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Research papers and articles

The Problem of Legal Recognition of Online Stores in Arab Legislations

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Abstract:

Today, we are witnessing an increasing technological development across all fields, particularly in the area of commerce. Individuals are now able to establish remote stores, known as online stores, which differ from traditional stores. Traditional stores consist of a set of tangible and intangible elements, whereas online stores fundamentally lack tangible elements.

The system of electronic commerce has emerged at a time when global commercial patterns are undergoing significant transformation toward electronic transactions.
In particular, E-commerce represents a continuously open market that operates around the clock, saving customers time and effort by enabling access to a wide range of goods and services with diverse options in an environment characterized by transparency and high competitiveness aimed at gaining consumer trust.

Despite the importance of online stores, they continue to face the problem of legal recognition and uncertainty regarding the legal rules governing them, especially in light of the absence of clear provisions in most Arab legislations defining the legal nature of online stores.

Keywords: Online store, customers, commerce, legal nature.

Introduction

The world is moving rapidly toward electronic commerce. Reports indicate that by the year 2040, online commerce is expected to account for approximately 95% of global buying and selling activities.

E-commerce has witnessed widespread expansion in recent years and has become one of the most important activities of the digital economy. However, this expansion has varied between developed and developing countries. While e-commerce has spread extensively in many countries, some states still lack widespread online shopping. This is due, on the one hand, to the absence of encouragement and support for e-commerce at the national level, and on the other hand, to the lack of legal provisions regulating such activities.

The Organisation for Economic Co-operation and Development (OECD) defines electronic commerce as the process of buying and selling goods and services carried out through digital communication means, via platforms specifically designed to send and receive purchase and sale orders electronically, supported by digital payment mechanisms.

Accordingly, this study seeks to define the concept of the online store and distinguish it from other electronic platforms, with the aim of determining the legal nature of the online store.

Problem Statement:
Despite the expansion of commercial activity conducted via the internet, legal systems in some Arab countries, including the Sultanate of Oman and Syria, continue to suffer from shortcomings in fully recognizing the online store as a legal entity.

Research Question:
To what extent are Omani and Syrian legislations adequate in regulating the legal nature of the online store ?

Research Methodology:
A comparative legal analysis, with reference to the Syrian model as a legislative example for comparison.

Significance of the Study:
Highlighting the need to develop the legislative framework in a manner that corresponds to the realities of the digital economy in the Sultanate of Oman and Syria.

Section One: The Concept of the Online Store

The technological development witnessed in the contemporary era has made it possible to establish online stores through the internet. This enables customers to browse easily online without being bound by a specific place or time, by using designated websites through which goods are displayed via the online store. An online store may thus be defined as a virtual space on the internet in which customers use specific software applications to view the services and products offered by the store.[1]

According to a study conducted in 2009, the United States of America held a significant share of global e-commerce activity, accounting for approximately 80% of worldwide e-commerce volume at that time. However, this percentage has since changed, with U.S. e-commerce now representing around 29% of global e-commerce sales.[2]

Nevertheless, the Sultanate of Oman occupies an important position with regard to e-commerce. Several initiatives in this field have been launched under the supervision of the Ministry of Commerce and Industry. The number of e-commerce licenses has reached nearly six thousand, with approximately one hundred online stores registered through the "Maroof Oman" platform. Although these figures remain insufficient for the Sultanate's ambitions, Oman continues to pursue the development of legislation regulating e-commerce, which places it among the leading countries that show strong interest in electronic commerce.[3]

The Executive Regulation of Electronic Commerce in the Sultanate of Oman, issued by Decision No. 499 of 2023, defines electronic commerce in Article (1) as:

"An economic activity conducted between the licensed party and the consumer through an electronic means or an online store, for the purpose of selling, offering, marketing, or promoting goods or services, or exchanging data r."[4]

In light of the importance of this subject, the United Nations Economic and Social Commission for Western Asia (ESCWA), as part of its work program, prepared a study on trade facilitation and electronic commerce in the ESCWA region, aiming to enhance effective participation in e-commerce and online marketing.[5]

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[1]Inas Hashem Rasheed, "The Legal Nature of the Digital Store," Al-Kufa Journal of Legal and Political Sciences, Vol. 15, Issue 52, 2022, p. 229.

[2]Mhana bin Rashid bin Hamad Al-Saadi, E-Commerce Contracts via the Internet: A Jurisprudential and Comparative Legal Study, 2019, p. 76.

[3]E-Commerce in the Sultanate of Oman, www.omandaily.om

[4]Regulatory Framework for E-Commerce in the Sultanate of Oman, issued under Decision No. 499 of 2023, Article 1: "Consumer is defined as a person who obtains a product or receives a service for consideration or without consideration."

[5] United Nations Economic and Social Commission for Western Asia (ESCWA), Study Prepared to Facilitate Trade and E-Commerce in the ESCWA Region, 2001, p. 9.

Various definitions of electronic commerce have been proposed. The International Journal of Electronic Commerce defines it as the processes of selling, purchasing, delivering, and ordering goods from their producer or seller not through traditional means, but electronically, with such operations usually conducted via the internet.[6]

It is therefore essential to clarify the concept of the electronic store, distinguish it from the traditional store and the electronic platform, and examine its advantages, disadvantages, and key characteristics within this section.

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[6] The International Journal Specialized in E-Commerce and Online Shopping, Middle East Edition, Year 2, Issue 1, 1999, p. 22.

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Section One: The Concept of the Electronic Store

Article 43(1) of the Syrian Commercial Law No. 33 of 2007 defines a store as:
"A combination of tangible and intangible elements intended for the exercise of a commercial activity."

Article 43(2) further states that a store generally includes the trade name, commercial address, trademark, customer base, lease rights regulated by special commercial laws and their amendments, as well as equipment, industrial tools, furniture, patents, licenses, drawings, and models, unless certain elements are expressly excluded in the store register or in the contracts related thereto.

According to these legal provisions, Syrian law considers the store to be an independent legal entity rather than a mere aggregation of separate elements. Its legal status arises from the integration of both material and immaterial components.[7]

In contrast, the Omani Electronic Transactions Law No. 39 of 2025 does not provide an explicit definition of the electronic store.

However, the Omani Regulation on Electronic Commerce No. 499/2023, issued by the Minister of Commerce and Industry, defines the electronic store as "an electronic platform through which a licensed person may conduct electronic commerce."

Under this definition, the electronic store can be understood as a digital environment that enables the licensed entity to carry out economic activities with consumers, including the sale, display, marketing, or promotion of goods or services, as well as related data.

It is evident that the legislator equated the electronic store with the electronic platform by defining one in terms of the other, without establishing a clear conceptual distinction. This approach implies that the two concepts are identical or, at the very least, functionally interchangeable.

Moreover, the regulation does not offer a separate definition of the electronic platform as an independent legal concept, despite the clear distinction between the two in commercial practice.

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[7]DR. Jamal Al-Din Abdullah Maknas, "The Issue of Registering the Store and Its Enforcement in Syrian Law," Studies in Sharia and Law Sciences, Vol. 41, Issue 2, 2014, p. 1407.

This lack of conceptual clarity may give rise to practical and legal challenges, particularly in identifying and allocating legal liability. For instance, an electronic store may be operated by a single trader offering their own products, whereas an electronic platform typically serves as an intermediary that allows multiple traders to interact with consumers.

Ignoring this distinction may result in legislative gaps, particularly in disputes relating to liability for products or services, warranty obligations, and consumer protection.

Legal scholarship has defined the electronic store as:
 "An electronic service accessed via the Internet, open to all users, which allows traders to display their goods or services to customers."[8]

For our part, we define the electronic store as:
 "A digital commercial establishment used by a trader to offer goods and services through the Internet."

From the foregoing, it can be observed that the Syrian legislator explicitly stated that a store consists of both tangible and intangible elements, beginning its enumeration with the trade name, commercial address, and trademark, in recognition of their practical significance. However, the Syrian legislator did not expressly define the electronic store, unlike the Omani legislator, who defined the electronic store as an electronic platform that enables a licensed person to conduct electronic commerce through it. Nevertheless, this definition does not clearly indicate whether the elements of the electronic store correspond to those of the traditional store or differ from them.

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[8] Ibrahim Al-Shambali, "The Electronic Store and Consumer Protection Requirements in the Saudi System," Qada Journal, 2023, p. 268.

Subsection One: Distinguishing Between the Traditional Store, the Electronic Store, and the Electronic Platform

Following the Industrial Revolution of the eighteenth and nineteenth centuries, commercial activity evolved significantly, particularly with the emergence of large physical stores in urban centres.

In today's world, with the rapid advancement of information technology and the widespread use of the Internet, it became necessary for commerce to adapt to these technological developments. This transformation led to the emergence of the electronic store, which operates through the Internet.[9]

Despite certain similarities between electronic stores and traditional stores, there are fundamental differences between the two.

First: The Traditional Store

The traditional store is a physical commercial establishment that requires a tangible presence and a specific location for the display and sale of products. Under Omani law, one of the most important elements of the traditional store is the trade name[10].

Despite technological progress, some consumers still prefer shopping through traditional stores.

Traditional stores require skilled and experienced labor to operate effectively. They are also characterized by conventional payment methods, such as cash payments, checks, or bank transfers. Moreover, the cost of establishing traditional stores is generally very high.

It also requires substantial capital and the payment of workers' wages. As for the ordering of products, this is carried out through direct communication between the trader and the customer. Following the placement of the order, a printed invoice is issued as proof of the transaction.[11]

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[9]Sharqi Abu Odeh, The Legal Regulation of Moral Rights: The Electronic Store in Jordanian Legislation, Master's Thesis in Private Law, Middle East University, 2024, p. 20.

[10] Omani Commercial Law, Royal Decree No. 55 of 1990, amended by Royal Decree No. 53 of 2019, Article 39.

[11]Munther Qassem Al-Battoush, The Legal System of the Electronic Store, Master's Thesis in Law, Mutah University, 2016, p. 22.

Second: The Electronic Store

The electronic store is a website that enables shopping through the Internet. Unlike the traditional store, it does not require a physical presence or a specific location. The essential components of an electronic store include a homepage for users, a product page, a shopping cart page, a checkout page, and an email address.

Some consumers prefer shopping through electronic stores due to the advantages they offer, which will be discussed later. Electronic stores generally require a limited workforce, resulting in significantly lower operating expenses for traders, particularly in terms of labor costs. Moreover, the cost of establishing an electronic store is considerably lower than that of a traditional store.

In electronic stores, products and goods are ordered online, and payment is made through electronic payment methods.[12]

Third: Distinguishing Between the Electronic Store and the Electronic Platform

A variety of concepts are used in the contemporary digital environment, most notably the terms "electronic store" and "electronic platform." Although these terms are often used interchangeably in everyday discourse, closer examination reveals fundamental differences between them in terms of legal nature, economic function, operational requirements, and the responsibilities of the parties involved.

An electronic store may be understood as a privately owned digital site established by a trader, whether a natural or legal person, for the purpose of marketing and selling their own products or services directly to consumers. This model is characterized by full ownership of the website and its content, which entails complete control over the commercial process in all its stages, from product display and pricing to delivery and after-sales services. By contrast, an electronic platform is a shared digital space operated by an intermediary entity, typically a technology company, which enables sellers, whether individuals or institutions, to offer their products through it, as is the case with platforms such as Amazon and Noon. The platform acts as an intermediary between the seller and the consumer and benefits from the high volume of traffic generated by its centralization and reputation, thereby providing sellers with broader marketing opportunities without the need to establish independent websites.

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[12]Syrian Electronic Transactions Law, Law No. 3 of 2014, Article 17.

An electronic platform may also be defined as an interactive digital environment that employs various web-related technologies to facilitate communication, transactions, and the exchange of goods and services.[13]

For the sake of simplification, the electronic store may be likened to a "shop located on a public street," which requires prior knowledge of its location or deliberate access, whereas the electronic platform resembles a shopping mall that brings together multiple stores under one roof and attracts a large number of visitors due to its visibility and public prominence.

From an operational perspective, establishing an electronic store requires a relatively higher financial investment, particularly in website design, hosting services, technical support, and individual marketing campaigns. In addition, technical resources are needed to ensure fast browsing speeds and server security, especially as traffic increases. By contrast, electronic platforms allow sellers to offer their products within a ready-made digital environment in exchange for an annual subscription or a commission deducted from sales, thereby reducing the seller's operational costs.

With regard to logistics, delivery responsibilities in electronic stores fall on the store owner, whereas delivery models in electronic platforms vary. The platform may provide delivery services itself or leave this responsibility to the seller, depending on the agreement between the parties.

In terms of financial returns, electronic platforms offer access to a broader audience, which enhances product marketing and visibility. However, this advantage comes at the cost of a commission charged on each sale, potentially reducing net profits. Conversely, the owner of an electronic store enjoys greater financial independence and retains full profits, but must independently bear all operational expenses. From a legal qualification perspective, some platforms cannot be considered electronic stores in the strict sense, as they neither own nor market the products displayed. Their role is limited to connecting users and enabling transactions between them, as seen in platforms such as Facebook Marketplace or Instagram Shop.

  In such cases, the platform functions more as a commercial communication environment and does not assume the responsibilities of a seller or supplier. Accordingly, the distinction between the electronic store and the electronic platform is not merely terminological but rather involves regulatory and legal considerations related to the rights and obligations of the parties, supervisory mechanisms, the scope of liability for product quality, transaction transparency, and the implications for consumer protection.

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[13]Mona Al-Haddad, Digital Platforms, see: https://portal.arid.mylar-Ly.

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Subsection Two: Advantages and Disadvantages of the Electronic Store

Electronic stores offer numerous advantages that encourage consumers to use them. At the same time, they also involve certain disadvantages, the most significant of which are outlined below.

First: Advantages of the Electronic Store

1. Time Efficiency
Electronic stores are characterized by their ability to save time, as they eliminate the need for goods and buyers to be present in the same physical location. The owner of an electronic store is not required to be constantly present, nor is the customer required to visit the store in person, as is the case with traditional stores.[14]

2. Ease of Displaying Goods and Products
Electronic stores are distinguished by the ease with which goods and products can be displayed. Sellers are able to promote their products efficiently through digital means, which encourages consumers to make purchasing decisions.

3. Continuous Availability
Electronic stores are characterized by continuous availability, as the seller can offer and sell products at all times, even while operating from home. This stands in contrast to traditional stores, where the seller must be physically present and is unable to conduct sales during rest periods or outside working hours.

Second: Disadvantages of the Electronic Store

Just as electronic stores offer advantages that encourage both traders and consumers to use them, they also present a number of disadvantages and challenges, the most significant of which are as follows:

1. High Operating Costs for Large Electronic Stores
Studies have shown that one of the major challenges of online shopping lies in the high operational costs associated with large-scale electronic stores, rather than newly established ones. When comparing the volume of electronic commerce spending in Arab countries with the amounts spent on advertising on global platforms, the disparity becomes evident, as online shopping expenditure remains relatively low. For this reason, some Arab countries have adopted a cautious approach toward the widespread use of electronic stores.

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[14]Advantages of the Online Store, www.qeematech.net

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This cautious stance, however, contrasts with the rapid progress made by countries such as China in expanding the use of electronic commerce.[15]

2. Inadequate Protection of Electronic Store Customers

Due to the differing mechanisms of the electronic marketplace, consumers may be exposed to practices that compromise their interests, such as inaccurate or misleading product descriptions. Traders or producers may present exaggerated or false advantages of products, thereby deceiving consumers. The risks faced by consumers when using electronic stores may therefore exceed those encountered in traditional stores, particularly with respect to the inability to physically inspect products prior to purchase.[16]

3. Poor Product Imaging

One of the disadvantages of electronic stores is the lack of clarity or accuracy in product images displayed online. This may lead to consumer uncertainty and reluctance to complete purchases. Accordingly, sellers must ensure that product presentations are realistic and accurately reflect the actual goods in order to build consumer trust and encourage purchasing.

The electronic store is characterized by several key features, most notably ease of use, quality of content, and the provision of shipping and delivery services.

Subsection One: Ease of Use

Both traders who operate electronic stores and consumers benefit from ease of use, particularly in the modern era, where commercial development has coincided with rapid advancements in information technology. The use of electronic stores does not require complex procedures; rather, transactions are carried out through simple and user-friendly processes, whether for traders or consumers.

Subsection Two: Quality of Content

Traders consistently seek to attract customers by offering high-quality products. The quality of goods and products, as well as the manner in which they are presented through the electronic store, play a decisive role in encouraging consumers to make purchases. High-quality products motivate consumers to buy, and traders often enhance this appeal by offering discounted prices on well-known goods and products, which in itself is sufficient to attract customers through the provision of quality merchandise.

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[15]Ahmed Abdullah Al-Awadi, "Factors Affecting E-Commerce and Marketing," Economy and Society Journal, Issue 6, 2010, p. 171.
[16]Ibid., p. 173.

Subsection Three: Provision of Shipping and Delivery Services

Electronic stores are distinguished by their ability to provide shipping and delivery services. Consumers place orders through the electronic store's website, and in order to encourage purchases, traders may offer shipping and delivery services either for a fee or free of charge, thereby incentivizing consumers to complete transactions.

Subsection Four: Availability of Electronic Payment Services

Electronic stores are characterized by the availability of electronic payment methods, such as payment by electronic or bank cards. Consumers are not required to carry physical cash; instead, they can complete purchases by paying electronically after selecting the desired product. In this manner, consumers can choose goods or products, purchase them, and pay their value through electronic payment systems.[17]

Chapter Two: Obligations of the Trader in the Electronic Store and the Legal Regulation of the Electronic Store

Section One: Obligations of the Trader in the Electronic Store

The Omani Executive Regulation on Electronic Commerce No. 499 of 2023 defines the legal relationship between the electronic trader and the consumer through a set of legal obligations imposed on the trader. These obligations may be summarized as follows:

First: The Requirement to Maintain a Clearly Defined Place of Business

Article (8) of the aforementioned Regulation obliges the trader to maintain a clearly defined place of business for the conduct of electronic commercial activities. The determination of this place varies according to the legal nature of the trader:
1. If the trader is a natural person, the place of business is the location specified in the license.
2. If the trader is a commercial company, the place of business is the address registered in the commercial register.

The purpose of this requirement is to enhance trust in electronic transactions and to ensure that the trader can be held legally accountable in the event of any breach of their obligations.

Second: The Obligation of Transparency and Electronic Disclosure

Article (9) of the Regulation imposes on the electronic trader the obligation to disclose, through a clearly visible electronic link, a set of essential information, including:

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[17]Syrian Electronic Transactions Law, Law No. 3 of 2014, Article 1.

