reports and research papers that highlight the utilization of digital technology in a responsible and efficient manner. However, how green financing has transformed global trading and business operations for Gulf countries needs an in-depth analysis to gain knowledge of the progression phases. Furthermore, the surface-level knowledge has been developed by the research objectives, but in-depth evaluation regarding the effectiveness and compatibility of the reforms and policies is subjected to further research. It is evident that transformation has been brought to the financial services and platforms and improved the global trading process, but adherence to policies and measures for renewable energy resources and sustainable development is undetermined.

Future Research

Investments and bond issuance by the Middle East countries in renewable energy and green financing will determine the effectiveness of the policies and technology for the firms in maintaining sustainable ecosystems for financial services. Alongside, incorporating ESG and CSR frameworks into business layouts needs more research. It is noticed that digitalization has played a dominant role in restructuring traditional financial practices. Thus, the adoption of technology needs deeper insights to study the impact of restructuring traditional financial practices and services.

Declaration

I hereby declare that this research project is my original work and has not been submitted, in whole or in part, for any other academic qualification. All sources used in this study have been properly acknowledged and referenced.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my supervisor for their guidance and support throughout this research. I also extend my appreciation to all authors and institutions whose work contributed to this study. Finally, I thank my family and peers for their encouragement during the completion of this project.

REFERENCE

- Abdelrhman Meero, Habeeb Ur Rahiman, Aziz, A. and Nishad Navaz (2025). Fintech and Green Finance: Driving Renewable Energy Growth in GCC. *Studies in big data*, pp.105–116. https://doi.org/10.1007/978-3-031-83915-3_9
- Abdulrahman, M., Khan, M.F., Saif, A.-G., Koliby, A., Oussama Saoula, Saeed, M. and Mohammad, R.A. (2025). The future of green finance: how digital transformation and FinTech drive sustainability. *Discover Sustainability*, 6(1). <https://doi.org/10.1007/s43621-025-01356-w>
- Abuamsha, M.K. (2025). The impact of FinTech on financial sustainability in the GCC: A comparative study of FinTech and non-FinTech companies. *Sustainable Futures*, 10, pp.101493–101493. <https://doi.org/10.1016/j.sfr.2025.101493>
- Admin (2025) *Guide to Understanding the Research Onion* | 15 writers. <https://15writers.com/research-onion/>.
- Ajouz, M., Abuamria, F., Zeer, I.A., Salahat, M., Shehadeh, M., Binsaddig, R., Al-Sartawi, A. and Al-Ramahi, N.M. (2023). Navigating the Uncharted: The Shaping of FinTech Ecosystems in Emerging Markets. *Cuadernos de Economía*, [online] 46(132), pp.189–201. Available at: <https://cude.es/submit-a-manuscript/index.php/CUDE/article/view/469>.
- Al Hadwer, A., Tavana, M., Gillis, D. and Rezania, D., 2021. A systematic review of organizational factors impacting cloud-based technology adoption using technology-organization-environment framework. *Internet of Things*, 15, p.100407. https://www.researchgate.net/profile/Madjid-Tavana/publication/351443429_A_Systematic_Review_of_Organizational_Factors_Impacting_Cloud-based_Technology_Adoption_Using_Technology-Organization-Environment_Framework/links/60983b51a6fdccaebd1d6091/A-Systematic-Review-of-Organizational-Factors-Impacting-Cloud-based-Technology-Adoption-Using-Technology-Organization-Environment-Framework.pdf

