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Editor's Letter

Disruptive Technologies and the Development of Knowledge Economy

Dear Readers,

We are pleased to announce the publication of the inaugural issue of *Knowledge Economy Studies*, which features a collection of significant studies in the field of knowledge economy. This issue focuses on innovative technologies that are pivotal to the development of a knowledge-based economy, offering strategic insights for decision-makers and policymakers.

In today's world, the key divide between developed and developing countries is not access to natural resources but access to knowledge resources. Knowledge capital is increasingly recognized as essential for achieving national and organizational objectives, with competitive advantage in the information age reliant on managers' abilities to acquire, utilize, and protect knowledge assets. Recent years have seen significant investments in knowledge management, focusing on technologies that enhance knowledge processes within communities and organizations. The United Nations General Assembly's initiative, "The Future We Want," highlights the importance of sustainable development through equitable economic growth, creating opportunities, reducing inequality, and managing resources sustainably. Building a knowledge society is closely linked to disruptive technologies like artificial intelligence (AI), Blockchain, social media, cloud computing, the Internet of Things (IoT), and big data. Sustainable development depends on effective knowledge asset management, achievable through the adoption of digital technologies. We are witnessing the rise of a digital knowledge society, which promotes good governance at the national level, efficient management at the organizational level, and improved productivity for individuals. International organizations are working to bridge the digital divide between developed and developing nations regarding access to these transformative technologies. Establishing a digital knowledge society is essential for fostering equitable economic growth and social development globally. Thus, investing in disruptive technologies is a crucial strategy for nations aiming to enhance their technical capabilities and transition to a knowledge-based economy.

The studies featured in this issue encompass various domains, including artificial intelligence, Fintech, customer knowledge, and more, examining the potential of emerging technologies in the knowledge economy from diverse perspectives.

I hope that the articles in this issue will enhance the knowledge of researchers and practitioners in related fields and serve as a guiding light for future scholars in this domain. Finally, I would like to extend my heartfelt gratitude to the esteemed authors and dedicated reviewers whose commitment to scholarly excellence has made this journal a valuable resource in our field.

Warm regards,

Mona Jami Pour
Editor-in-Chief
Knowledge Economy Studies

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Ranking Key Indicators for Effective Brand Integration in Advergaming Experiences Using the Fuzzy AHP Method

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ABSTRACT

Advergames are a popular strategy for attracting customers and enhancing brand awareness by integrating brand-related content into video games. However, the effectiveness of this integration depends on factors such as game design, player engagement strategies, and the alignment of game content with brand identity. Despite the growing importance of this field, limited research has systematically identified and ranked key indicators affecting brand integration in advertising experiences. Most existing studies focus on specific aspects of advertising, such as the impact of brand placement, the role of rewards, and the effect of game competition on brand acceptance, without providing a comprehensive framework for collectively evaluating these factors. This research employs the fuzzy analytical hierarchy process (FAHP) method to identify and rank the most influential factors for brand integration in video game advertising. The ranking results indicate that these three factors, in order of priority from first to third, are crucial for effective brand integration in advergaming: creating player engagement with the brand, matching game type with product/brand, and aligning advertising content with target players. The findings of this research help marketers and game developers design more impactful advertising experiences that align with brand objectives and player expectations. Games function as entertainment tools and can influence customer engagement and loyalty while conveying the brand's advertising message indirectly and without causing irritation.

KEYWORDS

Advergaming, Decision Making, Fuzzy Analytic Hierarchy Process (FAHP).

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Introduction

Technology's evolution has influenced our lives in many areas. One of the domains where technology has made a significant impact is "gaming." The emergence of digital games and continuous evolution in advertising has emphasized the importance of advergames (a combination of gaming and advertising) (Eyice Başev, 2024). Advergames create positive emotions among consumers by combining entertainment, advertising, and gaming elements, thereby increasing interest in products and services. Furthermore, advergames have been observed to increase consumers' conscious or unconscious willingness to purchase products or services (Elsayeh, 2020).