1. Accurate information relating to the goods or services offered, in accordance with applicable legislation.
2. Measures adopted to protect the consumer's personal data, reflecting an explicit commitment to privacy protection.
3. Procedures for receiving and handling consumer complaints.
4. The tax number, if applicable.
5. The license number and trademark.
6. Contact information and customer service details.
7. The policy governing replacement and returns, in accordance with Omani laws.

This obligation not only ensures transparency but also serves as an effective mechanism for enhancing consumer trust and protecting consumers from fraud or misleading practices.

Third: Affiliation with a Licensed Electronic Payment System

Pursuant to Article (10) of the Regulation, the electronic trader must be affiliated with a bank or a licensed payment service provider in the Sultanate of Oman in order to offer secure electronic payment tools. This requirement constitutes one of the fundamental safeguards for the protection of consumers' financial rights.

Fourth: Correction of Errors in Orders Prior to Delivery

Article (11) of the Regulation requires the trader to provide a clear mechanism for correcting errors in orders, whether such errors originate from the trader or the consumer, provided that the goods or services have not yet been delivered or shipped. This provision grants consumers a degree of security and flexibility in the event of mistakes occurring during the electronic ordering process.

Fifth: Respecting the Consumer's Choice to Opt Out of Electronic Notifications

Under Article (12) of the Regulation, the trader is required to provide consumers with a means to discontinue electronic notifications. This obligation falls within the broader framework of privacy protection and the prevention of digital nuisance.

Sixth: Immediate Notification of Competent Authorities in the Event of Security Breaches

Pursuant to Article (13) of the aforementioned Regulation, if the electronic medium or the electronic store is subjected to a security breach, the trader must immediately notify the competent authority and inform the Ministry upon becoming aware of the incident. This obligation constitutes a fundamental requirement for the protection of consumer data and

the safeguarding of cybersecurity in electronic transactions, and is enforced under the threat of legal accountability.

Section Two: The Legal Regulation of the Electronic Store

The electronic store represents a direct outcome of the digital transformation experienced by global commercial activity. It is characterized by technical and organizational features that fundamentally distinguish it from the traditional store in terms of nature, location, constituent elements, and mode of operation.

Although the electronic store shares the same objective as the traditional store, namely, the conduct of commercial activity, it differs in terms of the means employed and the legal and technical environment in which it operates. This divergence necessitates an independent legal characterization that takes into account the specific nature of electronic commerce.

First: Absence of the Physical Element and the Predominance of Intangible Elements

The electronic store is primarily composed of purely intangible elements, including:
1. The domain name.
2. Customer databases.
3. User interface design and website architecture.
4. Software and application rights.
5. Digital reputation and electronic reviews.
6. Social media accounts associated with the store.

These elements constitute non-material digital rights that fall within the scope of intellectual property or moral rights. In most cases, a tangible physical element, such as a geographical location, equipment, or fixed inventory, is absent, which clearly distinguishes the electronic store from the traditional commercial establishment.

In the absence of a clear legislative determination of the elements of the electronic store under Syrian law, reference may be made to Syrian Commercial Law No. 33 of 2007. Article 43 thereof provides that a store consists of both tangible and intangible elements.[18]

Second: Rejection of the Classification of the Electronic Store as an Independent Patrimony

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[18] Syrian Electronic Transactions Law, Law No. 3 of 2014, Article 24: "In all matters not explicitly addressed by this law, reference shall be made to the Commercial Law, the Electronic Signature and Network Services Law, the Law Regulating Online Communication and Combating Cybercrime, the Consumer Protection Law, the laws regulating the work of the Central Bank of Syria, the relevant rules of international commercial custom related to the transaction or electronic commercial activity, and all other applicable laws and regulations."

In light of the theory of independent patrimony[19], its application to the electronic store appears inaccurate, as the latter does not constitute a financial entity existing independently from the trader or the owning entity.

Notably, the law does not grant the electronic store an independent legal personality, nor does it provide a legal framework that allows for the creation of a legally protected digital patrimony separate from the owner's original patrimony.

Accordingly, it cannot be asserted that the electronic store enjoys an independent patrimony, and a "digital legal personality" cannot be conferred upon it, except in the event that it is transformed into a digital company or a separate legal entity.

Third: Rejection of Its Classification as a Real-Asset Ensemble

Applying the theory of a real-asset ensemble to the electronic store also appears unsuitable. This theory presupposes the existence of interconnected elements "in reality" within a physical unit (such as a warehouse, location, tools, or employees), which are characteristics that do not apply to the electronic store. The electronic store is managed remotely, and its components may be distributed across multiple servers in different countries.

Furthermore, the components of the electronic store are not physically interconnected; rather, their connection is functional and technical. Consequently, it is difficult to separate a digital element from its operating environment or to assign it a physical location. The theory of the real-asset ensemble has not gained broad acceptance, particularly because it does not clarify whether the trader maintains an independent patrimony from the commercial establishment or operates under a single patrimony. [20]

Fourth: Adoption of the Digital Intangible Property Concept

The most appropriate legal characterization of the electronic store is to consider it an intangible movable asset, referred to in modern doctrine as "digital intangible property," which falls within the category of intangible assets similar to trademarks, copyrights, and patents.

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[19]Mohammad Farouk Abu Al-Shamat & Jamal Al-Din Maknas, Commercial Rights (Commercial Activities, Merchants, and the Store), Damascus University Publications, Faculty of Law, 2022, p. 244.
[20] Munther Qassem Al-Battoush, The Legal System of the Electronic Store, Master's Thesis, Department of Law, Mutah University, Jordan, 2016, p. 29.

Under this characterization:

1. The electronic store is considered an intangible asset that may be transferred, leased, or licensed.
2. It falls within the scope of legal protection for intellectual and intangible property rights.
3. It enjoys protection against unfair competition and digital piracy under electronic commerce and data protection laws.
4. In case of disputes, it is subject to the same rules governing intangible assets, and possession principles do not apply.

Conclusion

The electronic store represents an advanced form of the traditional store. Both share several aspects, particularly the presence of tangible and intangible elements. Accordingly, the electronic store can be defined as the commercial entity through which a trader conducts business via the Internet by owning and operating a website.

The obligations outlined in the Omani Executive Regulation on Electronic Commerce are not limited to organizing the relationship between the trader and the consumer; they also aim to establish a safe and reliable digital commercial environment. Compliance with these obligations constitutes a fundamental requirement for engaging in electronic commerce in the Sultanate of Oman, forming part of the broader framework that the state seeks to establish within the contemporary digital economy.

Characterizing the electronic store as a transferable digital intangible asset represents the most appropriate legal treatment, as it accounts for its technological and economic particularities. The electronic store is neither a real-asset ensemble nor does it possess an independent patrimony; rather, it is an intangible unit of digital rights protected under intellectual property law and contemporary digital regulations, especially in the absence of explicit legislative provisions in most Arab legal systems.

on the above analysis, the following findings and recommendations can be drawn:

Findings

1. The electronic store is an advanced form of the traditional store, operating through a website on the Internet.
2. The electronic store acquires commercial status by engaging in business activity, similar to the traditional store.
3. The electronic store consists of a combination of tangible and intangible assets, with intangible elements predominating.
4. The prevailing approach regarding the legal nature of the electronic store is that it constitutes a bundle of intangible property rights (a transferable digital intangible asset).

Recommendations

1. Work on developing and updating electronic systems to facilitate rapid and convenient ordering for customers.
2. Expand electronic payment methods while ensuring legal protection for consumers in cases where payment is made but the product is not delivered.
3. Develop specific legal frameworks for electronic stores to provide comprehensive legal protection for both traders and consumers.
4. Promote the development of technological infrastructure and encourage e-commerce initiatives supported by the state.

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A Grammatical- Semantic Study of All Major Parts of Speech in Selected English Children's Rhymes

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Abstract:

This study aims to explore the way of using all major parts of speech, except interjections, in selected English children's rhymes used in primary schools in Iraq from a grammatical and semantic viewpoint to identify patterns of word choice, syntactic structure, and semantic features. The descriptive qualitative method is used to examine nouns, verbs, adjectives, adverbs pronouns, prepositions, conjunctions, and determiners as they take place in an intentionally selected corpus of English children's rhymes used in primary-level instruction. Interjections and marginal categories are excluded because of their limited grammatical complexity in children's rhymes. This study analyzes lexical and functional items through their grammatical functions within clause structures and their semantic meanings in context. It is indicated via the findings that the rhymes exhibit simplified grammatical patterns, tangible semantic references and repetitive form-meaning relationships across parts of speech. The combination of grammatical simplicity and semantic expressiveness makes rhymes highly effective for developing vocabulary and comprehension skills. It is hypothesized that these rhymes may be useful to make it easy for children to learn the parts of speech and how they are used in various contexts. Because rhymes are attractive, easy to implement, and characterized by musicality and repetition, they can support children's learning of English grammar. They provide children with accessible linguistic input that may facilitate their implied comprehending of English grammatical categories in addition to semantic relations. The vocabulary used in these rhymes is usually related to children's daily experiences, which reinforces comprehension and retention. It is concluded that children's rhymes are of an amusing and energetic merit because they create a distinctive educational medium to integrate grammatical structure with meaningful expression to promote both cognitive and linguistic growth for children and enable them to develop their linguistic abilities.

Keywords: parts of speech, primary schools, children's rhymes

Introduction

In Iraq, English children's rhymes are commonly incorporated into primary school curricula as supplementary materials for introducing basic vocabulary and grammatical structures. Rhythm, repetition, and musicality are amalgamated in rhymes making them attractive, unforgettable, and effortlessly capable of being implemented in classroom settings. In particular, in the context second language learning, these properties contribute to reinforcing comprehension and retention of linguistic components. The vocabulary used in these rhymes is usually immediately connected to the child's everyday practical knowledges, while the repetitive and musical structures supply obvious form-meaning conformities. Rhymes with these properties are not just interesting but pedagogically worthy as well for presenting the structure and function of English parts of speech to young learners. To comprehend the way by which nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, and determiners function grammatically and transfer meaning semantically is helpful to supply worthy visions into the possibilities of rhymes as a linguistic input for young learners. The present study examines the way various parts of speech are realized and the way their grammatical and semantic characteristics contribute to meaning construction. Finally, this study seeks to highlight the pedagogical relevance of children's rhymes as an origin for initial English language instruction. Semantic definitions may be given to various "parts of speech" by traditional grammar. A noun is described, for instance, as "the name of a person, place or thing" and a verb as a "doing word". When adopting some criteria, ten parts of speech come into present, and they can be classified into "two broad categories", major parts of speech and minor ones (Chalker, 1984: 20-21). The five major elements of sentence "subject, verb, object, complement, adverbial" can be realized by the parts of speech (ibid: 22). Actually, the parts of speech have a propensity to be miscellaneous to some extent and also may be "problematic categories" even though they are of "deceptively specific labels." The traditional classification of parts of speech may rather be swerved from tradition to modern English. So, the article traditional category "the, a, an" may be classified under determines including the demonstratives "this, that" (Quirk et al, 1985: 73). Principal generalizations concerning the relation between parts of speech and their meaning should be taken into account even though they are of no absolute "reliability". In general, nouns are normally distinguished as "stative" because referring to stable entities can be achieved by them, whether these nouns are "concrete" such as "house, table, etc." or abstract such as "hope, botany, etc." On the opposite, it is possible to distinguish verbs, to a great extent, as "dynamic" because they are suitable to point to "action, activity, and temporary conditions" by means of their ability to reveal "tense" and "aspect". As adjectives ascribe "stable properties" to the noun referents, so they are related to them in conveying "stative meaning".

As adverbs provide the "dynamic implication" of the verb with a specific state of "time, place, manner, etc.", so they are dynamic like verbs (ibid: 74). For English language students, it is a difficult task to master parts of speech because this process of learning is in need of a lot of practice and "intelligent reading with the idiomatic eye open" (Mansour, 2011: 281). This paper focuses on the function of nursery rhymes in teaching English grammar to kids. Through combining verbs into memorable and repetitive rhymes. The aim is to make teaching grammar fun and attainable. These rhymes give kids different verbs forms and tenses throughout, encouraging active participation during music and action. The research looks at how this engaging way could aid kids in improving their grammar skills from an early age.

Ayu and Pusparini (2023: 281) state that using rhymes as a means to learn grammar is deemed successful in enhancing "students' learning motivation." Besides, when using a popular rhyme, it is possible to motivate students to take part in the process of learning in an effective way. As added by Ahmed (2014: 11), to change onomatopoeia words into verbs is considered one of the main techniques to make distinction between onomatopoeia and other words. According to Habeeb (2011: 4), the base form of the verb may be utilized in the imperative mood to express commands, appeals and requests. Lewis and Mol (2009: 22, 28) state that diurnal procedures, for young learners, are an interesting and reachable theme. "We often talk with people about the things we regularly do: about hobbies, habits, chores, and routines." This can be done by means of forms of present simple verb in company with adverbs of frequency or time indicators. Discussing regular activities also strengthens the matter of making style, some object that is extremely helpful in learning a language. Children are familiar with time very well. The actual reality that children were born provides them with a direct link in the past. From a conceptual point of view, introducing the simple past to children in the language classes is very easy. The forms of past tense is usually chosen by children throughout their rhymes. Jadhav (2015: 78) states that rhymes are helpful for students to improve their competence in reading, writing, listening and speaking skills. It is also possible to use rhymes in teaching secondary language skills such as "grammar, vocabulary and pronunciation." According to Yuliana (2003: 63) children can make use of music to improve "cognitive skills", in addition to promoting language skills, when a rhyme is sung, it will be possible for children to pick up "language appreciation, vocabulary and rhyme."

As stated by Noori et al (2023: 9) it is possible to use rhymes and games to produce multimedia contexts in order to motivate children to get involved with learning vocabulary. Consequently, they are promoted to communicate with further schoolfellows and obtain additional comprehension and details with regard to English grammar. Children can get similar possibility to participate in various actions by means of using games and rhymes in the classroom. In particular, it is possible for shy and weak students in the English language to turn into energetic components in their involvement and reciprocal action through the use of games and rhymes.

A nursery rhyme can be defined as a classic piece of poetry or rhyme mainly those produced for youthful children in countries such as Britain and many other to assist them pick up vocals, acquire a beginning in music or merely produce information with reference to their culture. Various sorts of rhymes are available such as "lullabies" sung by parents to their children at bedtime in order to hush and tranquillize infants, a group of narrative rhymes is available "for alittle grown up children such as riddles or rhymed fables, clapping rhymes, finger and toe games and so on" (Kelsy, 2016: 3).

When using rhymes in English language teaching, the most significant point be taken into account is that they are exceedingly successful being an amalgamated component of the course of study, chosen owing to their connection to each one of the vocabulary and actions during a course time and not considered "as an add-on or time-filler" (Prosic-Santovac, 2015: 40).

Method

Research Design

This study adopts a descriptive qualitative research design based upon a grammatical-semantic framework. The qualitative approach is suitable for this study because it aims to supply an in-depth analysis of the way parts of speech function grammatically and semantically in children's rhymes instead of measuring their frequency quantitively.

Data Source and Corpus Selection

The data include an intentionally selected corpus of English children's rhymes usually utilized in teaching English in the primary school in Iraq. The rhymes are selected depending on their pedagogical relevance, simplicity of language, and recurrent utilization in classroom settings at the primary stage.

Analytical Framework

A grammatical-semantic framework is used to guide the analysis where parts of speech are categorized in accordance with their syntactic functions and semantic roles. The study investigates all major lexical and functional classes, including nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, and determiners.

Procedure of Analysis

The analysis based on the following:
1. To identify and assign every lexical item to a particular part of speech depended upon its grammatical function in context.
2. To analyze, then, the identified parts of speech semantically to specify the way they contribute to meaning construction, especially with regard to action, concreteness, relational meaning, and description.

Reliability of the Analysis

For the sake of boosting the credibility of the qualitative analysis, grammatical classifications were examined by means of utilizing references of standard English grammar.

Data Analysis

There are several English children's rhymes (nursery rhymes) that can be created or modified in teaching in childhood education (Kindergarten) to be used as a medium for introducing English to children. These rhymes include:

1. Title: Reem's day

"It's morning!
Wake up, get dressed,
Eat breakfast and go on the school bus.
It's afternoon!
Read books, say rhymes,
Eat lunch and play games.
It's night-time!
Brush teeth, wash face,
close eyes and go to sleep."   (Etherton and MacBurnie, 2023: 31)

The nouns "Reem, morning, breakfast, school bus, afternoon, books, rhymes, lunch, games" help children to learn new vocabulary in terms of the names of people, objects, times of the day, and activities directly related to their daily lives. The nouns used here also assist children to improve their cognitive awareness by associating these nouns with real, tangible things. Additionally, the time markers "morning, afternoon" provide the children with an awareness of the concept of daily time and also clarify the time in which actions take place, thus helping them to organize and arrange events. The conjunction "and" is used to teach children how to connect between two verbs "eat, go" or two ideas. Conjunctions teach children how to organize and arrange events and actions which are sequential. The preposition "on' is employed to make a connection between the verb "go" and the spatial noun phrase "the school bus" and this assists children to understand spatial relationships. The use of the definite article "the" is helpful for children to distinguish a specific and well-known thing, which is "the school bus" and not any other type of bus, i.e. to pay attention to a certain object. This rhyme enables children to learn fundamental and daily verbs which they need to describe their day. This rhyme shows verbs (read, say, eat, play) in a real time context (the present), which helps the child understand the appropriate tense to use these verbs. The verbs "read', "eat", "say", and "play" are utilized in the context of well-known everyday activities. This step assists children comprehend the time and the way

these activities take place. The rhyme deals with a foreseeable routine "It's afternoon..." and saying again these usual actions assists kids accompany English verbs with the routines of their real life. In every line of this rhyme the structure "verb+ object", for example "say rhymes" is used which establishes basic grammar without being inordinate. It is possible for parents or teachers to act out the verbs or encourage children to carry out the actions "read, say, eat, play" while singing. This procedure will reinforce understanding by means of motion, i.e. using "Total Physical Response method". Children can listen to the rhyme and articulate the verbs used in a clear way. For example, "say rhymes" leads to a frisky and unforgettable sound. Semantically, the parts of speech used here make language a tool for constructing concrete life meaning. For example, nouns represent objects and times, verbs represent activities, adverbs organize events in time, and conjunctions contribute to the formation of a coherent text. Thus, children learn that language describes and organizes the real world, developing, developing their semantic understanding of everyday language.

2. Title: Bigger and smaller

"A ruler is longer than a pen,
And number 12 is bigger than 10.
A giraffe is taller than a bee,
And my mum and dad are older than me.
So I'm younger than them, you see!
A car is smaller than a van,
And I'm shorter than that man.
Let's say these words together, again:
Longer, shorter, older, younger, bigger, smaller, taller, shorter."