- Alasaeed, A. (2022) 'Saudi fintech sector grows 79% in a year,' *Arab News*. <https://www.arabnews.com/node/2196551/amp>.
- ALBlooshi, F. (2022). FinTech in the United Arab Emirates: A General Introduction to the Main Aspects of Financial Technology. pp.163–178. <https://doi.org/10.1108/978-1-80071-517-220221010>
- Al-Kasasbeh, O., Khasawneh, O.A.H. and Alzghoul, A., 2023. The Nexus between renewable energy consumption and economic growth: Empirical evidence from Jordan. *International Journal of Energy Economics and Policy*, 13(2), pp.194-199. https://savearchive.zbw.eu/bitstream/11159/630180/1/185500478X_0.pdf
- Alqudah, M.Z., Sierra-García, L. and María Antonia García-Benau (2024). Influence of ESG among Jordanian fintech businesses: the moderating role of sustainable finance technology. *Discover Sustainability*, 5(1). <https://doi.org/10.1007/s43621-024-00712-6>
- Arner, Douglas W., János Barberis, and Ross P. Buckley. *FinTech and RegTech in a Nutshell, and the Future in a Sandbox*. CFA Institute Research Foundation, 2022. <https://hub.hku.hk/bitstream/10722/250823/1/re01.htm>
- Assadpour, H., Ghalehnoee, M. and Bahramian, A., 2023. Developing the model of research method in urban landscape studies emphasizing the Saunders' research onion. *Motaleate Shahri*, 12(45), pp.3-18. https://urbstudies.uok.ac.ir/article_62249.html?lang=en
- Badruddin, A., 2022. Conceptualization of the effectiveness of Fintech in financial inclusion. *International Journal of Engineering Technology Science and Research*, 4(7), pp.960-965. https://www.researchgate.net/profile/Aisha-Badrudin/publication/323475007_Conceptualization-of-the-Effectiveness-of-Fintech-in-Financial-Inclusion/links/5aa3ec21a6fdcc544ba1007/Conceptualization-of-the-Effectiveness-of-Fintech-in-Financial-Inclusion.pdf
- Bakir Illahi Dar, Badwan, N. and Kumar, J. (2024). Investigating the role of Fintech innovations and green finance toward sustainable economic development: a bibliometric analysis. *International Journal of Islamic and Middle Eastern Finance and Management*. <https://doi.org/10.1108/imefm-01-2024-0018>
- Bocanet, A. and Webb, H.C. (2025). Fintech and Sustainable Finance. *Reference Works in Business and Management*, pp.951–967. https://doi.org/10.1007/978-981-96-6143-5_39
- Bocanet, A. and Webb, H.C., 2025. Fintech and Sustainable Finance: Innovations, Challenges, and Opportunities in the United Arab Emirates. *The Palgrave Handbook of fintech in Africa and Middle East: Connecting the Dots of a Rapidly Emerging Ecosystem*, pp.951-967. https://link.springer.com/content/pdf/10.1007/978-981-96-6143-5_39.pdf
- Danish, M. and Isaifan, R.J., 2024. Strategic plans to support action against climate change in the Arab countries in the Middle East Region. *Journal of Sustainable Development Law and Policy (The)*, 15(1), pp.304-335. <https://www.ajol.info/index.php/jsdlp/article/download/270964/255780>
- Daoulhadj, B. and Hussin, N., 2023. Islamic Green Finance, Ecosystem and Prospects in Scaling Up Sustainable Investments. *Islamic Finance*, 21. https://business.utm.my/wp-content/uploads/2024/10/update-VOL-III_AHIBS-ACT-Conference-Proceedings.pdf#page=30
- Dhouha Nefla and Jellouli, S. (2025). Emerging technologies in finance: challenges for a sustainable finance. *Cogent Business & Management*, 12(1). <https://doi.org/10.1080/23311975.2025.2495191>
- Dua, A. (2022). Aligning finance with sustainable development goals. *Journal of Cleaner Production*, 330, 129843. https://www.researchgate.net/publication/391418964_Role_of_sustainable_finance_in_driving_environmental_social_and_governance_ESG_based_investments
- Faten Ben Bouheni (2025). FinTech Landscape and Sustainable Economy in the GCC Region. *Gulf Studies*, pp.217–240. https://doi.org/10.1007/978-981-96-8287-4_11
- Forecast, M.D. (2024) *Middle East and Africa Fintech market Size & Growth, 2033, Market Data Forecast*. <https://www.marketdataforecast.com/market-reports/mea-fintech-market>.
- Hacioglu, U. and Aksoy, T. eds., 2021. Financial ecosystem and strategy in the digital era: Global approaches and new opportunities. Springer Nature. https://www.researchgate.net/profile/Uemit-Ilhan/publication/352390462_Business_Strategy_for_Sustainable_Development_in_the_Digital_Era_Green_Management/links/60c9f539a6fdcc01d476cfa/Business-Strategy-for-Sustainable-Development-in-the-Digital-Era-Green-Management.pdf
- Hadwer, A.A., Tavana, M., Gillis, D. and Rezania, D. (2021). A Systematic Review of Organizational Factors Impacting Cloud-based Technology Adoption Using Technology-Organization-Environment Framework. *Internet of Things*, [online] 15, p.100407. <https://doi.org/10.1016/j.iot.2021.100407>.
- Ho, J.C. (2021). Disruptive innovation from the perspective of innovation diffusion theory. *Technology Analysis & Strategic Management*, 34(4), pp.1–14. <https://www.tandfonline.com/doi/abs/10.1080/09537325.2021.1901873>