Consumer-brand engagement is a crucial consumer response to advertising and is conceptualized as consumers' cognitive, affective, and behavioral activities during or related to consumer-brand interactions. There has been an ongoing discussion about the dimensions of consumer-brand engagement (van Berlo & Chen, 2024). Consumer-brand engagement is an influential construct for creating customer satisfaction, brand love, and brand loyalty, improving advertising effectiveness and overall business performance (Cheung et al., 2020).

Customer engagement can be defined as a tool for creating and strengthening consumer relationships with commercial brands, as consumers often provide information and suggestions about brands to other consumers. They share their opinions, reviews, and questions about certain products, services, or companies. This concept, which represents consumer engagement with brands, indicates a shift in marketing research, as brands (and consumers) constantly seek new ways to increase their interaction (Marques et al., 2021).

Key performance indicators (KPIs) are one of the main concepts for increasing marketing effectiveness, both in digital marketing and in marketing for mobile applications (Reyes-Menendez et al., 2020). Improving business performance also requires delivering the highest added value to customers. KPIs are an essential element of performance measurement to help organizations achieve their goals. KPIs play a key role in measuring marketing effectiveness (Sychrová & Šimberová, 2012). It is important to define and monitor KPIs in marketing for a successful stay in the market and a competitive position at home and abroad. Today, the increase in competitive advantage includes mainly marketing, innovation, and information and communication technologies. New digital tools and innovations have changed how we approach data and decisions (Basile et al., 2023). KPIs play a role in increasing organizational efficiency and achieving long-term success. Metrics such as profitability, customer satisfaction, market share, sales growth, and planning efficiency are highlighted as essential tools for evaluating performance and refining marketing strategies. These indicators help managers assess the company's position relative to competitors, adjust strategies accordingly, and effectively meet market demand (Hennyeyová et al., 2021). The connection between KPIs and consumer engagement lies in the ability of businesses to use performance metrics to refine strategies that foster deeper, more interactive

relationships with consumers, ultimately enhancing both organizational efficiency and brand loyalty (Reyes-Menendez et al., 2020).

Consumer engagement goes beyond concepts like participation, as this concept demonstrates an active and interactive consumer connection with a specific focal objective (a product or brand). This concept is characterized by cognitive processing, affection, and activation characteristics (Cheung et al., 2020). With the growing role of advergames in industry, and it is suggested that they take a more prominent position in future marketing strategies (Eyice Başev, 2024).

Entertainment is a crucial principle in the interactive and digital use of media. Advertisers consistently emphasize the "enjoyment" element in their gaming advertising strategies (Adis et al., 2015; Cicchirillo & Mabry 2016). Today, computer games are no longer merely a form of entertainment; they have evolved to encompass numerous capabilities and applications, extending beyond children to become integral to everyone's daily lives. This shift has moved them beyond mere entertainment, compelling game developers to increasingly utilize their capabilities in various social, economic, political, and cultural spheres (Sharma, 2014; Terlutter & Capella, 2013). In this context, advertising can serve an entertaining role as a form of social communication, a function often fulfilled by advergames. Generally, advertising serves many functions, including information dissemination, education, persuasion, and sales (Ham et al., 2016).

While advertising serves multiple functions such as information dissemination, education, persuasion, and sales, a common limitation in many studies is the difficulty in measuring the effectiveness of these functions, especially in digital advertising formats like advergames (Cicchirillo & Mabry, 2016; Terlutter & Capella, 2013). These limitations often stem from lacking clear, quantifiable metrics for engagement and long-term impact.

To address these challenges, it is essential to integrate a more comprehensive framework for assessing consumer interaction with the advergame and how this engagement translates into measurable outcomes such as brand recall, purchase intent, and customer loyalty (Eyice Başev, 2024). By combining qualitative assessments with quantitative KPIs, advertisers can more effectively evaluate the broader impact of their campaigns and improve their strategies over time.

However, the success of advergames depends on identifying and effectively utilizing key factors that enhance brand integration and player engagement. Despite the growing popularity of advergaming, the lack of a structured approach to evaluating and prioritizing these factors presents a significant challenge. This study addresses this gap by using the Analytic Hierarchy Process method to rank key indicators for effective brand integration in advertising experiences. This research aims to systematically prioritize these factors to provide practical insights for designing more effective advergames, thereby bridging the gap between academic research and practical application.