First of all, the nouns " ruler, pen, number, giraffe, bee, mum, dad, car, van, man" give children real, recognizable examples to build comparison on. The verbs "is, are, say, see" are used to link the nominal sentence consisting of " subject+ verb+ adjective " such as "A giraffe is taller than a bee". The adjectives " longer, bigger, taller, older, younger, smaller, shorter" are utilized to teach children the comparative form, which often ends in -er. Semantically, the text teaches children the relationships between things (length, size, age) and shows them how an adjective can change with the subject. Thus, establishing the concept of contrast between things and people in children, for example, this verse "My mum and dad are older than me" is used to show the contrast between people in age comparison relationship. Linguistically, this text enriches children with everyday vocabulary close to their real lives such as "pen, mum, dad, car, van". Also, this text introduces children to a connected set of contrasting adjectives such as" longer vs. shorter", "older vs. younger", "bigger vs. smaller", etc. and fix them in their memory through repletion and poetic rhythm. The conjunctions" and, so" are used to teach children how to link sentences and ideas together to make different relationships, i.e., "and" used to express "addition" and "so" to refer to "result".

(MacBurnie and Etherton, 2024: 15)

3. Title: This is the way...

"This is the way
I brush my teeth.
This is the way
I wash my face.
This is the way
I comb my hair.
This is the way I go to sleep."   (Etherton and MacBurnie, 2023, 42)

As pronouns are one of the first things a learner should learn because they are used frequently in conversation, therefore the first-person singular pronoun "I" is used repeatedly to teach children to express themselves in matters related to their immediate daily lives and also enable them to build simple sentences "I brush my teeth, etc.". In addition, the possessive pronoun "my" is used here over and over to enhance the social and language skills related to the self-thinking. Moreover, the demonstrative pronoun "this" is used here to teach children how to use it as a determiner to refer to a specific thing or concept that is close on known in the context. The nouns "way, teeth, face, hair" are used here to expand the child's vocabulary in direct way and enable him to connect language to his body, i.e. concrete reality. These nouns also help children to name objects in their daily life and understand the instructions.

Through this rhyme, the children may learn daily and common verbs such as "brush", "wash", and "comb". These verbs are related to the children's life and they are used by children every day which makes it easier to memorize them and link them to their behaviors. These verbs enable children to learn present simple tense to express or describe everyday routine. Singing can be combined with actions. When saying "brush my teeth", the child will imitate the movement of brushing teeth. This connection between the verb and the movement strengthens understanding and memorization. The child can connect the verbs used in this rhyme to his daily life through the daily routine. When the child washes his face in the morning, the parents or teacher can repeat it with him "This is the way we wash our face". Thus, the child understands that the language is used in his real life and not only in the classroom or the rhyme. The child can also connect the verbs used in this rhyme to his daily life through playing and acting. Scenes from the daily routine can be acted out and the child can say the verbs he heard in the rhyme, such as acting out washing the face, combing the hair, brushing the teeth, etc. Semantically, the parts of speech used in this text have an educational and semantic purpose, which is to link language to children's daily behavior and build self-awareness in them through verbs and nouns associated with them personally within a recurring linguistic pattern that fixes meaning in their minds.

4. Title: Zack's goodbye

"You like the park
And you like the zoo.
You like the big wheel!
And the market, too.
We're your friends.
So please don't go.
Zack, Zack, Zack
Zack says No.
I like your family
And I like to play.
You're my friends
But I can't stay.
I'm going home.
So please don't cry.
Zack, Zack, Zack
Zack says Goodbye."   (Quintana et al, 2014: 75)

This rhyme uses the present simple and the present progressive tenses such as "I like", I'm going" to help children distinguish between an event happening now and an event happening in general. All the verbs used in this rhyme are familiar and connected to the child's daily experience. The present progressive "I'm going" is used to express a plan "a future happening anticipated in the present". The present progressive is mainly regularly with "dynamic transitional verbs" like "go".This reinforces learning through meaning and context, not just memorization. Tho rhyme shows the negation of verbs such as "can't stay", "don't cry" and the auxiliary verb "to be" in its different forms. The construction "please don't cry" is used to refer to a hope and it is used to express a negative imperative in a polite way. The verbs used here develop the child's ability to build skills of expressing feelings such as "cry" or intentions such as "going home", which helps the child's understanding of how verbs can be used to express emotions and desires. Most of the verbs used in this rhyme are in the simple present tense, which give it a direct and simple feel. Using some verbs like "I'm going home", "can't cry" to express parting in a nice but sad way. The nouns used here are useful to teach children how to refer to persons such as "Zack", places such as "home", and concrete things such as "family, friends". The use of these nouns gives children new vocabulary and assists them associate sentences with reality and tangible concepts. The use of pronouns "I, my, you" helps children how to express themselves "I", address others "you" and referring to possession using possessive pronouns "my". However, the conjunctions used here "and, but, so" are useful for children to make a relationship between sentences and ideas and enable them to understand the relationship between sentences, whether it is addition "and", result "so" or contrast "but".

The noun "goodbye" is used to teach children to express their feelings, especially goodbyes and develop their emotional intelligence. Semantically, this rhyme reflects an important emotional experience, which is farewell and holding on to a friend, and this develops the social and emotional awareness in children. The use of pronouns teaches children the difference between the pronoun "you" which is used here as a second person pronoun and the pronoun "we" used as plural first person pronoun. Moreover, children learn the role of a noun as a subject such as "market" or a direct object such as "park, zoo, wheel, etc."

5. Title: Clean up the park!

"On Saturday Ali and his friends
clean up the park.
They pick up the litter.
They empty the bins.
They cut the grass.
They sweep up the glass bottles.
They water the flowers."   (Etherton and MacBurnie, 2023: 59)

The use of verbs in this direct and simple rhyme may be effective for children to learn English language because of several educational and linguistic reasons. This rhyme introduces children to a set of practical verbs used in everyday life such as "clean up", "pick up", "empty", "cut", "sweep up", and "water". This increases their vocabulary and makes more prepared to comprehend and utilize this vocabulary in daily situations. By singing the rhyme, children practice pronouncing verbs correctly, which improves their clarity of speech and confidence when speaking English. The rhyme links every verb to a context in the real life, such as "cleaning up the park". This procedure supports the child's comprehension of the practical meaning of the verbs rather than only theoretical memorization. The use of verbs in the present simple tense such as "They pick up", "They empty", etc. enables children to learn how these verbs can be used with pronouns such as "they" correctly, which supports his understanding of grammar in a natural way. After listening to the rhyme, the parents or teacher can ask "What do they do in the park?", "What do they water?", etc. thus encouraging the child to make use of verbs in sentences from his personal life. The repeated use of the plural third person pronoun "They" help children identifying the subject of the sentence and how it is related to the verb to produce complete sentences expressing many actions or events. This teaches children to construct correct grammatical sentences (subject+ verb+ object/complement) such as "They pick up the litter", which enhances their language skills. The use of the preposition "on" teaches children that this preposition is exclusively required with days of the week "Saturday" and this helps them to understand temporal relations. The definite article "the" is utilized here to refer to

specific or known objects such as "park, litter, bins, grass, etc." and this teaches children to distinguish between definite and indefinite nouns, and understand the subtle differences between general and specific meanings. The function of object of the sentences given here is achieved by means of nouns such as "park, litter, flowers, etc.", so that children will learn in turn how to connect verbs to their nouns, i.e. objects, to build grammatical sentences correctly. The use of nouns here "park, litter, bin, grass, bottle, flower" assists children understand the intended activity and connect between language and the real world around them. From a semantic point of view, the parts of speech instil in children the value of cooperation and the value of preserving the environment through verbs of cleanliness and caring for nature such as "clean, empty, sweep, etc.". Consequently, these parts of speech serve an educational purpose, both morally and semantically, by teaching children language and reinforcing their positive behaviour toward the environment.

6. Title: On a school trip

"We're on a school trip,
And we're having fun!
I'm drawing, she's sleeping,
They're writing, he's reading.
We're on a big train,
And we're having fun!
I'm singing, she's talking,
They're eating, he's drinking.
We're on a school trip,
And we're having fun!"   (MacBurnie and Etherton, 2024: 63)

This rhyme contains a collection of simple and familiar verbs such as "drawing, sleeping, writing, reading, singing, talking, eating, drinking". These verbs have great educational benefits for children, especially when used in a fun context such as this rhyme. These verbs are used in the present progressive tense, which helps the child understand this tense well and use it to describe ongoing activities. For example, "I'm drawing" teaches the child how to express what he is doing now. This rhyme introduces common verbs in the child's daily life, which helps him connect the language to real life such as "eating, drinking, reading, etc.". This rhyme presents simple and correct grammatical structures, which helps the child learn to construct sentences correctly. Through this rhyme, the child learns how to express what he does "I am drawing" and what others do "she is sleeping; they are writing", which supports social communication skills. The child learns how to use different and appropriate pronouns "I, she, they, he, we" with verbs, which helps him distinguish between the speaker, the addressee, and the absent person. Children learn to make an agreement between the subject as a singular or plural pronoun and the verb which comes with it.

Focus on the present continuous tense using"am/is/are+ v-ing" , which develops children's understanding of time. The nouns " school trip, train, fun" lead children to know that they are used here as objects or as genitives to specify the place and time of the event. Semantically, children learn that progressive verbs reflect the diverse activities undertaken by individuals, indicating the diversity of interests during the trip. On the other hand, the nouns " school trip, train, fun" define the spatial and semantic framework and thus establish the meaning of the event and the pleasure. The pronouns "I, she, they, he, we" reinforce the concept of the group and the individual, and thus develop children's awareness of the distinction between the singular and the plural.

7. Title: When I grow up

"Some day, one day when I grow up,
I'll have a job to do.
I'll write a book or be a cook,
Or work in a zoo.
I think I could drive a bus, "
Or be a busy nurse.
I'll fly a plane or drive a train,
Or be a doctor and help people again.
I think I could be a teacher,
And help children to read.
Or I could be a farmer,
And grow some vegetables seed.
There are so many jobs I could choose,
But I'm not sure what I'll be.
So now I'll work and learn,
Until it's my turn
To find the best job for me!"

(MacBurnie, 2018: 109)

Parts of speech are useful for children to comprehend sentence structure, for example, "I'll have a job" consists of a subject: I'll+ verb: have+ direct object: job. This rhyme teaches children and helps them to recognize verbal sentences such as "I think I could drive a bus".

This rhyme contains many important verbs such as "write' be, work, drive, fly, help, learn, etc." that provide significant educational benefits for children. These verbs help to expand vocabulary by introducing children to new vocabulary related to real life and professions, helping them comprehend the world around them. This rhyme teaches children to use the verb in the appropriate time, as it uses verbs in the simple present and simple future tenses. Some verbs are used in the simple present "I think I could be…", allowing the child to comprehend the different uses of tenses in the language.

Using the future "I'll write, I'll be, I'll work" gives an "idea of future dreams and ambitions. Each verb "write, cook, drive, fly, teach" is associated with a specific profession, which assists the child to imagine various parts he is able to attain in the future, and consequently developing imagination and self-confidence. This rhyme provides simple, easy-to-remember sentence models that help children learn to form English sentences correctly by using the appropriate verb. In short, the benefit of the verbs in this rhyme lies in enhancing language skills, expanding the child's imagination, and teaching him how to use verbs to express ambitions and future dreams. From a language viewpoint, children learn new vocabulary and its categories, for example, all the nouns used here " book, cook, zoo, bus, nurse, plane, train, doctor, teacher and farmer" refer to jobs or tools, which assist children to create a relationship between the new vocabulary and their real world. Additionally, children learn about conjunctions utilized here such as "or, and, so, until, when" and chronological order. Finally, the prepositions "in, until, for" are used here to refer to a spatial singular noun "zoo", refer to a time" until it's my turn ", or refer to a purpose " for me".

8. Title: Grapes and apples

"Grapes and apples,
Salad and soup,
Dates and pears,
Bread and cherries,
Chicken and cheese,
Meat and rice...
All these things are very nice!
Are there any lemons for my tea?
Are there any cakes just for me?
Is there any ice cream? It's so hot!
If there is, I would like a lot!
Are there any eggs?
Is there any fish?
Please put these things in a dish!"   (MacBurnie et al, 2024: 72)

First of all, the advantage of using nouns here such as "grapes, apples, salad, soup, dates, pears, cherries, cheese, cakes, eggs, fish, etc." is to help children expanding their vocabulary related to food, which enhances their awareness of the things around them. Secondly, the use of these nouns helps children to distinguish between countable "apples" and uncountable nouns "meat" and between plural "cakes" and singular nouns. In addition, children learn to link words and ideas using the conjunction "and", which is a simple but important tool in building sentences(addition). The benefit of using pronouns by children is to consolidate the use of personal pronouns such as "my, me, I" and pronouns that indicate place and existence such as "there".

The use of verbs here is to introduce children to simple, everyday verbs such as "are, is, put" and to teach them the polite form of requests "I would like". From a semantic point of view, the use of parts of speech here encourages children to express their wishes and needs in simple language. Also, the use of parts of speech indirectly inculcates the concept of nutrition and food diversity in children.

9. Title: The Challenge Cup

"How do we win the Challenge Cup?
We have to clean the room.
What do we need to win the Cup?
We need a bucket, bin and broom.
How do we win the Challenge Cup?
We have to make a cake.
What do we need to win the Cup?
We need sugar, flour and egg.
How do we win the Challenge Cup?
We have to write a letter.
What do we need to win the Cup?
We need a pencil, pen and rubber.
How do we win the Challenge Cup?
We have to sing this rhyme.
What do we need to win the Cup?
We need friends to sing along!"   (MacBurnie and Etherton, 2024: 103)

The verbs used here such as "clean, make, write, sing" teach children the function of each verb whether it is action or activity and show that each task has a different verb. On the one hand, the nouns employed here such as " bucket, bin, broom" show children the role of the noun as a tool, while the nouns such as " sugar, flour, egg" show children a physical thing they need. On the other hand, pronouns such as "we" encourage children to develop a sense of community and teach them the concept of subject plural pronouns. From a vocabulary point of view, children will learn vocabulary related to everyday life, such as cleaning tools, cooking ingredients, and writing utensils. Repletion in each verse of the rhyme reinforces new words and makes them easier to memorize. Diversifying between different contexts such as " home, kitchen, school, singing" enriches children's personal vocabulary. The use of parts of speech helps children connect words to a real-life context, so they don't remain isolated from reality. Symantically, each verse in the rhyme teaches the child how to link the required verb with the necessary tools. This enhances children's understanding of the relationship between purpose, activity, and means. Closing the rhyme with this verse "We need friends to sing along!" expands the meaning for children to include social values such as cooperation and friendship. Consequently, this will teach children

that language is not just words, but a means of thinking, problem-solving, and communication. In short, the use of parts of speech here develops in children a grammatical awareness of how sentences are formed and a rich vocabulary related to the variety of things and actions.

Conclusion

This study aimed to investigate the grammatical and semantic realization of all major parts of speech in selected English children's rhymes utilized in primary schools in Iraq. Using a qualitative grammatical-semantic analysis, the study showed the way both lexical and functional categories are systematically stood for in rhymes and the way they contribute to meaning construction within repetitive and simplified linguistic structures. It is demonstrated through close textual analysis that children's rhymes make use of understandable and accessible grammatical patterns in which nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions, and determiners function in semantically clear processes. Children's rhymes are particularly appropriate to introduce basic features of English grammar in an attractive and accessible method because of their simplicity, contextualized vocabulary, and patterned structures. In the Iraqi EFL context, where there may be limitations to use and learn English outside the classroom, rhymes are able to supply meaningful and interesting input to back up recognition of initial English grammar. The analysis revealed that nouns and verbs are the most dominant parts of speech and they are used to reflect children's everyday activities, routines, and social environments. Adjectives, including comparative forms, are utilized to describe size, age, and quantity, while pronouns, prepositions, conjunctions, and adverbs contributed to sentence cohesion and clarity. Semantically, the rhymes take care of tangible and accustomed meanings connected to school life, family, food, hygiene, community responsibility, and future aspirations, which reinforce vocabulary development and comprehension. Accordingly, these rhymes serve not only as attractive literary texts but as a worthy pedagogical device as well for presenting and enhancing major parts of speech in early English language instruction. The descriptive qualitative analysis emphasizes that the selected English children's rhymes successfully combine grammatical form with semantic content, reinforcing their instructional usefulness in the Iraqi primary school context. The rhymes selected in teaching children in primary schools in Iraq are supportive for modern goals in childhood education. When a foreign language like English be introduced to small children in Iraq, it is necessary to use rhymes that make them enthusiastic for the learning process and also that provide them with a good cultural information of that country. Multifaceted and multifunctional rhymes can help enriching and activating the classroom, because all children like them to a great extent.

This kind of love should be taken into consideration to enhance children's language. In primary schools in Iraq, rhymes are of important benefit to teach English as a foreign language. Rhymes have the ability to create a good relationship between main didactic values and enjoyment, life, and stimulation. It is necessary to ensure the benefit of the fundamental vocabulary used in a rhyme before giving it to children to make sure that the subject matter is comprehensible. It is important for all English teachers in Iraq and other countries to take the great advantage of rhymes into account and make them as a lasting component of their classroom's English lessons. It is possible to teach children by means of the amusement activity because their nature is playing and having fun. The use of rhymes provides teachers with the strong device that enables them to achieve their job in a proper way. Grammatically, establishing correct sentence structure in children can be achieved by means of using parts of speech in children's rhymes. Children learn to use verbs, nouns, adjectives, pronouns, prepositions, conjunctions, etc. in short, repetitive sentences, thus helping them understand the word order in English sentences (subject+ verb+ object/complement). Semantically, parts of speech help children build a relationship between the verb and the subject or between the adjective and the noun, which develops their semantic awareness. Through the example of, "A ruler is longer than a pen," children learn the meaning of "longer" through comparison and so on. Lexically, using a variety of parts of speech in children's rhymes helps them expanding their vocabulary as they learn the names of new objects, verbs, and adjectives in a fun and easy-to-remember way.

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The Impact of Artificial Intelligence-Driven Decision Making on Organizational Performance in Emerging Markets

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Introduction

Decision-making powered by Artificial Intelligence (AI) has become one of the disruptive elements of the modern organization, inherently redefining the decision-making process of strategic, tactical, and operational choices and their implementation. AI-driven decision-making is the application of high-level computing methods like machine learning, predictive analytics, natural language processing, and intelligent automation to assist or even fully automate managerial decisions. These applications help organizations to predict the demand, allocate resources efficiently, evaluate risks, improve service delivery, and create personalized strategies with speed and precision that is beyond the capabilities of traditional decision-support systems (Amiri et al., 2025). Consequently, AI has been progressively put at the forefront of organizational competitiveness and sustainability.