- Irianto, E.D.O., Kesuma, M.R., Aini, R.N., Henrika, M. and Ariswati, L.D., 2025. The Role of sustainable finance in driving environmental, social and governance (ESG) based investments. *JEMBA: Jurnal Ekonomi Pembangunan, Manajemen & Bisnis, Akuntansi*, 5(1), pp.36-46. <https://ejournal.upr.ac.id/index.php/jemba/article/download/20029/7240>
- Johannesson, P. and Perjons, E. (2021). Research Strategies and Methods. *An Introduction to Design Science*, 1(1), pp.41–75. https://doi.org/10.1007/978-3-030-78132-3_3
- Kapyshev, Y., 2024. Comparative analysis of EU and Kazakhstan banking laws, and another country in the east (UAE) with an increasing financial economy. <https://unitesi.unive.it/bitstream/20.500.14247/23856/1/898569-1295363.pdf>
- Kashif, M., Chen Pinglu, Ullah, S. and Zaman, M. (2023). Evaluating the influence of financial technology (FinTech) on sustainable finance: a comprehensive global analysis. *Financial Markets and Portfolio Management*. <https://doi.org/10.1007/s11408-023-00439-w>
- Kashif, M., Pinglu, C., Ullah, A. and Qian, N. (2025). The impact of green finance and FinTech mechanisms on financial stability: evidence from advanced and emerging economies. *China Finance Review International*. <https://doi.org/10.1108/cfri-07-2024-0393>
- Khalaf, B.A., Awad, A.B., Ahmed, O. and Gharios, R.T., 2023. The role of FinTech in determining the performance of banks: The case of Middle East & North Africa (MENA) region. *International Journal of Membrane Science and Technology*, 10(3), pp.1525-1535. <https://www.academia.edu/download/115901198/126.pdf>
- Khan, S. and Al-harby, A.S.A., 2022. The use of FINTECH and its impact on financial intermediation—a comparison of Saudi Arabia with other GCC economies. *Intellectual economics*, 16(2). <https://ojs.mruni.eu/ojs/intellectual-economics/article/download/7394/5617>
- Kumar, A. and Shankar, A. (2024). Building a sustainable future with enterprise metaverse in a data-driven era: A technology-organization-environment (TOE) perspective. *Journal of Retailing and Consumer Services*, 81, pp.103986-103986. <https://doi.org/10.1016/j.jretconser.2024.103986>
- Laryeafo, M.N. and Ogbewe, O.C. (2023). Ethical Consideration dilemma: Systematic Review of Ethics in Qualitative Data Collection through Interviews. *Journal of Ethics in Entrepreneurship and Technology*, [online] 3(2), pp.94–110. <https://doi.org/10.1108/JEET-09-2022-0014>
- Macchiavello, E. and Siri, M. (2022). Sustainable Finance and Fintech: Can Technology Contribute to Achieving Environmental Goals? A Preliminary Assessment of ‘Green Fintech’ and ‘Sustainable Digital Finance’. *European Company and Financial Law Review*, 19(1), pp.128–174. <https://doi.org/10.1515/ecfr-2022-0005>
- Mahajan, R., Lim, W.M., Sareen, M., Kumar, S. and Panwar, R., 2023. Stakeholder theory. *Journal of Business Research*, 166, p.114104. <https://www.sciencedirect.com/science/article/pii/S0148296323004629>
- Mbanaso, U.M., Abrahams, L. and Okafor, K.C. (2023). Research Philosophy, Design and Methodology. *Research Philosophy, Design and Methodology*, 1(1), pp.81–113. https://doi.org/10.1007/978-3-031-30031-8_6
- Methri, G. (2024) *FinTech surge in MENA: 5 key enablers driving growth in the industry*. <https://www.cedaribsfintechlab.com/fintech-surge-in-mena-5-key-enablers-driving-growth-in-the-industry/>.
- Noreen, U. (2024). Mapping of FinTech Ecosystem to Sustainable Development Goals (SDGs): Saudi Arabia’s Landscape. *Sustainability*, [online] 16(21), pp.9362–9362. <https://doi.org/10.3390/su16219362>
- Offiong, U.P., Szopik-Depczyńska, K. and Ioppolo, G. (2025). FinTech Innovations for Sustainable Development: A Comprehensive Literature Review and Future Directions. *Sustainable Development*. <https://doi.org/10.1002/sd.70068>
- Olaiya, O.P., Adesoga, T.O., Ojo, A., Olagunju, O.D., Ajayi, O.O. and Adebayo, Y.O., 2024. Cybersecurity strategies in fintech: safeguarding financial data and assets. *GSC Advanced Research and Reviews*, 20(1), pp.50–56. https://www.researchgate.net/profile/Omolara-Olaiya/publication/382023163_Cybersecurity_strategies_in_fintech_safeguarding_financial_data_and_assets/links/6688388c714e0b0315492000/Cybersecurity-strategies-in-fintech-safeguarding-financial-data-and-assets.pdf
- Othman, M. (2025). Fintech and Sustainability: Charting a New Course for Jordanian Banking. *Journal of Risk and Financial Management*, 18(6), p.328. <https://doi.org/10.3390/jrfm18060328>
- Pria, S., Al Rubaie, I. and Prasad, V. var a (2025). FinTech Innovations for Climate Transition in Oman. *Legal and Regulatory Considerations of Leveraging Sustainable Finance*, [online] pp.111–134. <https://doi.org/10.4018/979-8-3373-0350-5.ch005>
- Radu, C., Smaili, N., & Blumberg, B. (2023). Aligning corporate strategies with the SDGs. *Journal of Business Ethics*, 184(3), 437–456. <https://ejournal.upr.ac.id/index.php/jemba/article/download/20029/7240>
- Razavi, H. and Habibnia, A., 2024. The rise of AI in Middle Eastern fintech with the case studies from the UAE and Turkey. In *Exploring Global FinTech Advancement and Applications* (pp. 259-297). IGI