Literature Review

In the literature review, we first discuss advergaming and highlight its importance

through numerical data. Then, we address the effectiveness of advergaming. Despite its current significance, the ranking of advergaming has not received much attention.

Advergaming

In recent years, advergames have rapidly evolved as a creative platform for delivering advertising messages (Catalán & Martínez, 2020). Advergaming is one of the newest marketing strategies that has gained increasing attention and emerged as a dynamic mass medium for marketers (Jami Pour et al., 2020). Advergames (a combination of "advertising" and "gaming") is a term used to describe digital games specifically designed from the outset to advertise a product, service, or brand. Typically, these interactive online games incorporate advertising so that the games themselves become the brand message (Smith et al., 2020; Vanwesenbeeck et al., 2017).

Gaming has always been important for humanity. As our society develops digitally, it is unsurprising that digital games have become prevalent, and their distribution continues to increase. Digital games have evolved into mass media, attracting millions of people (Terlutter & Capella, 2013). While the term advergaming appears relatively new in advertising literature, the first advergames date back to 1983 (Catalán et al., 2019). Advergames are online games used to advertise products or brands and are most commonly used by the food industry. Evidence suggests that advergames encouraging food purchase and consumption can sometimes even improve children's food consumption patterns (Folkvord et al., 2020). Statistics about total internet users as of January 2021 show that the number of active internet users worldwide was 4.66 billion (59.5 percent of the global population). It is predicted that the online audience will reach 5,631.54 million users by 2025 (Statista, 2021).

Investment in advergaming represents the third-largest investment budget (approximately 12% of the online advertising budget) on the Internet (Jami Pour et al., 2020). Gaming companies, analyzing the share of in-game advertising, have predicted a growth of $3.54 billion in this industry during 2021-2025, progressing at an annual growth rate of 16 percent throughout the forecast period (Research & Markets, 2021). Advergames are widely used by famous companies implementing international marketing strategies; however, due to being a relatively new advertising method, there are few studies explaining the characteristics of advergaming and its effect on consumer behavior, even in developed countries (Gure & Gura, 2016).

We expect advergames, compared to static advertising, to have a positive impact on all three dimensions of consumer-brand engagement. Advergames, as gamified advertisements, are designed to provide interactive, entertaining experiences between consumers and products. Interaction is a precursor to consumer-brand engagement and is therefore believed to be an important driver of engagement with brands embedded in advergames (van Berlo & Chen, 2024).

Impact of Gaming on User Attitudes

Cognitive processing represents consumers' knowledge about a brand and is defined as

the level of consumer processing and thinking related to a specific brand (Bilro & Loureiro, 2020). The persuasive effectiveness of a game in brand evaluation is determined by its gameplay and the alignment of the message with the subject matter. The stronger the thematic connection between the game and the brand message, the stronger the persuasive effects on attitudes (Waiguny et al., 2012; Rifon et al., 2015; Grace & Coyle, 2011). If a game is entertaining, it positively impacts brand beliefs, brand attitudes, and brand selection behavior; all these factors demonstrate the power of advergames. Explicitly, this method of implicit learning and persuasion mechanism is employed by advergames for learning about brands and products (Waiguny et al., 2013; Waiguny et al., 2012). Players are exposed to company brands and their advertisements during gameplay. This enables advertisers to promote their brands through entertainment and information sharing, resulting in strong brand awareness among players (Sreejesh et al., 2018; Adis & Jun, 2013; Tina & Buckner, 2013).

In Reasoned Action Theory, it is assumed that intention or behavior directly affects an individual's attitude or object. Regarding exposure to advertising, the resulting responses and how they relate to attitudes and purchase intentions are further explained in the cognitive response model and are widely used (Patel et al., 2017). Attitudes toward advergames demonstrate consumers' favorable or unfavorable feelings toward the advertisement and represent an effective mediating variable for commercial attitudes and purchase intention. This can play into consumer benefits toward advertising that lead to active user interactions (Hernandez et al., 2004).

Internet advertising through online games, viral marketing, or social networks are just some of the non-traditional advertising tools that major companies still use to advertise their brands (Vashisht & Royne, 2016). Studies in this field generally agree that advergames can effectively influence brand-related information by fostering a positive and flexible connection with the game, thereby enhancing brand awareness, brand knowledge, and favorable brand attitudes. However, although many academic approaches have theoretically described advergames as a new form of advertising with significant potential, research on them is still limited in number and scope (Lee & Cho, 2017).