In this discussion, organizational performance is viewed as a multidimensional concept where it involves financial (including revenue growth, profitability and return on assets), operational efficiency, innovation capacity, customer satisfaction and competitive positioning in general. Recent research highlights that AIs can also be used to improve performance and quality of decisions, in addition to alleviating uncertainty and becoming responsive to environmental changes in real-time (Hughes et al., 2023; Grimaldi et al., 2025). But these effects do not have the same magnitude and direction in various institutional and economic conditions.

The emerging markets, such as the Middle East, Latin America, Africa, and South Asia, are distinct in their economic, technological, and organizational aspects that define the use of AI and its success. Such economies are usually typified by great volumes of economic fluctuation, institutional unpredictability, insufficient digital infrastructure, information lack, abilities deficit, and regulatory laxities. Simultaneously, they show a

fast-growing mobile technology, digital, and e-government development with the chance of technological leapfrogging (Abou-Moghli and Shatem, 2024; Fischer-Abaigar et al., 2024). This is a two-sidedness that places emerging markets as an environment of high potential and high risk in terms of AI-driven decision-making.

In this case, AI has a great potential to reduce the disparity in productivity, increase the efficiency of the public and private sector, and to increase governance and service delivery. According to the evidence of healthcare, telecommunications, public administration, and ICT sectors, it is possible to enhance agility, resilience, and accuracy of decisions using AI-enabled systems even in conditions of uncertainty (Almeida et al., 2026; Chairuddin et al., 2026). As an illustration, AI-based healthcare information systems have been demonstrated to aid clinical and managerial decision-making resulting in improved resource utilization and quality of services (Amiri et al., 2025). Equally, AI-based e-governance programs have the potential to improve transparency, accountability, and citizen satisfaction of developing economies (Abou-Moghli and Shatem, 2024).

Even with these likely advantages, the deployment of AI-based decision-making in new markets is not quite uniform and uncontested. The realization of the full value of AI is usually limited by organizational resistance to change, ineffective data governance structures, ethical issues, and safety issues, misalignment of technology and strategic leadership (Atoum et al., 2024; Butlewski, 2026). Poorly developed or unresponsibly managed AI systems, in certain instances, can solidify existing inequalities, increase biases, or generate new types of organizational risk, especially where there is weak institutional regulation over them.

The main issue of the research is that, although AI-based decision-making has proven to have a positive influence on the organizational performance in the developed economies, its influence in the emerging markets is under-explored and empirically dispersed. According to existing research, the results are rather mixed, and the benefits are often dependent on the mediating organizational variables, including the productivity of employees, the level of digital skills, leadership capacity, organizational agility, and change management practices (Al-Hamli and Al-Marhdi, 2024; Hughes et al., 2023). This literature gap restricts theoretical knowledge and practical advice to organizations that face the volatile and resource-constrained environments.

This paper, therefore, analyzes the impact of the AI-based decision-making on organizational performance in the new markets with specific focus on the mediating factors of performance in terms of productivity, agility, and organizational capabilities. This study will attempt to create a more distincted assessment of when and how AI can produce performance outcomes by aggregating evidence on the topic across sector-specific studies, such as healthcare, ICT, public administration, and engineering-intensive industries (Amiri et al., 2025; Atoum et al., 2024).

Moreover, the research study provides the most important obstacles to successful AI implementation and suggests both strategic and managerial solutions that can improve positive performance and reduce risks.

The research questions of the study are as follows:

·What is the relationship between AI-driven decision-making and the quality of decisions and the performance of organizations in new markets?

·What are the mediating variables that affect the relationship between AI and performance? (Employee productivity, organizational agility, change management, etc.).

·What are the obstacles to the successful application of AI in emerging economies, and what can be done to overcome these obstacles?

Answering these questions, the paper is expected to add to the existing literature on AI and organizational performance, providing context-specific information that can be used by the policymakers, managers, and scholars who might be interested in the topic of technology-driven change in the emerging markets.

1. Theoretical Framework and Literature Review.

The connection between artificial intelligence (AI)-based decision making and organizational performance has gained growing academic interest, especially as organizations enter the periods of uncertainty, digital disruption, and competition. In an attempt to understand the role of AI in generating sustained performance benefits, and in particular in the emerging markets, this research relies on three complementary theoretical perspectives: the Resource-Based View (RBV), Dynamic Capabilities theory, and the Technology–Organization-Environment (TOE) framework. Collectively, these views allow developing a very strong base to comprehend the potential role of AI in value creation as well as the contextual aspect of its use and results.

The relationship between AI-driven decision-making and organizational performance has received growing academic attention, particularly in contexts characterized by volatility, digital transformation, and intense competition. The study uses three theoretical perspectives, which include the Resource-Based View (RBV) theory and Dynamic Capabilities Theory and Technology-Organization-Environment (TOE) Framework, to explain how AI creates lasting performance benefits for emerging market companies.

1.1 Resource-Based View (RBV) and AI-based Decision-Making.

The Resource-Based View assumes that organizations can obtain a lasting competitive advantage by obtaining and implementing the valuable, rare, inimitable, and non-substitutable (VRIN) resources. In this context, AI-based decision-making systems can be theorized as strategic resources, which can provide better organizational performance by increasing information processing performance, decision accuracy, and strategic foresight (Grimaldi et al., 2025). Compared to generic IT resources, AI capabilities, when entrenched in organizational practices, information infrastructure, and knowledge of management, are hard to imitate by rivals.

Recent publications underline that AI-based decision systems are not only beneficial in terms of automation, but also in terms of how they will convert data into information that can be acted upon. Grimaldi et al. (2025) state that entrepreneurship guided by data should be based on AI-driven decision-making to discover opportunities, make optimal resource utilization, and become more innovative. Whereas resource constraints and institutional uncertainty are common in emerging markets, AI may be a leverage mechanism to ameliorate shortfalls on capital, infrastructure, or market transparency. Nonetheless, the RBV also states that the presence of AI technologies is not a sure-footed factor to increase the performance level, but instead the competitive advantage is conditional on complementary human capacities, organizational culture, and strategic alignment.

According to the RBV, organizations achieve sustainable competitive advantage through their development and implementation of resources which possess value and rarity and inimitability and non-substitutability (VRIN) attributes (Barney, 1991). AI-based decision-making systems function as strategic resources which empower organizations to improve their information processing abilities and achieve better decision-making results and stronger prediction capabilities and advanced strategic planning skills (Grimaldi et al., 2025). The RBV demonstrates through empirical research in developing countries that AI capabilities deliver major performance advantages to companies particularly in data-intensive industries like e-commerce, by enhancing their competitive strength and boosting their operational productivity (Chen et al., 2022).

1.2 The Dynamic Capabilities Theory amid Changing and unstable environments.

The Dynamic Capabilities theory is a theory which expands the RBV as it focuses on the capacity of an organization to combine, develop and redesign internal and external competences in accordance with the fast-evolving environment. This point of view is especially applicable to new markets, which can be described by volatility, regulatory unpredictability, and external shocks.

The use of AI in decision-making is a solution that improves dynamic capabilities by increasing the strengths of three fundamental processes: detecting the presence of opportunity and threats, leveraging opportunities by responding in time, and changing organizational structures and organizational processes (Almeida et al., 2026).

Empirical data indicate that AI-assisted analytics and decision support technology can enhance the agility of organizations, as organizations can respond to changes in the environment more quickly and create more adaptive strategic plans. In their study, Almeida et al. (2026) show that data-driven innovation and digital decision systems played a critical role in improving organizational resilience and agility in post-COVID public hospitals in Brazil. Even though the study is focusing on the health sector, the findings can be generalized to other organizational settings in the developing economies where there are the same constraints and uncertainties. Artificial intelligence-based decision-making is therefore a facilitator of dynamic capabilities, where organizations can constantly align their strategies and operations in turbulent markets.

Dynamic Capabilities Theory extends RBV by showing that organizations need to detect emerging possibilities and dangers and then implement immediate solutions while they adapt their resources and operational systems to handle unstable conditions (Teece et al., 1997; Almeida et al., 2026). The decision support systems which operate through AI function as fundamental technologies that support organizations to implement their processes of sensing and seizing and transforming because they provide organizations with the ability to perform analytics in real time and create simulation scenarios and execute dynamic strategic plans. Research consistently demonstrates that firms actively investing in AI technologies achieve measurable increases in labor productivity, with particularly pronounced effects in SMEs and service sectors — both highly represented in emerging markets (Damioli et al., 2021).

1.3 Technology-Organization-Environment (TOE) Framework.

Whereas RBV and Dynamic Capabilities describe the creation of value by AI, the Technology-Organization-Environment (TOE) describes the reasons and the process through which organizations adopt AI in the first place. TOE framework assumes that there are three interconnected dimensions that determine technology adoption: technological preparedness (e.g. data availability, infrastructure), organizational aspects (e.g. leadership support, skills, culture) and environmental factors (e.g. regulation, competition, institutional pressure). This model applies in particular to small and medium-sized businesses (SMEs) and state-owned institutions in developing countries, where the barriers to adoption can be quite high.
Empirical research on the emerging economies has repeatedly indicated that the impact of organizational and environmental factors on the translation of the AI-based decision-making into performance improvements is decisive.

Indicatively, Al-Hamli and Al-Marhdi (2024) establish that information technology and AI implementation in the Yemeni telecommunications companies had statistically significant positive effects on strategic performance, mainly through the enhancement of resource distribution and planning in the situation of political and economic instability. On the same note, Abou-Moghli and Shatem (2024) determine that the use of AI to improve e-governance services in Jordanian ICT organizations reinforced the implementation of the strategy and the quality of decisions, which underscores the significance of institutional support and leadership commitment.

The TOE framework demonstrates that organizations need three interrelated contexts to achieve successful technology implementation which generates positive operational outcomes. The first context requires organizations to establish their technological readiness through available infrastructure and reliable data. The second context needs organizations to develop their operational capabilities through executive management support and employee expertise and organizational values. The third context requires organizations to deal with environmental pressures which include regulatory requirements and market competition and institutional dynamics. (Tornatzky & Fleischer, 1990) This viewpoint holds particular relevance for developing nations because their inadequate infrastructure and incomplete regulatory framework and missing institutional structures create barriers to achieving AI advantages. (Abou-Moghli & Shatem, 2024; Ade-Ibijola & Okonkwo, 2023; Al-Hamli & Al-Marhdi, 2024).

1.4 Improvement in Performance and Productivity.

- Chen et al. (2022) — in terms of the RBV approach, the overall firm performance in e-commerce is improved significantly due to AI capabilities.
- Damioli et al. (2021) — AI patenting firms are more productive in terms of labor, and the effects are more pronounced in SMEs and service sectors.
- Al Naqbi et al. (2024) — Generative AI tech results in high productivity in the workplace through the automation of tasks and cognitive benefits in various industries.
- Ekuma (2024) — Systematic review demonstrates that AI and automation transform the current human resources development practices, which result in better employee performance and company outcomes.
- Amiri et al. (2025) — AI-based healthcare information systems enhance the efficiency of the operations, resource distribution, and quality of care.
- Almeida et al. (2026) — DSS-based decision-making enhanced agility and resilience of post-COVID Brazilian state-owned hospitals.
- Al-Hamli and Al-Marhdi (2024) — IT/AI implementation resulted in better strategic performance of Yemeni telecommunication companies even in the face of extreme instability.
- Abou-Moghli and Shatem (2024) — e-governance in Jordan with the help of AI improved the consistency of decisions and their strategic directions.

1.5 Employment and Workforce Effects.

- Abuselidze and Mamaladze (2021), Cp — Comparative pre- and during-pandemic analysis AI increases the rate of displacement of routine jobs, and creates new skills demanded.
- Acypreste and Paraná (2022) — The systematic review finds that AI is likely to destroy more jobs than it will generate in the developing economies in the short-to-medium term.
- Braganza et al. (2021) — adoption of AI has consequences on psychological contracts, employee engagement, and trust, which might become negative without adequate management.

1.6 Intermediating Mechanisms and Requirement Barriers.

- Atoum et al. (2024) — Technology adoption has a strong mediating role on performance through strategic leadership and effective change management in higher education.
- Butlewski (2026) — Demands the introduction of human-centered and realistic AI integration as the means of protecting the well-being of employees and guaranteeing sustainable results.
- Ade-Ibijola and Okonkwo (2023) — In the African contexts, the key limitations are infrastructure inadequacies, absence of skilled personnel, poor data ecosystem, ethical threats, and absence of AI policy frameworks.
- Ahmed et al. (2020) — Knowledge sharing and employee engagement turned out to be important mediating factors of performance in digital transitions caused by the crisis.

1.7 Methodological Advancements

The recent approach to the methodological literature offers strict principles of investigating complicated mediation patterns in this field:

Becker et al. (2023), Benitez et al. (2020), Cheung et al. (2023), Chin et al. (2010) — Becker et al., Benitez et al., Cheung et al., and Chin provide the state-of-the-art suggestions in terms of Partial Least Squares Structural Equation Modeling (PLS-SEM), which is most appropriate in the current research of the emerging market with many mediators.

1.8 AI-Based Decision-Making and Organization Performance: Overview Evidence

The wider literature offers a lot of information about the fact that AI-based decisions result in better organizational performance through the factors of speed, consistency, and prediction reliability. The cognitive bias is minimized by AI, and

a vast amount of data is processed in real time, and insights are produced that aid proactive decision-making, as opposed to reactive decision-making. Empirical research indicates that companies that use AI-based decision aids can attain efficiency and revenue increase of between 10 percent and 25 percent especially in data-centric industries (Amiri et al., 2025).

Amiri et al. (2025) demonstrate that AI-informed choices make healthcare information systems more efficient regarding operational processes, resource distribution, and service quality. Even though these results are placed in the frame of healthcare, the underlying processes, which are predictive analytics, automation, and decision support, can be applied to organizational settings like logistics, manufacturing, education, and the public administration. Furthermore, AI assists in knowledge generation and innovation by helping organizations to detect patterns, experiment with new business models, and take advantage of business opportunities (Grimaldi et al., 2025).

1.9 Evidence of Emerging Market and Sector Studies.

The potential and sophistication of AI-based decision-making is emphasized in emerging markets by empirical evidence. Sector-specific research demonstrates that, leadership quality, change management, and organizational readiness usually mediate performance gains. Atoum et al. (2024) observe that in institutions of higher education, which are prevalent types of organizations in emerging economies, strategic leadership and quality change management are highly mediating factors that can determine how technology is adopted and how it is related to organizational performance. This indicates that those decisions that are made by AI are best applied when they are incorporated into conducive systems of governance and leadership.

This is also supported by studies conducted in the public sector. Chairuddin et al. (2026) show that AI applications in university governance, e.g., prediction mapping and performance analytics, help to increase transparency and strategic planning. Similarly, Fischer-Abaigar et al. (2024) claim that AI-based decision toolkits can address the governance gap in the situation with the institutional void on the condition of the existence of ethical principles and capacity-building systems. These results highlight the sensitivity of AI results in the new economies.

1.10 Mediating Mechanisms: Productivity, Agility, and Human-Centered Integration

A growing body of literature suggests that AI-driven decision-making rarely affects organizational performance directly; instead, its impact is mediated by intermediate organizational capabilities. Two of the most frequently cited mediators are employee productivity and organizational agility. AI automates routine and repetitive tasks, freeing employees to focus on strategic, creative, and problem-solving activities.

This reallocation of human effort enhances productivity and decision quality, particularly in resource-constrained environments such as emerging market SMEs.

Organizational agility represents another critical mediating mechanism. AI enables real-time monitoring, scenario analysis, and rapid decision cycles, which are essential for organizations operating in volatile markets. However, recent studies caution that without a human-centered approach, AI adoption may lead to resistance, skill obsolescence, or ethical concerns. Butlewski (2026) emphasizes the importance of non-utopian, human-centered AI frameworks that balance efficiency gains with worker well-being and safety, ensuring sustainable integration rather than short-term performance improvements.

1.11   Research Gaps and Conceptual Implications

Despite increasing scholarly interest, the existing literature contains essential research gaps. Researchers have not sufficiently studied how AI technologies affect decision-making processes in emerging market small and medium enterprises because they lack complete longitudinal data about these technologies, which includes various sector-specific risks that need more research (Hughes et al., 2023). The current research studies concentrate on adoption results instead of evaluating decision-making effectiveness and operational success factors. The research needs integrated frameworks which connect strategic organizational environmental elements according to the study's proposed approach.

The research creates an all-encompassing theoretical model which combines RBV Dynamic Capabilities and TOE framework to investigate the effects of AI-driven decision-making on organizational performance in emerging markets while showing the pathways that connect these two elements and the constraints that exist in each specific situation.

The research shows that established economies experience direct performance improvements through AI-based decision making according to multiple studies which include Chen et al. 2022 Damioli et al. 2021 and Al Naqbi et al. 2024. The research from emerging markets shows inconsistent results which depend on specific contextual factors and the readiness of organizations to implement changes through their leadership and change management and digital skills and their organizational infrastructure and their ethical and regulatory development (Abuselidze & Mamaladze 2021 Acypreste & Paraná 2022 Ade-Ibijola & Okonkwo 2023 Ekuma 2024 Atoum et al. 2024). Research studies which focus on specific sectors face challenges because they need to establish direct pathways for their analysis while testing their mediation processes.

The present study delivers its contribution through its process of combining dispersed research findings to develop an integrated RBV–Dynamic Capabilities–TOE framework which specifically serves the needs of emerging-market research. The study focuses on understanding how employee productivity and organizational agility and change management practices connect with each other while the study identifies specific obstacles which exist within the particular context. The study development generates new theoretical insights which help managers and policymakers while advancing research for future studies.

3. Methodology

This is a conceptual/review paper using secondary sources: academic databases, journals (e.g., Problems and Perspectives in Management, Government Information Quarterly), and reports. The sources examine emerging and developing contexts which include Jordan Yemen Brazil and the various reviews of these two countries. The study combines both qualitative and quantitative results to examine mediation effects which were studied through PLS-SEM methods in comparable research. The study depends on existing information as its main source of data although the researchers suggest that subsequent research should use empirical methods through surveying participants in Egypt.

4. The Benefits of AI-based Decision Making in the Emerging Markets.

Decision-making in the realm of artificial intelligence (AI) has become a strong source of organizational performance in new markets where uncertainty, volatility, and resource limitations increase the demand of accurate and timely decisions. Among the most obvious and apparent positive effects of AI, one can distinguish the improvement of the quality and efficiency of decisions. AI systems can quickly process significant and diverse databases, and companies can make forecasts, risk evaluation, and strategic options in real-time. Such capabilities greatly decrease the decision latency and enhance accuracy in uncertain market environments. As Amiri et al. (2025) prove, AI-based analytics can lead to better predictive accuracy and more accurate decisions because it reduces the cognitive bias in people and increases their predictive effectiveness. Despite their scope of study being on healthcare information systems, the decision-making rationale can be applied to organizational setting in emerging economies.