Global Publishing. https://www.researchgate.net/profile/Hooman-Razavi-2/publication/378975721_The_Rise_of_AI_in_Middle_Eastern_Fintech_With_the_Case_Studies_From_the_UAE_and_Turkey/links/66dc0649f84dd1716cd49b24/The-Rise-of-AI-in-Middle-Eastern-Fintech-With-the-Case-Studies-From-the-UAE-and-Turkey.pdf

- Swift (2023) *Global Sustainable Investment Review finds US\$30 trillion invested in sustainable assets.* <https://www.gsi-alliance.org/global-sustainable-investment-review-finds-us30-trillion-invested-in-sustainable-assets/>.
- Taherdoost, H. (2021). Data Collection Methods and Tools for Research; a Step-by-Step Guide to Choose Data Collection Technique for Academic and Business Research Projects. *International Journal of Academic Research in Management (IJARM)*, 10(1), p.10. <https://hal.science/Hal-03741847/>
- Taherdoost, H. (2022). *Different Types of Data Analysis; Data Analysis Methods and Techniques in Research Projects.* [online] International Journal of Academic Research in Management. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4178680.
- Taherdoost, H. (2022). What Are Different Research Approaches? Comprehensive Review of Qualitative, Quantitative, and Mixed Method Research, Their Applications, Types, and Limitations. *Journal of Management Science & Engineering Research*, [online] 5(1), pp.53–63. <https://hal.science/hal-03741840/document>.
- Takona, J.P. (2023). Research design: qualitative, quantitative, and Mixed Methods Approaches / Sixth Edition. *Quality & Quantity*, 58(1), pp.1011–1013. doi:<https://doi.org/10.1007/s11135-023-01798-2>
- 2. <https://link.springer.com/article/10.1007/s11135-023-01798-2>
- Tanchangya, T., Islam, N., Naher, K., Mia, M.R., Chowdhury, S., Sarker, S.R. and Rashid, F. (2025). Financial Technology-Enabled Sustainable Finance for Small- and Medium-Sized Enterprises. *Environment, Innovation and Management*, 01, <https://doi.org/10.1142/s3060901125500061>
- Urikova, O., Mysko, Y., Bondarchuk, M., Karyy, O. and Masiuk, V. (2025). Fintech Revolution: How Digital Technologies Are Transforming the Global Financial Ecosystem and Promoting Sustainable Development. *Lecture Notes in Electrical Engineering*, pp.426–449. https://doi.org/10.1007/978-3-032-02272-1_18
- Wang, S., Asif, M., Shahzad, M.F. and Ashfaq, M., 2024. Data privacy and cybersecurity challenges in the digital transformation of the banking sector. *Computers & security*, 147, p.104051. <https://www.sciencedirect.com/science/article/pii/S0167404824003560>
- Yong, S.M., 2023. 4th industry revolution digital marketing adoption challenges in SMEs and its effect on customer responsiveness. *Information Management and Business Review*, 15(2), pp.152–172. https://www.researchgate.net/figure/Technology-Organization-Environment-TOE-framework_fig3_371570346
- Zauro, Z.S., Civín, A.S. and Bouma, O. (2024) 'Islamic Economics for Sustainable Development,' Seriat Ekonomisi, 1(2), pp. 53–70. <https://doi.org/10.35335/ac1n5382>.
- Zhang-Zhang, Y., Rohlf, S. and Rajasekera, J., 2020. An eco-systematic view of cross-sector fintech: The case of Alibaba and Tencent. *Sustainability*, 12(21), p.8907. <https://www.mdpi.com/2071-1050/12/21/8907>