Key Indicators for Effective Brand Integration in Advergaming Experiences

Today, creating brand interest among customers is not a simple task. *Interest* can be defined as a feeling, passion, and pleasure experienced by consumers with brands. Activation refers to the energy, effort, and time consumers spend interacting with specific brands, meaning activation is the behavioral dimension of customer brand engagement (Agustina & Ardiyanto, 2020). Meanwhile, technological advancements have changed how customers interact and become loyal. Advertising in the digital space is interactive, and increased interaction in this type of advertising makes it more effective (Salciuviene et al., 2017).

Today's media environment is filled with numerous advertising messages that encompass every aspect of our society and culture. This has created confusion in advertising that appears on the internet and digital media, which can lead to negative

attitudes toward advertising. Due to this oversaturation, brands are forced to define their messages as entertainment; one way to create an engaging and entertaining experience with consumers is through advergames (Cicchirillo & Mabry, 2016).

Key Performance Indicators (KPIs) play a critical role in brand integration within advergames by helping to measure and optimize the effectiveness of the advertising experience. Some of the key indicators include:

1. Brand Recall and Recognition: This measures how well consumers remember the brand after interacting with the advergame. Strong brand recall often translates into better customer retention and loyalty (Terlutter & Capella, 2013).
2. Consumer Engagement: This is assessed by players' active participation and emotional investment in the game, which enhances the depth of brand interaction (Cheung et al., 2020). The more engaged the consumer, the more likely they are to internalize the brand message and develop a positive attitude toward it.
3. Purchase Intent: This indicator measures the likelihood of a consumer purchasing a product or service after interacting with the advergame. It is the direct link between the advertising experience and real-world consumer behavior (Cicchirillo & Mabry, 2016).
4. Emotional Response: This evaluates consumers' emotional reactions- such as enjoyment or excitement- to the game and can provide insights into how effectively the brand is integrated into consumers' experience (Eyice Başev, 2024). Positive emotional responses are often associated with stronger brand affinity.

By measuring these KPIs, businesses can ensure that their advergames not only entertain but also reinforce brand messages, drive sales, and foster long-term customer relationships. A comprehensive approach to monitoring and analyzing these indicators can bridge the gap between entertainment and brand integration, ensuring that advergames achieve marketing and consumer engagement goals.

Research Background

Overall, the studies that were conducted emphasize the importance of advergaming design elements, including interaction, game speed, and brand placement, as factors that can significantly impact on consumer behavior. These studies necessitate establishing a comprehensive model for examining advergames and their impact on brand recall. The following table reviews these previous studies.

Table 1.
Key Factors for Effective Brand Integration in Advergaming: A Literature Review

Title	Authors & Year	Methodology	Finding
A General Review of the Impact of Advergames on Consumer Purchasing Behavior: A Literature Review	Eyice Başev (2024)	Documentary review method analyzing existing literature on advergames and consumer behavior. Various sources were examined to obtain sufficient evidence for analysis.	- Emotional Impact: Advergames increase interest in products and services by creating positive emotions in consumers. - Increased Purchase Intent: Evidence shows these games can strengthen consumers' conscious or unconscious