These findings are supported by empirical evidence of Middle Eastern regions. IT- and AI-based decision systems improved the responsiveness of the strategic decisions and maximized the allocation of resources in Yemeni telecommunications companies amidst political instability and economic uncertainty (Al-Hamli and Al-Marhdi, 2024). In a similar fashion, Abou-Moghli and Shatem (2024) determine that e-governance and ICT solutions in Jordan were enhanced by AI and positively affected the level of

strategic alignment and decision consistency by introducing real-time performance indicators to managerial operations. These examples demonstrate the importance of AI-driven decisions in the situation when a delay or inaccurate decision can have disproportionately bad outcomes.

Another important performance aspect that can be affected by AI-driven decision making is operational gains. Mechanization of repetitive and regular operations will lower the costs of operation, lessen wastage, and increase the uniformity of the process. Predictive decision tools are useful in manufacturing and logistics-oriented emerging economies to optimise supply chain, inventory control and preventive maintenance. The use of such applications enhances productivity and ability to withstand disruptions in supply and infrastructure constraints. Based on the experience of developing market SMEs, AI-assisted systems of operational decisions have led to efficiency and revenue growth in the event of adoption with commitment and managerial readiness to adopt digital technologies (Hughes et al., 2023).

In addition to efficiency, AI-based decision-making enhances innovation and competitiveness due to the opportunity to develop new business models and entrepreneurship. Innovation in other sectors of fintech and agri-technology is supported by AI in emerging markets where information-driven insights can enable organisations to access low-served markets and become more inclusive. According to Grimaldi et al. (2025), data-driven entrepreneurship facilitated by AI analytics can enable organizations to detect new opportunities, test new value propositions, and expand innovations faster. Consequently, the decisions made through AI are seen as a source of competitive difference but not as a cost-cutting tool.

Notably, organizational capabilities tend to mediate the positive effects of AI on the performance of an organization. The productivity of employees is boosted by the automation of routine tasks, which ensures that human resources are not occupied with these routine tasks, thus are able to engage in strategic, analytical, and creative tasks. Another important mediator is organizational agility. It is demonstrated by Almeida et al. (2026) that data-driven decision-making facilitated agility and resilience of Brazilian publicly funded hospitals in the post-COVID era, allowing the rapid response to the crisis and adaptive resource distribution. Strategic leadership and change management in higher education institutions enhance the performance advantages of adopting technology and focus on the importance of having governance structures to actualize the value of AI (Atoum et al., 2024). Furthermore, AI-assisted university governance trends including predictive mapping and performance analytics are also factors in administrative innovation and strategic planning (Chairuddin et al., 2026).

Lastly, the need of human-centered AI integration is emphasized in recent literature. The use of ergonomics would synchronize AI-driven decision systems to match the

capabilities of the workforce, improving the welfare of the employees and making sure that the performance is sustainable (Butlewski, 2026). These advantages are further enhanced by public sector efforts that offer AI-based decision toolset to enhance transparency and coherence in situations of governmental void (Fischer-Abaigar et al., 2024).

5. Issues and Problems of AI-Based Decision-Making.

Although having such a great advantage, AI-based decision-making in new markets is associated with various challenges and risks that can limit its usefulness or even increase existing inequalities. One of significant barriers is the lack of digital infrastructure and low quality of data. The systems of AI systems are founded upon precise, prompt and thorough data, and numerous developing economies have incoherent information systems and poor data regulation. There is empirical evidence that in Yemen and Jordan there is a lack of data and infrastructure that decreases the predictability value and strategic usefulness of AI-based decision systems (Al-Hamli and Al-Marhdi, 2024; Abou-Moghli and Shatem, 2024).

There are also skill gap and resistance to AI in the organization. Making quality decisions based on AI should be accompanied by digital literacy, analytical skills, and readiness to change within an organization. In most organizations in an emerging market, the employees might not have the skill required to process the output of AI or feel threatened by AI with regard to their employment. Research in the higher education field has shown that without effective leadership and well-organized change management, introducing technology in terms of its performance improvement is not likely to have significant effects (Atoum et al., 2024).

There is also a great risk of a threat of ethical and regulatory problems. The decisions made by AI can be biased, especially when it comes to the diverse population, and can bring up the issues of data privacy and transparency. The low regulatory levels in new markets make it more likely that AI will be abused or, at best, advantage only some people. Amiri et al. (2025) note that the decision systems based on AI need to include ethical safeguards, whereas Fischer-Abaigar et al. (2024) state that the decision toolkits applied to the realm of the public sector should be extended to cover the governance and regulatory gaps.

The issue of cost and lack of fairness in adoption are other challenges. The high cost of implementation and maintenance makes AI less accessible to SMEs the high introduction and maintenance costs are limiting AI adoption to large organizations and increasing the digital divide. When it comes to volatile environments, the mismatched AI investments can result in greater organizational risk, instead of better performance (Hughes et al., 2023). The wider structural obstacles such as system integration of legacy systems and shortage of talents also make AI integration in emerging economies even more complex.

6. Discussion and Recommendations.

The created evidence shows that AI-based decision-making may contribute to the substantial improvement of organizational performance in emerging markets provided it is mediated by the organizational readiness factors, including productivity, leadership, and quality of governance. Experimental experience of Yemen telecommunications companies and Brazilian state hospitals shows that the context-specific and adaptable strategies of AI implementation can ease the volatility and institutional barriers (Al-Hamli and Al-Marhdi, 2024; Almeida et al., 2026). Nonetheless, AI advantages cannot happen automatically and must be consciously strategically aligned.

At the organizational level, managers ought to consider pilot implementations in the high impact areas including predictive analytics, resource allocation and operational planning. Trust, skills, and long-term value creation can be increased by investing in hybrid human–AI decision models and constant training programs (Butlewski, 2026). A robust leadership and change management is still needed to insert AI-informed decisions into organizational practices (Atoum et al., 2024).

Governments should invest in data governance structures, digital infrastructure, and education at the policy level to facilitate inclusive adoption of AI. Incentives and ethical provisions to SMEs, decision toolkits at the public sector can lessen the barriers to adoption and decrease risks as evidenced by governance-oriented interventions in the emerging settings (Fischer-Abaigar et al., 2024; Chairuddin et al., 2026).

Future studies need to go beyond conceptual and cross-sectional research through the use of longitudinal and sector-based empirical research designs. The opportunities available in the context of the Egyptian ICT and the public service organizations are promising to test mediation models and analyze the long-term performance effects of AI-based decision-making, especially through ethical and human-centered lenses.

7. Conclusion

The impact of AI-driven decision-making on the performance of organizations in new markets can be substantial and can lead to greater organizational efficiency, innovation, and agility. The given advantages are most vivid with the mediation of the employee productivity, the efficiency of the leadership, and the proper governance framework. Nevertheless, limitations related to infrastructural issues, shortage of skills, ethical and regulatory issues remain to limit the actualization of the full potential of AI. The adoption of AI-based decisions should therefore be strategic, human-centered, as well as context-sensitive to allow AI-based decisions to positively impact inclusive growth and sustainable competitiveness. The lack of response to these challenges will potentially increase the pre-existing performance and digital disparities within and between the emerging economies.

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Strategic Agility and Its Effect on Competitive Advantage in Technology-Oriented Organizations

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Abstract:

The digital disruption, which drives fast innovation together with global competition, creates unpredictable conditions for technology-oriented organizations, resulting in their competitive advantages disappearing quickly and their static strategic approaches failing to deliver results. Strategic agility—quick sensing of changes, timely decisions, and resource reconfiguration—helps sustain competitive advantage in dynamic markets. The framework concentrates on long-term renewal efforts, while operational agility works on short-term process improvements. The theoretical literature review studies how strategic agility enables technology-driven companies to gain competitive advantages in emerging markets that have resource limitations. The framework examines both direct impacts and mediation pathways, which include strategic renewal, organizational intelligence, e-HRM, and AI. Agile organizations develop capabilities to forecast upcoming changes while they create new solutions and maintain their competitive edge despite facing obstacles, which include insufficient resources and internal cultural problems, and the rapid obsolescence of their operations. The study recommends building foresight capabilities together with establishing institutional frameworks for renewal, implementing digital technological solutions, and enhancing organizational intelligence capabilities. Future empirical studies are needed in high-tech sectors in emerging contexts. This review provides integrated insights for building resilient strategies in turbulent environments.

Keywords: Strategic Agility, Operational Agility, Dynamic Markets, Strategic Flexibility, Competitive Advantage.

Introduction

In the modern competitive and technologically driven business world, organizations are becoming more vulnerable to sudden and unforeseeable change brought about by digital transformation, increased rate of innovation, globalization and shifting customer demands. Technology-driven organizations, including telecommunications, software developers, IT service providers, and high-tech manufacturing companies, survive under especially turbulent environments with competitive positions being lost fast in case firms do not adapt (Arokodare and Asikhia, 2020). This has meant that old methods of performance based on steady and constant strategies can no longer be used in order to maintain performance or success over time.

In this light, strategic agility is a concept that has received a lot of scholarly and managerial interest. Strategic agility is the ability of an organization to recognize and react promptly to any new opportunity or threat and reorganize its strategies and resources in a efficient and timely time (Abshire, 1996; Alhosseiny, 2023). Strategic agility is a concept that is based on strategic flexibility as opposed to the operational agility, which is based on short-term flexibility.The common focus of strategic agility is on long-term flexibility, renewal of strategies and the continued alignment with an external environment that is volatile. This renders it specifically applicable to technology-driven organizations that exist on dynamic and uncertain markets.

Strategic agility turns out to be even more crucial when one takes into account the type of competitive advantage present in the technological industries. Competitive advantage is a concept that traditionally goes by the capability of a firm to surpass its competitors by providing a better value in terms of cost leadership, differentiation, innovation, or unique capabilities. But in the hyper-pace of technology competitive advantages are short-lived as opposed to a long-term sustainability because competitive innovation is easily emulated and as the standards in the market shift within a short period of time (Agarwal and Helfat, 2009). Consequently, companies have no choice but to keep on replacing their strategies, capabilities, and business models, in order to uphold their competitive standings.

Strategic renewal is thus one of the core processes of responding to the turbulence of the environment. It entails change or redesigning of the organizational strategy, structure and capabilities in order to guarantee that they remain relevant and perform (Agarwal & Helfat, 2009). Previous studies indicate that strategic agility can be a key to the strategic renewal since it enables the firm to escape stale patterns, explore new strategic alternatives, and re-align internal resources with external needs (Abd-Hussein, 2016; Al-Zu'bi, 2022). Strategic agility in this sense serves as a dynamic capability which can help to keep things liable to constant renewal and repositioning.

The empirical research on various settings is delivering an increasing number of attestations of the favourable connection amid the strategic agility and organizational performance. As a case in point, Arokodare and Asikhia (2020) have shown that strategic agility contributes greatly to the performance of an organization in highly competitive settings. Likewise, Ahammad et al. (2021) conclude that strategic agility fortifies performance in the international setting, and especially in the environment of high uncertainty. The strategic agility is also noted to enhance competitive competencies, innovation performance, and organizational image (Amini and Rahmani, 2023; Al-Romeedy and Mohamed, 2022).

Furthermore, the recent literature points out that the effect of strategic agility on competitive advantage has been found to be indirect and has been mediated by such strategies as strategic renewal, strategic intelligence, foresight and organizational learning. As an example, Abd-Hussein (2016) demonstrates that the relationship between strategic renewal and strategic agility is mediated by the boundary-spanning strategies, which strengthens the organization to be adaptive and competitive. Similarly, according to Al Shamari and Al Zyadi (2018), organizational agility is associated with strategic renewal, which further improves competitive positioning. These results imply that to understand the relationship between strategic agility and sustained competitive advantage there is a need to understand the mediating pathways.

Regardless of the accumulated research, there are a number of gaps. Firstly, a large part of the existing literature is devoted to developed economies, and less research studies strategic agility in the context of emerging and developing situations, where the constraints of institutional frameworks, resource scarcity, and instability of the environment can be more significant. Second, digital disruption, electronic human resource systems, and knowledge-based processes are specific issues in technology-oriented organizations and can change the relationship between strategic agility, renewal, and competitive advantage (Alqarni et al., 2023). Third, additional conceptual integration is required, which would combine the disjointed results and would explain the processes through which strategic agility relates to competitive results.

This paper will therefore focus on evaluating how strategic agility plays out on a competitive advantage of technology-oriented firms based on a thorough review and synthesis of the available literature. The research questions that are discussed in the study include:

- What is the role of strategic agility on strategic renewal and competitive advantage in technology-driven organizations?

- What are the mediating factors to this relationship in dynamic and uncertain environments?

- What are the most significant obstacles to the successful application of strategic agility, and how to eliminate them?

This paper has threefold objectives. First, it aims at integrating theoretical and empirical findings on strategic agility and its importance in the strengthening of a competitive advantage. Second, it will examine the mediating processes such as strategic renewal that connects agility to high organizational results. Third, it offers actual input and advice to the managers and decision-makers of technology-based organizations that would like to develop adaptive and resilient strategy. The study fulfills these purposes and adds to the body of academic information regarding the concept of strategic agility and provides a better insight into how organizations can attain and maintain competitive advantage in the quickly changing technological context.

1. Theoretical Framework and Literature Review

1.1 Conceptual Foundations of Strategic Agility

Strategic agility serves as a vital concept within strategic management research because organizations face environmental disruptions and technological advances and increased competition. The term describes an organization's capacity to detect external environmental alterations which enables it to execute strategic decisions while swiftly mobilizing its resources and abilities for effective response (Alhosseiny 2023). The definition describes three interconnected elements which enable organizations to maintain their ability to adapt through uncertain situations: strategic alertness and decision-making speed and execution flexibility.

Strategic agility operates at an organizational level which exceeds operational agility that aims to improve short-term operational efficiency through process flexibility and rapid response capabilities. The process involves making strategic choices which determine the long-term path that organizations will take while they maintain their strategic alignment to their operational environment (Abshire, 1996). Abshire developed agile strategy through his initial research on global policy environments because he recognized that organizations use agility as a strategic position which requires them to develop future scenarios and flexible responses to dynamic environments.

The significance of strategic agility becomes more important for technology-based organizations. The organizations must deal with three main challenges which include faster innovation cycles, shorter technology lifecycles and greater market competition that results from digital transformation and international business expansion. Organizations need to develop their capability to predict technology developments while testing different business models and making rapid changes to their operational methods according to Arokodare and Asikhia 2020. Organizations need to implement strategic agility because delays in their operations will cost them market access and decrease their ability to compete.

Strategic agility enables organizations to develop dynamic capabilities which allow them to combine existing internal resources with external competencies to adapt to external changes according to Alhosseiny 2023. Strategic agility allows organizations to maintain continuous learning processes while conducting strategic experiments and corporate renewal activities, which enables them to seize new market possibilities and handle unpredictable risks.

1.2   Strategic Agility and Competitive Advantage

Competitive advantage has existed as a primary strategic management concept since its establishment, which defines the concept as a company's capacity to achieve better results than its rivals through its particular resource distribution and ability to manage expenses and its unique offerings and capacity to create new products (Agarwal & Helfat, 2009). The quick imitation process and technology convergence along with the changes in customer expectations make it difficult for companies to maintain their competitive edge in today's fast changing technological business environment.

Strategic agility enables companies to establish competitive advantage because it allows them to swiftly modify their operational methods and strategic resources according to updates in their business environment. Companies that use agile methods establish their market position through continuous testing and strategic resource adjustments, which create fresh competitive advantages (Abd-Hussein, 2016). Companies use this proactive approach to maintain their market advantage while pursuing new business prospects and preventing their long term strategic development from reaching a standstill.

Different industry sectors show empirical proof that strategic agility creates a direct link to competitive advantage through its positive effects. Amini and Rahmani (2023) demonstrate that private banks experience major operational performance improvements through the implementation of strategic agility, which helps them compete more effectively in an industry that increasingly adopts digital technologies and fintech innovations. The study demonstrates that organizations use agility to address technological changes and shifting customer preferences, which helps them build a stronger market advantage.

Arokodare and Asikhia demonstrate that strategic agility functions as a mechanism that helps organizations maintain their competitive advantage through its ability to develop strategic forecasting and create new products and build organizational capacity to respond to challenges. The study proves that agile organizations possess superior abilities to predict market changes which enables them to adjust their business strategies in technology-driven markets where constant unexpected developments occur.

The research findings demonstrate that organizations use strategic agility as their main tool for gaining competitive advantage because it enables them to change their operations while developing new products and implementing strategic transformations through all times of market uncertainty.

1.3   Mediating Mechanisms: Strategic Renewal and Organizational Intelligence

The existing research shows that strategic agility creates a direct link which leads to competitive advantage. Recent studies have shown that organizations need to understand their mediating mechanisms because they connect agility to better business results. Strategic renewal represents one of the mechanisms which researchers have studied extensively (SSRN, 2025).

Organizations use strategic renewal to establish new business directions by changing their existing organizational systems and processes which already exist in their business operations (Agarwal & Helfat, 2009). Strategic agility functions as a mediating factor which connects boundary-spanning strategies to strategic renewal according to Abd-Hussein (2016). The research shows that organizations with higher strategic agility can better absorb external knowledge which they use to develop new business strategies. Organizations use strategic renewal to develop their ability to adapt while they create new ways to compete in their markets.

Al-Zu'bi (2022) provides additional evidence that strategic renewal serves as a mediating factor which connects strategic agility to organizational performance. The study shows that agile organizations require less time to start their renewal processes which results in better competitive positioning and improved environmental adaptability.

The organization requires both strategic renewal and organizational intelligence which functions as a vital mediator. Organizational intelligence refers to an organization's capability to gather and examine data regarding its internal operations and external environment for the purpose of making strategic choices. Al Shamari and Al Zyadi (2018) establish that organizations which implement strategic agility will experience improved organizational intelligence because it fosters better information distribution and organizational learning and interdepartmental teamwork. This process helps the

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organization to develop its ability to implement strategic changes and sustain its market position against rivals.

Strategic agility functions as a crucial tool for organizations which need to operate in international markets that require advanced technological solutions because it helps them manage unpredictable environmental situations. Ahammad et al. (2021) demonstrate that organizations which use strategic agility can overcome environmental uncertainty to achieve international success under changing conditions. According to Ahmed et al. (2023) strategic orientation and strategic renewal serve as the main factors that drive international competitive advantage for born-global and technology-oriented firms while strategic agility enables these firms to execute their business strategies.

Strategic agility requires multiple mediating processes that connect renewal intelligence and learning mechanisms to establish its operational effects in the organization.

1.4 Relevance of Strategic Agility to Technology-Oriented Organizations

Technology-oriented organizations function within environments that experience rapid technological progress together with shorter product life spans and fierce competition from around the world. Organizations require the ability to change their strategic approach and resource allocation to ensure their survival and success in these challenging environments. Abd-Hussein (2016) explains that Zain Iraq and other telecommunications companies use strategic agility to enable their businesses to adapt to new technologies and increasing market competition (Nature, 2025).

Organizations in technology sectors use strategic agility to develop new value propositions while implementing new technologies and changing their organizational structures to create innovative solutions. Al-Romeedy and Mohamed (2022) demonstrate that organizations can achieve better service delivery and knowledge-based performance through strategic renewal which agility allows for their operations. New research studies show that organizations in technology-driven markets use strategic planning together with strategic thinking and operational flexibility as essential elements of their strategic agility capacity (Alhosseiny, 2023). Organizations use these dimensions to maintain their ability to respond to challenges while maintaining stability during times of digital disruption.

The strategic agility of emerging and developing economies functions as a vital mechanism which enables them to overcome their institutional weaknesses and their limitations on available resources. Alqarni et al. (2023) demonstrate that strategic agility enables organizations to achieve sustainable competitive advantage through their digital tools which include electronic human resource management systems

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because it increases their operational flexibility and operational efficiency. The study demonstrates that technology-focused organizations which work in unpredictable environments need agility as their core strategic capability.

The existing literature has documented numerous findings which scientists have not yet fully established. The existing research does not provide longitudinal studies and specific technology studies which examine the development of strategic agility over time and its relationship with digital transformation efforts. The theoretical and empirical research that exists demonstrates how strategic agility positively impacts both strategic renewal and competitive advantage which makes it essential for technology-focused companies that operate in dynamic markets.

2. Methodology

This research uses a literature review that combines conceptual and systematic approaches to study how strategic agility affects competitive advantage in technology-based organizations. The research method combines empirical research with theoretical frameworks and conceptual knowledge from the 2016 to 2023 period using information from journals such as Journal of Kerbala University and Organization Science and Journal of World Business and Asia Pacific Journal of Management. The methodology requires researchers to analyze both direct and indirect relationships between variables while studying how contextual elements and different industries function at their maximum speed and technology development rate.

The researchers conducted a systematic analysis of the sources to find evidence about:

- How strategic agility helps organizations improve their overall performance.

- The mediating processes which include strategic renewal and organizational intelligence and foresight.

- The organizational performance improvements which technology-oriented organizations achieve through digital HR systems and IT infrastructure and their internationalization efforts.

The study uses a thematic synthesis method to unite research findings with conceptual frameworks and actual business instances while discovering common themes and theoretical connections. The study establishes both direct and indirect relationships which connect strategic agility to strategic renewal and competitive advantage. The research uses secondary data to create a theoretical framework which shows how organizations sustain their competitive advantage through adaptive strategic capabilities and continuous learning and strategic planning.

Organizations achieve strategic agility through the following methods: they adapt their strategic approaches and implement operational elements and initiatives while learning from historical events and managing present-day conflicts. The study evaluates various methods which organizations use to develop strategic agility and their results while comparing these methods to different growth pathways.

The methodology delivers strong theoretical and practical insights but primary data absence prevents establishment of causal connections. Researchers should use empirical methods such as surveys and structured interviews to test the proposed relationships in technology-focused and emerging market environments.

3.   The Effect of Strategic Agility on Competitive Advantage

Strategic agility creates multiple effects which different technology-oriented organizations use to obtain their competitive advantages through operational and strategic methods. The following sections elaborate on direct, mediated, and context-specific pathways.

3.1   Direct Effects

Organizations use strategic agility to develop fast responses toward three main business threats which include technological disruptions and market changes and competitive pressures, which lead to operational cost savings and unique value delivery. Alhosseiny (2023) emphasizes that agile organizations are better positioned to integrate emerging technologies into their value propositions, which helps them achieve exceptional performance and quick responsiveness. Technology-intensive firms achieve competitive advantage through strategic foresight which combined with agility enables managers to forecast market developments and stop competitors from entering their territory and maintain ongoing innovation (Arokodare & Asikhia, 2020).

Private banking organizations which increasingly adopt fintech solutions through digital platforms show that their competitive abilities improve through strategic agility which enhances their service innovation and process efficiency and customer-centricity capabilities (Amini & Rahmani, 2023). The results show that agility enables organizations to operate flexibly, which creates operational advantages, but it also functions as a strategic asset that assists organizations in improving their market presence.

3.2   The Role of Mediation in Strategic Renewal

Strategic renewal serves as the primary mechanism which enables strategic agility to generate long-lasting competitive advantages. Organizations which undergo renewal process must reconfigure their resources and rewrite their business models while they

develop new organizational strategies to match existing technological and market developments (Agarwal & Helfat, 2009). Agile organizations use environmental information from their boundary activities and internal team collaboration to predict future disruptions while they use emerging possibilities (Al Shawabkeh, 2024).

Telecommunications companies, including Zain Iraq, provide proof that strategic renewal depends on organizational agility. The research of Abd-Hussein (2016) demonstrates that boundary-spanning strategies which use agile practices enable organizations to develop their resource capabilities and business operations which helps them maintain their market dominance. Al-Zu'bi (2022) and Al Shamari and Al Zyadi (2018) discovered that the agility-renewal connection which organizations need to create performance results through their high agility but incomplete renewal capabilities.

The research conducted by Al-Romeedy and Mohamed in 2022 shows that companies which pursue renewal projects while using agile methods will achieve better customer perception results together with enhanced unique product attributes. The strategic renewal process functions as an essential link between operational agility and companies' ability to maintain competitive advantages over time.

3.3 Contextual Enhancers in Technology Organizations

The capacity of organizations to remain agile during periods of environmental uncertainty becomes more critical when operating in high-velocity market environments. The research conducted by Ahammad et al. in 2021 shows that international companies which operate across various technological fields gain an advantage through agility because it enables them to handle unpredictable situations while maintaining their operational efficiency. According to Ahmed et al. in 2023 born-global tech firms use their agile capabilities together with their strategic renewal processes to expand into international markets by using foresight to locate niche markets and adjust their resource allocation (PMC, 2025).

The combination of digital systems and human resource systems improves the strategic agility performance of organizations. Alqarni et al. (2023) demonstrate that electronic HR management systems enable organizations to improve workforce flexibility and knowledge sharing and decision support capabilities which build their capacity to respond with agile solutions. Organizations achieve improved competitiveness through their implementation of agility in both their technological systems and their organizational structures.

Technology-driven organizations use strategic agility to create new business opportunities from changing market conditions. Organizations achieve sustained market dominance through agility which links their capacity to forecast future developments with their ability to make quick decisions and reorganize resources.

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The capacity of organizations to remain agile during periods of environmental uncertainty becomes more critical when operating in high-velocity market environments. The research conducted by Ahammad et al. in 2021 shows that international companies which operate across various technological fields gain an advantage through agility because it enables them to handle unpredictable situations while maintaining their operational efficiency. According to Ahmed et al. in 2023 born-global tech firms use their agile capabilities together with their strategic renewal processes to expand into international markets by using foresight to locate niche markets and adjust their resource allocation (PMC, 2025).

The combination of digital systems and human resource systems improves the strategic agility performance of organizations. Alqarni et al. (2023) demonstrate that electronic HR management systems enable organizations to improve workforce flexibility and knowledge sharing and decision support capabilities which build their capacity to respond with agile solutions. Organizations achieve improved competitiveness through their implementation of agility in both their technological systems and their organizational structures.

Technology-driven organizations use strategic agility to create new business opportunities from changing market conditions. Organizations achieve sustained market dominance through agility which links their capacity to forecast future developments with their ability to make quick decisions and reorganize resources.

4. Challenges and Limitations

Technology-oriented organizations need to overcome multiple restrictions which diminish their ability to use strategic agility despite the obvious advantages it provides:

- Implementation Barriers: Organizations face difficulties in adopting agility because they lack sufficient resources and their digital systems are incomplete and their employees resist changes to established processes and organizational culture (Alhosseiny, 2023).

- Over-reliance on Agility Alone: Organizations that depend on agility without implementing strategic renewal processes will achieve only brief operational flexibility which will not provide them with enduring competitive benefits (Agarwal & Helfat, 2009).

- Rapid Technological Obsolescence: Organizations need to continuously improve their skills and processes and systems because technology evolves rapidly which forces them to adapt their business operations (Abd-Hussein, 2016).

- Underdeveloped Mediators: Organizations that lack sufficient organizational intelligence together with strategic foresight capabilities will find it difficult to transform their agile practices into measurable benefits (Al Shamari & Al Zyadi, 2018).

- Contextual Challenges in Emerging Markets: Organizations face increased operational risks when they fail to adjust their agile practices according to local requirements which emerge from regulatory gaps and infrastructure shortages and market instability.

The organization needs to develop its agility through strategic processes which require intelligence capabilities and contextual adjustments to achieve enduring market advantage.

5. Discussion and Recommendations

Evidence shows that strategic agility creates strong competitive advantages which operate through strategic renewal and organizational intelligence (Ahammad et al., 2021; Amini & Rahmani, 2023). The agile companies develop nonstop improvement capabilities that allow them to use their resources better while they predict market changes and transform unpredictable situations into business advantages.

Recommendations:

For Leaders:

- The leaders need to develop strategic foresight skills and boundary-spanning abilities which allow them to acquire external knowledge (Abd-Hussein, 2016).
- Organizations should establish institutionalized renewal procedures which enable them to maintain agility while achieving measurable outcomes (Arokodare & Asikhia, 2020).

Organizational Practices:

- Organizations should use digital technology and human resource management systems to improve their ability to adapt and react (Alqarni et al., 2023).
- Organizations must build their intelligence functions to create better decision-making systems which enable them to develop flexible operational procedures (Al Shamari & Al Zyadi, 2018).

For Researchers:

- The researchers need to conduct empirical research in three technology sectors which include AI and software and fintech to test their theoretical frameworks.
- The researchers should investigate the long-term development of agility and renewal processes to comprehend how these factors impact organizational performance over time.

6. Conclusion

Organizations that operate in technology-driven markets need to develop strategic agility because it helps them maintain their competitive edge. Organizations transform uncertain situations into operational advantages through their ability to detect environmental changes and their capacity to make quick decisions and their capability to adjust their resource distribution (Alhosseiny, 2023; Agarwal & Helfat, 2009). The approach becomes more effective through its connection to strategic renewal and organizational intelligence and digital infrastructure elements.

Organizations that adopt proactive strategies can handle fast technological evolutions while they preserve their leadership in innovation and keep their competitive market advantage. Companies that want to thrive in the market must develop both agility and renewal capabilities to prevent their competitive advantages from fading away after short-term changes. Strategic agility serves as the main factor that determines how organizations survive and develop innovative solutions and achieve success in the long term within technology-driven markets.

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The Role of Digital Accounting Systems in Enhancing Financial Transparency and Cost Control

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Introduction

Digital technologies have improved accounting methods because they provide organizations with Digital Accounting Systems which automate all financial processes of their business operations. The introduction of cloud computing and enterprise resource planning systems and big data analytics and blockchain technologies has developed financial information processing systems which work more quickly and accurately and process more data than before (Enyi, 2016; Hannan, 2023). Digital accounting systems allow organizations to record transactions as they happen while generating financial reports automatically and performing sophisticated analysis which helps them manage their operations in complex business situations.

DAS adoption provides organizations with a vital advantage because it improves their financial reporting practices. Financial transparency refers to the degree to which financial information is accurate, timely, complete, and accessible to internal and external stakeholders. Transparent financial reporting reduces information asymmetry, strengthens stakeholder confidence, and improves decision-making quality (Demmer et al., 2019). Previous studies demonstrate that better accounting information environments lead to financial analysts producing more accurate forecasts and capital markets achieving superior performance results (Embong & Hosseini, 2018; Filip et al., 2022). The use of digital systems enables organizations to achieve transparency because digital systems create standardized data which reduces processing errors and enables organizations to monitor their financial results in real time.

Organizations which compete in fierce markets while facing resource limitations have made cost control their main strategic objective. The process of cost control involves businesses using systematic methods to decrease their operational expenses while they maintain their operational efficiency and product quality through improved resource distribution and process enhancements and mistake elimination (Gejing & Yang, 2019).

Digital accounting systems function as essential components for this procedure because they create automatic accounting workflows while they combine financial data with operational data and they let users conduct instant cost analysis. Research demonstrates that businesses which adopt digital transformation show operational improvements that lead to better financial results and reduced waste (Al-Tarawneh et al., 2023; Balios, 2021).

DAS demonstrates its greatest importance within developing countries because these nations experience institutional deficiencies and unpredictable regulatory environments and their businesses struggle to obtain necessary financial backing. Digital accounting systems enable organizations to overcome existing infrastructure limitations while they establish better governance practices (Abu Afifa et al., 2023). The use of blockchain-based accounting systems provides organizations with permanent transaction documentation which increases their ability to conduct audits and creates safer financial reporting methods according to (Abu Afifa et al., 2023). Organizations show different levels of DAS adoption because their technological capabilities and corporate culture and governmental backing and organizational control systems differ.

The research on digital transformation in accounting shows increasing development but current studies analyze transparency and cost control as separate factors while they fail to investigate how digital accounting systems affect both of these aspects. The research on integrated reporting and corporate social responsibility (CSR) reporting shows that digitalization helps organizations improve their stakeholder engagement through better disclosure practices which lead to increased organizational legitimacy and operational efficiency according to Bakker et al. 2020 and Baumeister and Gutsche 2017. The implementation of digital accounting systems which improve information quality through their services has shown to produce better results in tax planning and lower compliance expenses according to Francis et al. 2019 which proves the strategic importance of digital accounting systems.

The research examines how digital accounting systems improve financial transparency and cost management for businesses that function in developing countries. The research study aims to create a unified framework that shows how digital accounting systems (DAS) enhance the quality of information and improve forecasting precision and operational productivity through the study of earlier research results and theoretical studies. The paper intends to answer research questions through its research.

- Digital accounting systems improve financial transparency through their capacity to provide better information and more precise predictions.
- Digital accounting systems use multiple mechanisms to assist organizations with their cost management activities and their ability to operate efficiently.
- The implementation of DAS systems faces obstacles because of specific contextual factors which impact their effectiveness in emerging markets.

The study has three main purposes which it wants to achieve. The first goal of the research is to collect existing empirical data about the impact of DAS on two areas which include transparency and cost control. The research identifies three main mediating factors which include efficiency and information integration and governance quality to explain these relationships. The research study presents specific recommendations which organizations and policymakers can use to implement digital accounting systems successfully in environments that face technological limitations and experience rapid economic changes.

1. Theoretical Framework and Literature Review

1.1 Conceptual Foundations of Digital Accounting Systems

Digital Accounting Systems (DAS) create integrated digital platforms which perform automated financial procedures through special digital tools. The systems use automated processes which operate through ERP systems and cloud computing and big data analytics and blockchain technology to process financial data. DAS creates instant data availability which enables different departments to work together while organizations perform ongoing financial assessments which transform accounting from its traditional role into a strategic function that supports decision-making.

Theoretical models which include technology acceptance and information systems success models explain how organizations choose to implement digital accounting systems. The Unified Theory of Acceptance and Use of Technology (UTAUT) model explains how organizations in developing countries adopt digital accounting systems because their technological environment and institutional framework differ from each other. The study by Abu Afifa et al. (2023) demonstrates that blockchain-related trust and transparency and security perception elements influence the adoption of accounting technologies according to their modification of the UTAUT framework.

The Information Systems Success Model demonstrates how system quality and information quality together with service quality contribute to positive business

results. Al-Tarawneh et al. (2023) demonstrate that electronic accounting systems achieve both operational productivity and operational efficiency which leads to improved accounting information quality that supports better management choices and increased financial results. The proposed framework which connects DAS to financial transparency and cost control receives theoretical support from these three theoretical perspectives.

1.2 Impact of Digital Accounting Systems on Financial Transparency

Effective accounting systems achieve financial transparency as their fundamental result which provides stakeholders with access to precise and prompt trustworthy and comparable financial data. Digital accounting systems improve transparency through their better information quality which includes relevant and consistent and complete and timely information (Al-Tarawneh et al. 2023). The use of automated data processing together with standardized reporting formats successfully decreases human errors and subjective manipulation which results in increased trustworthiness of financial reports.

The research findings demonstrate that electronic accounting systems improve accounting information quality because they simplify data processing and provide immediate access to financial reports according to Al-Tarawneh etal 2023. Organizations that use digital technologies can maintain real-time access to their financial records while improving their internal control systems and external reporting methods. The improved information environment decreases information asymmetry between businesses and their stakeholders which drives transparency according toDemmer et al 2019.

Blockchain-based accounting applications enhance transparency through their ability to create permanent and accessible transaction records. The adoption of blockchain technology in DAS systems helps emerging economies which have low trust in financial reporting because it prevents data manipulation and improves audit capabilities according toAbu Afifa et al 2023. The UTAUT model extension by Abu Afifa et al 2023 shows that perceived transparency and trust create a vital link between blockchain adoption and accounting system effectiveness.

Big data analytics serves as a vital system for enhancing transparency because it allows organizations to evaluate extensive databases which contain both organized and unstructured financial information.

Balios 2021 demonstrates that big data applications enable financial analysts to conduct deeper and more precise evaluations of financial data which leads to better auditing and corporate reporting outcomes. The system provides features that enhance forecasting accuracy and performance assessment which help organizations achieve financial reporting transparency.

Research studies demonstrate that improved digital reporting systems lead to better analyst forecasts and increased market efficiency. Demmer et al. (2019) show that the adoption of mandatory accounting standards such as IFRS, when combined with advanced digital systems, improves the quality of financial disclosures and analyst forecasts. Digital platforms enable organizations to maintain ongoing disclosure processes, which help stakeholders assess their operational results throughout different periods (Francis et al., 2019).

The development of internet technologies enables organizations to share information and maintain transparency between different sectors of their operations. Gejing and Yang (2019) argue that internet-based accounting systems enhance the speed and openness of financial communication, reinforcing transparency in both internal and external reporting processes.

1.3 Impact of Digital Accounting Systems on Cost Control

Cost control represents a strategic organizational objective which aims to decrease operational expenses while preserving operational efficiency and service delivery standards. Digital accounting systems enable organizations to achieve cost control through their ability to automate processes and optimize resources and decrease operational mistakes. The study conducted by Enyi in 2016 demonstrates that digital accounting tools enable organizations to automate their manual work processes and decrease their dependency on physical documents, which results in faster transaction handling that brings about substantial savings in both administrative and operational expenses.

DAS systems provide organizations with real-time cost monitoring capabilities through their ability to connect financial data from different departments while simultaneously detecting operational problems. The system provides automated budgeting and variance analysis and cost tracking functions which enable managers to make better decisions and implement necessary corrections without delay. Enyi (2016) further notes that paperless accounting and digital decision-support systems enhance value creation by enabling proactive financial controls rather than reactive cost adjustments.

All digital transformation efforts which various organizations, including educational institutions and government bodies undertake, show they achieve measurable efficiency improvements through their adoption of digital systems. Hannan (2023) demonstrates that digital transformation enhances operational efficiency through its three main benefits which include workflow optimization and duplication reduction and enhanced financial monitoring capabilities. The organization achieves better cost management, which leads to financial stability through the efficiency improvements they have achieved.

DAS systems for financial transparency provide direct operational efficiency benefits, but they also enable organizations to maintain their expenses. Financial reporting through transparent systems enables organizations to improve their monitoring processes while establishing better accountability measures and governance frameworks, which results in reduced wasteful expenditures and misconduct. Integrated reporting and CSR disclosure studies show that organizations achieve better resource management and sustainable efficiency through improved transparency (Baumeister & Gutsche, 2017; Bakker et al., 2020). DAS systems provide managers with visible cost structures and performance results, which enable them to make operational choices that support their strategic business goals.

1.4   Research Gaps and Emerging Market Context

The existing literature contains research gaps which remain unaddressed despite evidence that digital accounting systems provide advantages to organizations. First, research studies show transparency results as a common finding which most researchers observe. The research gap restricts knowledge about the relationship between transparency and digital accounting systems which control costs.

The current research landscape shows a strong focus on developed nations while emerging markets encounter challenges which stem from their infrastructure deficiencies and lack of skilled workers and their unpredictable regulations and their organizational resistance to change. The authors Abu Afifa and his colleagues 2023 show that successful DAS adoption requires emerging economies to develop three key elements which include technological readiness and human capital development and institutional support. Organizations need these three elements to achieve the full advantages of digital accounting systems.

The need for integrative frameworks which assess DAS effects on financial transparency and cost control in particular contexts remains unfulfilled. The research gaps need to be addressed because they will produce a deeper understanding of digital accounting systems strategic value which will benefit both managerial work and policy development in emerging technology-driven fields.

2. Methodology

This study uses a conceptual research design which combines existing literature through systematic review to assess how Digital Accounting Systems (DAS) improve financial transparency and cost control in emerging and developing economies. The research uses a qualitative literature review method which combines empirical data with theoretical information from peer-reviewed academic articles that exist between 2016 and 2023.

The literature selection process focused on the references provided for this study, which include journal articles, conference papers, and scholarly lectures addressing digital accounting, blockchain adoption, big data analytics, financial reporting quality, transparency, and cost efficiency. The study examined empirical research which took place in emerging markets and developing markets because these regions face unique technological and institutional and governance challenges that relate to the study goals.

The research used thematic synthesis to analyze the results which involved comparing and combining results from both quantitative and qualitative studies. The researchers developed a synthesis model from their study because quantitative results showed how digital accounting adoption affected information quality and efficiency and transparency and performance in their regression-based research. The researchers examined qualitative data from conceptual and case-based research to discover how DAS systems impact financial transparency and cost control through their automation and real-time reporting functions and governance improvements and error reduction capabilities.

The synthesis process established a complete theoretical framework which demonstrates how digital accounting systems enhance information quality and transparency and cost management. The research combines statistical data with interpretive analysis to show how DAS implementation affects both operational results and implementation procedures.

The methodology demonstrates strong points, yet it contains built-in restrictions which limit its effectiveness. The study relies on secondary data sources, which prevent researchers from establishing causal links and testing their hypotheses through empirical methods. The different research designs, sample characteristics, and contextual settings, which appeared in the reviewed studies, will impact how their findings can be applied to other situations.

Future studies should use primary empirical methods, such as surveys or structured interviews, to confirm and expand the proposed framework. Researchers should focus on empirical studies in emerging economies, especially Egypt, because they will reveal how organizations prepare and which obstacles they face when implementing digital accounting systems to improve their transparency and cost management processes.

3. Enhancing Financial Transparency through Digital Accounting Systems

Digital Accounting Systems (DAS) serve as essential tools for boosting financial transparency by delivering better financial information which becomes more accessible and trustworthy to users. Financial management requires transparency because it helps stakeholders trust one another while making decisions based on available information. The financial information process undergoes complete transformation through the use of DAS which combines its automation and integration features with its advanced analytical tools.

3.1 Information Quality, Accuracy, and Reliability

The primary way that DAS improves financial transparency lies in their ability to enhance accounting information quality. Information quality consists of multiple elements which include accuracy, relevance, timeliness, completeness, and comparability. Electronic accounting systems enable accountants to work more efficiently while producing high-quality financial data which meets both internal control requirements and external reporting standards (Al-Tarawneh et al., 2023).

Automation leads to decreased need for human workers who handle standard accounting duties which results in fewer data entry mistakes and discrepancies. The implementation of standardized digital procedures enables organizations to apply accounting rules consistently throughout their different departments, which improves their financial reporting accuracy and uniformity.

The implementation of blockchain-based accounting systems produces unchangeable transaction records which make financial data more trustworthy. The implementation of blockchain technology prevents any changes to financial data after it has been recorded because only authorized personnel can make modifications which protects against potential fraud and manipulation. The research by Abu Afifa et al. (2023) shows that blockchain technology makes accounting systems more transparent and trustworthy for businesses located in developing countries which face challenges with data security and management systems. The unchanging nature of blockchain records together with their capacity to trace back information creates financial records which stakeholders can trust while auditors use the records for their verification process.

3.2 Forecast Accuracy and Analyst Benefits

Digital accounting systems also enhance transparency by improving the broader information environment, particularly in relation to financial forecasting and analyst performance. The availability of high-quality digital data allows financial analysts to create more precise earnings projections while it decreases the level of uncertainty they face during their financial assessments. The existing studies demonstrate that better accounting information results in improved forecasting accuracy which decreases the differences between analyst predictions (Demmer et al., 2019; Embong & Hosseini, 2018).

Digital accounting systems connect with reporting platforms to produce more regular and accurate financial disclosures. Filip et al. (2022) demonstrate that digital reporting environments create specific information access for market participants through their ability to produce more frequent disclosures and shorter reporting intervals. The research by Bakker et al. (2020) demonstrates that organizations improve their disclosure quality through digital system-based integrated reporting which increases their disclosure transparency from both complete and clear information.

The combination of digital tools with DAS authentication through mandatory accounting standards which include IFRS creates additional transparency advantages for organizations. Demmer et al. (2019) discovered that IFRS adoption leads to better analyst forecast accuracy because it improves disclosure quality which becomes more effective in modern reporting systems.

Digital systems enable organizations to meet compliance standards through their ability to automatically generate required reports while maintaining uniformity throughout all reporting durations.

3.3 Real-Time Access and Reduction of Information Asymmetry

DAS systems establish their transparency through their capacity to deliver financial data to users in real-time. Internet-based accounting platforms and big data technologies enable continuous data flows and instant access to financial records, which stakeholders use to monitor organizational performance (Gejing & Yang, 2019).

Big data analytics enhances transparency by enabling the analysis of detailed transactional data, which enables researchers to detect patterns and anomalies that remain hidden in traditional reporting methods. Balios (2021) emphasizes that big data applications improve auditing and financial reporting by providing granular insights into organizational activities, which subsequently enhances both the credibility and the usefulness of financial information.

The digital disclosure methods businesses use for their corporate social responsibility (CSR) commitments and their non-financial reporting show how they operate their business activities to the public. Baumeister and Gutsche (2017) demonstrate that digital platforms which provide access to CSR reporting data help analysts improve their work and stakeholders better understand the information, which shows how digital platforms help decrease information gaps between different parties.

DAS adoption brings organizations in developing countries essential benefits because it enables them to achieve greater transparency throughout their operations. Abu Afifa et al. (2023) assert that organizations which adopt digital accounting technologies can enhance their institutional capacity while improving their governance standards to achieve better financial reporting practices which build public trust.

4. Cost Control through Efficiency and Automation

Digital accounting systems provide organizations with more than transparency because they help control expenses through better operational performance which decreases mistakes and improves resource management. Organizations that operate in resource-limited environments face complex

operational challenges which require them to use cost control as a strategic method for maintaining their market position.

4.1   Automation and Error Reduction

DAS systems achieve cost control through their main method of operations which uses automation to enhance their financial management capacity. Organizations can reduce their administrative expenses and processing time by turning their accounting operations into digital systems which remove all paper-based procedures. Enyi (2016) demonstrates that paperless accounting systems enable organizations to decrease their need for human work while they achieve lower costs for processing transactions and decrease their chances of experiencing expensive mistakes.

DAS systems include automated controls which improve compliance while decreasing expenses that organizations need to spend on correcting mistakes or fixing audit problems. The systems provide organizations with the ability to monitor their financial transactions in real time which helps them identify any operational problems that lead to deviations from expected performance. The DAS system transforms cost control from a response operation into a system that enables active financial management.

4.2   Operational Efficiency and Financial Planning

DAS digital transformation initiatives lead to increased operational efficiency at organizations. Hannan (2023) shows that digital transformation helps institutions achieve better operational efficiency through its ability to optimize workflows and improve interdepartmental coordination while eliminating process redundancy. The organization achieved financial benefits because of the efficiency gains which resulted in both lower expenses and better financial results.

The organization needs accurate financial data which it must receive directly and on time to achieve better results in budgeting and forecasting and financial planning. Francis et al. (2019) demonstrate that organizations which obtain high-quality accounting information achieve better tax planning and expense management results which lead to lower compliance costs and improved financial performance. DAS systems provide organizations with real-time expenditure data and performance indicators which enable them to establish their cost structures according to their strategic targets.

4.3   Resource Optimization and Indirect Cost Savings

DAS enables organizations to control expenses through its ability to optimize resources which serves as an essential aspect of cost management. Organizations achieve better resource distribution through financial and operational data which becomes accessible during real time periods. Al-Tarawneh et al. (2023) demonstrate how better information quality enables managers to make better decisions which leads to lower expenses for organizations.

Organizations use transparency as a tool to control costs because it creates better accountability which decreases the chances of people acting unethically. Gejing and Yang (2019) demonstrate that internet-based accounting systems which provide transparent access to their operations lead organizations to minimize waste while they develop methods to use resources more effectively. Abu Afifa et al. (2023) report that emerging market organizations experience efficiency improvements and better financial management results after they implement digital accounting systems.

5.   Challenges, Discussion, and Recommendations

5.1   Challenges in Adopting Digital Accounting Systems

The implementation of digital accounting systems presents many obstacles that organizations must overcome despite the system's advantages. Organizations in developing nations experience challenges because they lack essential technological resources and trained personnel and face user opposition and data protection issues. The researchers Abu Afifa et al. (2023) discovered that organizations reject digital systems because their technological capabilities are insufficient for blockchain-based accounting adoption.

The fast-changing nature of internet technologies creates potential for immediate operational problems and security threats because systems require effective handling processes (Gejing & Yang, 2019). Successful implementation of digital accounting systems requires organizations to use governance frameworks together with change management methods (DAS implementation requires governance frameworks and change management strategies as essential components for achieving success.

5.2 Discussion

The reviewed literature shows that digital accounting systems (DAS) improve financial transparency and cost management through their interconnected operational systems. Digital accounting system adoption leads to organizational results which improve through three specific factors: information quality and system efficiency and governance quality (Al-Tarawneh et al., 2023). Digital accounting systems (DAS) provide their greatest advantages to developing economies because digital technologies enable institutional weaknesses to be overcome through effective governance systems (Abu Afifa et al., 2023).

5.3 Recommendations

For organizations:

The organizations should implement integrated digital accounting systems together with ongoing training programs which will boost system performance and user proficiency. (Enyi, 2016)

For policymakers:

The regulatory authorities need to establish digital reporting standards while they should also promote blockchain technology to strengthen financial system transparency and trustworthiness. (Abu Afifa et al., 2023)

For future research:

The researchers need to conduct empirical tests of mediation models which connect DAS with transparency and cost control in their studies of MENA and emerging market economies.

6. Conclusion

Digital accounting systems function as a revolutionary element in contemporary accounting because they provide organizations with improved methods to monitor their financial activities and manage their expenditures. The development of DAS leads to better information accuracy through its use of automated systems and real-time reporting capabilities together with its advanced data analysis methods. The research shows that these advantages deliver maximum value to developing nations because digital technologies help enhance governance systems and better prediction methods while they reduce operational expenses (Al-Tarawneh et al., 2023; Abu Afifa et al., 2023).

Digital accounting systems create a path for organizations to attain long-term market advantage through their effective implementation which needs proper institutional support and developed organizational skills. The future development of accounting will depend on DAS systems because they provide organizations with better methods to achieve transparent operations and efficient processes and sustainable financial results.

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Factors Influencing Nurses' Acceptance of Digital Health Technologies in Clinical Practice: A Cross-Sectional Study in Saudi Arabia

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Abstract

Background: Digital transformation is reshaping healthcare delivery worldwide, with nurses playing a central role in the successful implementation of digital health technologies. **Aim:** This study aimed to identify the factors influencing nurses' acceptance of digitalization in nursing care. **Methods:** A descriptive cross-sectional design was used. The study was conducted at Ahad Rofidah Hospital, affiliated with the Ministry of Health of Saudi Arabia. A convenience sample of all staff nurses having six months of experience composed the study sample (180 nurses). Two main tools were formulated pertained to this study. Descriptive statistics, inferential tests, and correlation analysis were used to examine predictors of acceptance. **Results:** The study revealed that most participants were male (52.7%), aged 20−25 years (32.1%), Saudi nationals (70.1%), held a bachelor's degree in nursing (66.3%), and had 5−10 years of experience (60.3%). Overall, nurses demonstrated a high level of acceptance of digital health technologies. Age was the only demographic variable significantly associated with digital acceptance (p < 0.001). Nurses acknowledged training requirements and skill demands as key barriers, but did not perceive digitalization as a threat to professional ethics or patient privacy. **Conclusion:** Nurses generally accept digitalization in clinical practice; however, acceptance varies significantly by age. Tailored training programs and age-sensitive implementation strategies are essential to ensure equitable and sustainable adoption of digital health technologies. Healthcare organizations should enhance nursing performance and communication by leveraging digital technologies while addressing challenges through comprehensive training and user-friendly systems.

Introduction

The increasing adoption of digital technologies has had a significant impact on the nursing profession in recent years. Digitalization has transformed various aspects of nursing care, leading to improved patient outcomes, enhanced efficiency, and better overall healthcare delivery (Muñoz et al., 2022). Modern technology in nursing practice is the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures, and systems developed to solve a health problem and improve the quality of life. Implementation of modern technology in health care has become a global trend. The effect of global changes, especially the rise of new diseases like the Coronavirus, Ebola virus, Lassa fever, and so on, has led to an increase in the development of technologies in nursing practice to combat the new challenges (Olorunfemi et al., 2020).

The digitalization of health care delivery has brought up a new relationship for nurses: the nurse and technology relationship. Although technology cannot replace compassionate inpatient care, it is defined as a unique competence expected to be acquired in nursing. This competence, believed to be developed through informatics expertise and health informatics solutions, is a significant opportunity to improve health care quality. In addition to keeping the patient's information wholly and accurately, health informatics has made it possible to access this information easily and quickly. This ease of access positively impacts correct decision-making, reduces medical errors, and supports evidence-based practices. It is also known that health information systems that provide easy access to nursing care plans enhance satisfaction in nurses (Yilmaztürk, Kose & Cece, 2023).

While the integration of digital technologies in nursing care has brought numerous benefits, it has also raised concerns about patient privacy, data security, and the potential for technology to replace human interaction. Nurses must balance the advantages of digitalization with the need to maintain a patient-centered, compassionate approach to healthcare delivery (Han et al., 2023). The technology adoption and acceptance behavior shown by nursing staff represents a key outcome within the corpus of studies examining digital transformation processes in health care. But aside from the surrounding discourse of factors causing a successful or an unsuccessful adoption or implementation of technology, few research exists broaching the issue of consequences of digital transformation for nurses' professional identity or relations of power to colleagues and patients, although the interaction with digital technologies in clinical environments becomes a significant part of nurses' daily work routines (Garnett et al., 2022). As these work routines change, nurses become aware of a technology-infused way to deliver care.

In particular, concerns arise that the digitization of nursing seems to shift the interaction between nurse and patient from a direct, bodily interaction to an indirect, machine-driven one (Knop et al., 2020), resulting from technologies' ability to create digital reflections of the patient (e.g., telehealth) and, therefore, an artificial distance between nurse and patient. This interactional work, which is at the core of nursing and greatly contributes to nurses' identity, thus gets complemented by new job demands beyond interpersonal solicitude and professional knowledge, that is, the appropriate and effective use of digital technology intended to support nursing processes (Hack-Polay et al., 2023).

The study aimed to identify the factors influencing nurses' acceptance of digitalization in nursing care

Methodology

Study design and participants

A descriptive exploratory cross-sectional research design was utilized in the current study. The study was conducted at Ahad Rofidah Hospital, affiliated with the Ministry of Health of Saudi Arabia, and offers both free and paid healthcare services for a range of diseases. It consists of (2) floors with a total capacity of (100 beds). A convenient sample of all staff nurses having six months of experience will compose the study sample (about 184 nurses).

Study measures

The researcher developed two tools to collect data for the present study:

Tool (1): Nurse' Personal characteristics data sheet: it was developed by the investigator and included age, gender, level of education, years of experience, and training courses.

Tool (2): Digitalization Acceptance Questionnaire:

The tool was developed by the investigator after an extensive review of related literature guided by Bayomee, Mohammed, & Elmwafy. (2020). It is used to explore nurses' opinions regarding the use of digitalization in nursing care and was translated into the Arabic language. It consisted of 35 items, which were divided into two parts. The first part was concerned with the positive aspects of using digitalization in patient nursing care. It included 19 items, and the second part was concerned with the negative aspects of using digitalization in patient nursing care. It included 16 items. Scoring system: Staff nurse responses were measured against -point Likert scale ranging from (1) for " disagree, (2) for "neutral and (3) for " agree.

Scoring system: Staff nurse responses were measured against -point Likert scale ranging from (1) for " disagree, (2) for "neutral and (3) for " agree. <u>The use of a three-point Likert scale in the present study</u> was methodologically justified to enhance clarity and ease of response among staff nurses, reduce respondent burden, and minimize ambiguity in item interpretation. The score of items was summed up and converted into percentage scores. The staff nurse's acceptance is considered High acceptance if the percent score is more than 50%, Moderate acceptance if the percent score ranges from 35 to 50%, and low acceptance if the percent score is less than 35%.

Validity and reliability

Content validity of the developed tool was established by three experts in the nursing education specialty from the Faculty of Nursing, Cairo University. They were asked to assess the questionnaire for its content coverage, appropriateness, clarity of sentences, sequence of items, length, format, and face validity. Reliability of the questionnaires was tested using Cronbach's alpha coefficient analysis, and the value was 0.75.

Ethical Considerations

Official permission to conduct the proposed study was obtained from the research ethics committee at the Faculty of Nursing, Cairo University. Then, official permissions were obtained from the medical manager and the nursing director of the selected hospital to conduct the study. Participation in this study was entirely voluntary; each participant had the right to accept or refuse participation in the study. Informed consent was obtained after an explanation of the aim and nature of the study from the study participants. Anonymity and confidentiality are assured through the coding of the data, and each participant has the right to withdraw from the study at any time. Participants were assured that this data would not be reused in another research without permission. The data collected were used for research purposes only.

Procedure

Once official permission was granted to proceed with the proposed study, the researcher started to collect data through two phases: preparation and implementation. The preparatory phase involved the preparation of the study tools through a literature review and examining the tools for content validity and reliability.

Implementation phase

Once permission was granted to proceed with the proposed study, a letter from the faculty of nursing, Cairo University, was sent to the directors of the selected study setting seeking their official approval for collecting data. Upon receiving the approval of hospital directors, the investigator contacted the manager of each department to get permission, then contacted the participant nurses, explained to them the nature and

and the purpose of the study, invited them to voluntarily participate, and gained their acceptance by formal written consent and filled out the Nurses' Personal Characteristics Data Sheet (Tool 1).

The Digitalization Acceptance Questionnaire (Tool 2) was distributed individually by the investigator to nurses in their working units while they were on duty. Some participants received the questionnaires at the beginning of the shift, with instructions on how they fill and then they were collected at the end of the shift for those who were busy or just after filling for those filled them out.

Statistical Analysis

Upon completion of data collection through the previously mentioned tools, the data were coded, entered into a computerized database, and analyzed using the statistical package for the social sciences (SPSS), program version 22. Descriptive statistics were used to present the data pertinent to the study in the form of frequency and percentage distribution, mean, and standard deviation. Appropriate inferential statistical tests were used to examine the difference and relationship between study tool variables. The significance level of all statistical analyses was ≤ 0.05 (P-value).

Results

The Results of this Study are presented in three Sections:

Section I: Nurses' Personal Data

Table (1): Frequency and Percentage Distribution of Study Sample Nurses According to Personal Characteristics (n= 184).

Characteristics	Categories	No	%
Gender	Male Female	97 87	52.7 47.3
Age	20- >25 26- >30 30 ->40 40 and above	59 45 57 23	32.1 24.5 31.0 12.5
Nationality	Saudi Egyptian Sudanese Filipino Indian Tunisian	129 11 2 30 7 3	70.1 6.0 1.1 16.3 3.8 1.6
Qualification	Bachelor of Nursing Technical Institute of Nursing Postgraduate Studies Other	122 6 30 26	66.3 3.3 16.3 14.1
Years of Experience	5-10 10-20 20 and above	111 56 17	60.3 30.4 9.2
Years of experience in the same unit	5-10 10-20 20 and above	139 29 16	75.5 15.8 8.7
	Total	**184**	**100**

Table 1 shows that 52.7% of the sample were males, while 47.3% were females. In terms of age groups, the highest percentage of the nurses were 32.1% (59 participants) in the age group 20 to >25 years old, 24.5% (45 participants) were aged between 26 and >30 years, 31.0% (57 participants) were aged between 30 and >40 years, and 12.5% (23 participants) were aged 40 years and above. Regarding nationality, the biggest number (129) were Saudi, followed by Filipinos at (30), while the least number were Sudanese (2 nurses).

For educational qualifications, the majority of participants held a Bachelor's degree in Nursing at 66.3% (122 participants), followed by those with postgraduate studies at 16.3% (30 participants). The remaining participants were graduates of Nursing Technical Institutes (3.3%) and other qualifications (14.1%). Regarding years of experience, participants with 5 to 10 years of experience were the majority at 60.3% (111 participants), followed by those with 10 to 20 years of experience at 30.4% (56 participants), and those with more than 20 years of experience at 9.2% (17 participants).

Finally, for years of experience in the same unit, the majority had 5 to 10 years of experience at 75.5% (139 participants), followed by those with 10 to 20 years at 15.8% (29 participants), and those with more than 20 years at 8.7% (16 participants).

Section II: Part I– Nurses' Level of Digital Acceptance in Patient Care

Table (2): Frequency and Percentage Distribution of Nurses' Level of Digital Acceptance in Nursing Care of Patients (n= 184)

N	Item	Agree N / %	Neutral N / %	Disagree N / %	Mean	SD
1.	Enhance nursing performance through work task organization.	178 / 96.7	6 / 3.3	0 / 0	2.97	0.178
2.	Improvement of nurses' knowledge and skills that allow a higher level of competence in nurses.	175 / 95.1	9 / 4.9	0 / 0	2.95	0.216
3.	Strengthen the nurse's professional role among others	169 / 91.8	14 / 7.6	1 / 0.5	2.91	0.301

4.	Increase the reliability of the data documented	174 / 94.6	10 / 5.4	0 / 0	2.95	0.227
5.	Enhancing nurse communication with other health team members	176 / 95.7	8 / 4.3	0 / 0	2.96	0.204
6.	Help to compensate for the shortage of nurses	151 / 82.1	25 / 13.6	8 / 4.3	2.78	0.511
7.	Save costs for the practice in the long run	160 / 87	24 / 13	0 / 0	2.87	0.338
8.	Create more time for patient care	165 / 89.7	17 / 9.2	2 / 1.1	2.89	0.351
9.	Reduce the time nurses spend on paperwork	172 / 93.5	11 / 6	1 / 0.5	2.93	0.227
10.	Improve the privacy and security of confidential patient information	176 / 95.7	6 / 3.3	2 / 1	2.95	0.271
11.	Increase Health Awareness and Education about the patients	168 / 91.3	16 / 8.7	0 / 0	2.91	0.283
12.	Improve nurses' ability to track medication history	174 / 94.6	9 / 4.9	1 / 0.5	2.94	0.260
13.	Enhance medical research and development	175 / 95.1	9 / 4.9	0 / 0	2.95	0.216
14.	Establish a coordinated care management system for patients	174 / 94.6	10 / 5.4	0 / 0	2.95	0.227
15.	Enhance patient data completeness	176 / 95.7	8 / 4.3	0 / 0	2.96	0.204
16.	Patient's information is always updated	175 / 95.1	9 / 4.9	0 / 0	2.95	0.216
17.	Improve the quality of patient care.	171 / 92.9	13 / 7.1	0 / 0	2.93	0.257
18.	Ensuring nurse work satisfaction	161 / 87.5	22 / 12	1 / 0.5	2.87	0.354
19.	Making patients more satisfied with their healthcare experience.	168 / 91.3	16 / 8.7	0 / 0	2.91	0.283

Table 2 shows that the majority of nurses demonstrated a high level of acceptance of digital health technologies. A majority of studied sample agreed that digital tools enhance nursing performance, enhancing nurse communication with other of health team, improve privacy and security of confidential patient information, improve patient data completeness, and increase reliability of the data documented, with percentages of 96.7%, 95.7%, 95.7%, and 94.6% respectively with mean scores of 2.97±0.178, 2.96 ±0.204, 2.95 ±0.271, 2.96 ±0.204 and 2.95 ±0.227 respectively.

Part II– Nurses' Perceived Barriers to Digital Acceptance in Patient Care

Table (3): Frequency and Percentage Distribution of Nurses' Perceived Barriers to Digital Acceptance in Nursing Care of Patients (n= 184)

N	Item	Agree N / %	Neutral N / %	Disagree N / %	Mean	SD
1.	Increase errors of health team personnel through the misinterpretation of data provided by machines	31 / 16.8	50 / 27.6	103 / 56	1.161	0.760
2.	Increase nurses' psychological stress and burnout	42 / 22.8	33 / 17.9	109 / 59.2	1.64	0.832
3.	Increase Health and physical risks for nurses	40 / 21.7	31 / 16.8	113 / 61.4	1.60	0.823
4.	Restrict the autonomy ofnurses in deciding by increasing dependence on other health care professionals	44 / 23.9	38 / 20.7	102 / 55.4	1.68	0.835
5.	Requires high-level and more qualified skills	53 / 28.8	30 / 16.3	101 / 54.9	1.74	0.879
6.	Increase the nurse's workload	48 / 26.1	31 / 16.8	105 / 57.1	1.69	0.860
7.	Compromising nurses' professional ethics	31 / 16.9	24 / 13	129 / 70.1	1.47	0.768
8.	It is impractical because behavioral health information cannot be captured by checkboxes and dropdown lists	39 / 21.2	32 / 17.4	113 / 61.4	1.60	0.817

9.	Require more training	70 / 38	24 / 13	90 / 48.9	1.89	0.929
10.	Difficult because nurse practice lacks the technological expertise to implement.	43 / 23.3	27 / 14.7	114 / 62	1.161	0.842
11.	Negatively influence treatment plans	34 / 18.5	28 / 15.2	122 / 66.3	1.52	0.789
12.	Disrupt nurses' relationships with their clients	34 / 18.5	33 / 17.9	117 / 63.6	1.55	0.788
13.	Be resisted by staff at the practice	47 / 25.5	32 / 17.4	105 / 57.1	1.68	0.855
14.	Increase the violation of patient privacy	35 / 19	26 / 14.1	123 / 66.8	1.52	0.796
15.	High cost of digitalization in healthcare	47 / 25.6	35 / 19	102 / 55.4	1.70	0.851
16.	Increase nurses' legal vulnerability	45 / 24.4	29 / 15.8	110 / 59.8	1.65	0.849

Table 3 indicates that nurses identified several barriers to digital acceptance. The highest levels of agreement are for issues related to requiring more training, requiring high and more qualified skills, and the high cost of digitalization in healthcare, in percentages of 38%, 28.8% and 25.6% respectively. In contrast, Nurses also showed high levels of disagreement regarding digitalization compromising nurses' professional ethics, increasing the violation of patient privacy, and negatively influencing treatment plans in percentages of 70.1%, 66.8% and 66.3% respectively.

Section III: Factors Influencing Digital Acceptance

Table (4):Correlation between nurses' personal data and their acceptance of digitalization

Variable	Correlation	Sig. (2-tailed)
Gender	1.00	0.038
Age	**0.154**	**0.000**
Nationality	0.526	0.318
Qualification	0.074	0.296
Years of Experience	0.009	0.902
Years of experience in the same unit	0.193	0.009

Table 4 indicated that revealed that age was significantly associated with nurses' acceptance of digitalization (p < 0.000). Older nurses demonstrated comparatively lower acceptance levels than younger nurses. No statistically significant relationships were found between acceptance and gender, nationality, educational qualification, or years of experience.

Although the study aimed to explore factors affecting staff nurses' acceptance, regression analysis was not performed due to the exploratory nature of the study and the limited response scale. Therefore, correlation analysis was used to identify significant associations that may guide future predictive research.

Discussion

This chapter discusses the results of the current study compared with recent literature and other related studies. It also explains to what extent the results of the present study supported or contradicted the results of others. The present study aimed to explore staff nurses' opinions about the use of digitalization in nursing care in Saudi Arabia.

The current study results revealed a relatively balanced gender distribution, with males comprising 52.7% and females 47.3%. While nursing has traditionally been a female-dominated profession globally, recent local studies show mixed gender patterns depending on the context and setting. This finding is in agreement with that of Tagreed, (2025) who studied Quality of Nursing Care of Patients under Mechanical Ventilation in Intensive Care Unit and reported nearly equal representation of male and female nurses (49% male and 51% female), highlighting an evolving gender composition in some clinical environments.

Examining the age distribution, the largest percentage of nurses (32.1%) fell within the 20-> 25-year age group, suggesting a relatively young workforce in this particular study. This contrasts with findings by Smiley et al. (2025) in the US, which reported the median age of registered nurses to be 46 years, indicating a potentially younger nursing demographic in the studied population compared to the US.

In terms of nationality, the majority of nurses in this study were Saudi nationals, with smaller proportions of Filipino and Sudanese nurses. This aligns with national efforts under Vision 2030 and health sector transformation initiatives to increase the representation of Saudi nurses in the healthcare workforce. Although broader national data indicate ongoing diversity and regional inequalities in nurse distribution, the trend toward higher localization within specific facilities remains evident (Kattan & Al-Hanawi, 2025).

Regarding qualification, the majority of the nurses (66.3%) held a Bachelor of Nursing degree, followed by those with postgraduate studies (16.3%). This suggests a generally well-educated nursing workforce in the study. This finding is in agreement with that of Tagreed, (2025) who reported 64.7% of studied sample held bachelor's degrees. Recent trends in nursing education, as highlighted by the American Association of Colleges of Nursing (AACN) in April 2024, show an increasing preference and requirement for baccalaureate-prepared nurses, indicating the growing importance of higher education in the nursing profession globally.

Regarding years of professional experience, the largest group had between 5 and 10 years of experience (60.3%), followed by those with 10–20 years (30.4%). A considerable proportion was also relatively experienced within their current units. This finding is in agreement with that of Tagreed, (2025) who reported (64.7%) of the

of the studied sample had 1–5 years of experience in ICU. These findings on experience levels are crucial for understanding the skill mix and potential mentorship opportunities within the nursing teams in the study. Recent studies have emphasized the importance of experienced nurses in mentoring new entrants, especially given concerns about potential shortfalls due to retirements in some regions, as noted in the WHO's May 2025 report.

<u>The current results showed</u> that the majority of nurses demonstrated a high level of acceptance of digital health technologies, as evidenced by the overwhelmingly positive agreement across multiple dimensions of technology utility. These findings suggest a strong overall endorsement of digitalization, reflecting nurses' recognition of its practical benefits in clinical settings. These results are consistent with recent literature demonstrating that healthcare professionals, including nurses, generally hold positive perceptions toward digital health technologies. For instance, Jarva et al., (2022) who studied and reported that nurses believe these systems enhance workflow efficiency and support safer, more accurate documentation, which are key contributors to technology acceptance.

Also, Ismail, Mamdouh, Mohamed, & Said, (2025) Conducted a study titled Digital Nurses' Competencies in Relation to Patient Safety and Teamwork Communication and found a significant positive correlation between nurses' digital competencies, patient safety, and teamwork communication. They also emphasized the importance of technology in modern healthcare settings.

Moreover, the integration of digital tools can lead to significant time and cost savings. Research conducted by Volkan, Köse, Cece & Elmas (2024) about Analysis of the effect of digital hospital efforts on paper savings in inpatient procedures and on the duration of nursing care services indicates that digitalizing forms and administrative tasks can free up nurses' time, allowing them to focus more on direct patient care. This efficiency not only reduces the workload on nurses but also contributes to increased job satisfaction. The adoption of telehealth and remote monitoring technologies has also expanded the scope of nursing practice, enabling nurses to provide care to patients in various settings and improving overall accessibility to healthcare services.

<u>The current results</u> revealed that nurses identified several key barriers to digital acceptance, with the highest levels of agreement being for issues related to the need for more training (38%), requirement for more highly qualified skills (28.8%), and the high cost of digitalization in healthcare (25.6%). These results align with existing literature emphasizing insufficient training and skill gaps as major obstacles to the adoption of digital health technologies. A systematic review of digital nursing technologies identified insufficient training, increased workload, and low technological confidence as recurrent barriers that negatively impact nurses' ability to integrate new digital tools into practice (Walzer et al., 2025).

The current study showed that the identified barriers, particularly training and skill requirements, indicate that resistance to digitalization reflects a need for organizational support rather than rejection of technology. Structured training, continuous technical assistance, and user-friendly system design are essential to enhance acceptance across age groups. Additionally, nurses reported concerns about potential data misinterpretation, increased stress and burnout, and reduced professional autonomy, highlighting the importance of careful implementation and sustained support to minimize the negative impacts of digitalization.

The data also reveals that nurses are worried about the potential for increased psychological stress and burnout associated with digitalization. The integration of new technologies into clinical practice can create additional workload and pressure on nurses, who may already be facing demanding work environments. Studies have shown that the learning curve associated with new technologies, coupled with concerns about technical malfunctions and data security, can contribute to increased stress levels among nurses. Healthcare organizations must address these concerns by providing sufficient resources, training, and ongoing support to help nurses adapt to the digital transformation.

Study results indicated that age is the only demographic variable significantly correlated with nurses' acceptance of digitalization in patient care. Specifically, older nurses were more likely to express different opinions about the use of digital technologies compared to their younger colleagues. This finding is consistent with some previous research that has explored the relationship between age and technology adoption among healthcare professionals.

Several studies have suggested that younger nurses, often referred to as "digital natives," tend to be more comfortable and proficient with technology, which may influence their perceptions of digitalization in healthcare. They've grown up with digital tools and may see them as integral to efficient and effective patient care. On the other hand, older nurses who may have less exposure to technology in their formative years might express more reservations or face more challenges in adapting to digital systems. This can shape their opinions on the benefits and drawbacks of digitalization in their daily practice.

However, it's important to note that the relationship between age and technology acceptance is complex and not always consistent across all studies. Some research has shown that with proper training and support, older adults, including healthcare professionals, can successfully adopt and utilize digital technologies. Therefore, the significant correlation between age and opinions on digitalization in this study highlights the need for tailored interventions and training programs that address the specific concerns and needs of nurses across different age groups.

The fact that gender, nationality, qualification, and years of experience (both overall and in the same unit) did not show a significant correlation with nurses' opinions suggests that these factors do not play a substantial role in shaping their views on digitalization. This could imply that nurses' perceptions of digital technologies are more influenced by their personal experiences, training, and exposure to these tools in their professional practice, rather than by these demographic variables. However, further research with larger and more diverse samples may be needed to confirm these findings and explore other potential factors that may influence nurses' attitudes towards digitalization.

Conclusion

Nurses in the studied setting demonstrate a high level of acceptance of digital health technologies. However, acceptance varies significantly by age, underscoring the need for age-sensitive digital transformation strategies. Addressing training needs and providing tailored support can enhance nurses' engagement with digital systems and promote sustainable integration into nursing practice.

Recommendations

Designing age-appropriate digital training programs can be a good idea to help the acceptance of technology among older nurses. However, embedding digital skills development in nursing education at all stages would be a great professional development strategy. Consistent technical help should be available to lower anxiety and raise self-assurance in one's abilities to operate digital systems. Incorporating nurses as co-designers and testers of the systems can be a powerful way to raise the level of comfort and approbation of these tools.

Funding

Availability statement

The corresponding author may obtain data substantiating the study's conclusions upon a reasonable request.

Conflicts of interest

The authors declare no conflicts of interest related to this article.

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