Title	Authors & Year	Methodology	Finding
			willingness to purchase products or services. - Role in Marketing Strategies: Advergames are growing as an effective tool in the advertising industry and are predicted to have a more prominent position in future marketing strategies.
Understanding Customer Attitude Towards Advergames: An Extended TAM Approach	Jami Pour et al., (2023)	Used a mixed approach conducted in two phases: 1. Qualitative phase: Literature review and 15 semi-structured interviews. 2. Quantitative phase: Validating the proposed model using 102 questionnaires completed by advergame players.	- Main attitude factors identified in three categories added to TAM - Advertising content and game-related factors positively affect the perceived ease of use. - Advertising content and player-related factors significantly impact perceived usefulness
Engaging Consumers with Advergames: An Empirical Evaluation of Interactivity, Fit and Expectancy	Goh & Ping (2014)	Created an online 3D virtual environment with 8 modes based on different combinations of interaction (low/high), fit (low/high), and expectancy (low/high).	- High fit, high interaction, and low expectancy led to more favorable attitudes. - Under low interaction, low expectancy led to more positive attitudes - Brand attitudes significantly affect purchase intention. - Interaction directly impacts consumer attitudes toward game and brand.
Using Mobile Advergames as a Tool for Brand Communication: A Case Study	Gura & Gura (2016)	A case study of an Albanian company using mobile advergames for brand experience advertising.	- Impact on Brand Recognition: Helps measure campaign effects in the short term and builds a customer database. - Customer Relationship Management: Effective design helps brands manage social responsibilities and maintain customer relationships.
Impact of Advergame Speed and Brand Recall: Moderating Effects of Brand Placement Strength and Gamers' Persuasion Knowledge	Vashisht & Royne (2016)	The research examined the effects of low and high speed in advergames and analysis of differences related to customer persuasion power.	- Lower-speed games have a greater impact on brand recall. - A two-way interaction was found between advertising speed and brand placement strength. - No difference was observed between high and low persuasion power in brand recall.
Purchase Behavior in Advergames and the Mediating Role of Brand Attitude	Adis et al., (2015)	Used Structural Equation Modeling (SEM) to examine direct and indirect effects of brand congruity and entertainment on brand attitude and purchase intention.	- Brand congruity and entertainment directly affect brand attitude. - These factors indirectly influence purchase intention through brand attitude. - Positive brand attitude strengthens the relationship between brand congruity, entertainment, and purchase intention.
Effects of Brand Placement Strength, Prior Gaming Experience, and Game Involvement on Brand Recall in Advergames	Vashisht & Sreejesh (2015)	Quantitative approach using interactive experiment design and statistical modeling.	- Stronger brand placement significantly increases brand recall. - Players with prior experience show higher brand recall. - Active player participation leads to stronger emotional brand connection. - Player interaction directly affects brand recall.

(Source: Researcher's Findings)

Eyice Başev (2024) identifies factors affecting advertising games, including their emotional impact, their effect on increasing purchases, and their role in shaping marketing strategies. Similarly, Gura and Gura (2016) points out that advergames can measure short-term campaign impact, collect customer data for future use, support customer relationship management, and help brands fulfill social responsibilities through sustained engagement.

A review of the literature has identified key indicators of brand effectiveness in advergames, as provided in Table 2.

Table 2.
Categories extracted from literature concepts

Indicators	Literature Sources
Matching game type with product/brand	Martí-Parreño et al., (2013); Smith et al., (2013); Terlutter & Capella (2013); Adis & Kim (2013); Hernandez et al., (2004); Jashnabadi et al., (2023).
Creating player engagement with the brand	Cicchirillo & Mabry (2016); Vashisht & Royne (2016); Wang et al., (2018); Ham et al., (2016); Vashisht & Sreejesh (2015); Gure & Gura (2016); Choi et al., (2015); Sharma (2014); Sreejesh & Anusree (2017); Dahl et al. (2009); Farías (2018); Amiri Sardari et al., (2024).
Matching advertising content with target players	Terlutter & Capella (2013)
Providing information about product/brand features	Catalán et al., (2019); Çardici & Gungor (2019); Liu & Jang (2011); Unal et al., (2011); Rodrigues et al., (2017); Rese et al.; (2017, 2014); Nazarian-Jashnabadi et al., (2024).
Offering comparison capability between different brand products in-game	Martí-Parreño et al., (2013); Liu & Jang (2011); Unal et al., (2011); Rodrigues et al., (2017); Rese et al., (2017, 2014).
Facilitating brand selection through gameplay	Terlutter & Capella (2013); Jami Pour & Kazemi (2020).
Providing positive social experience for players	Grace & Coyle (2011); Terlutter & Capella (2013).
Offering various rewards to players	Terlutter & Capella (2013); Grace & Coyle (2011).
Using visually-appealing games	Grace & Coyle (2011).
Using celebrities in games	Terlutter & Capella (2013); Jami Pour & Kazemi (2020); Nazarian-Jashnabadi et al., (2023).
Designing competitive game in brand acceptance	Terlutter & Capella (2013); Jami Pour & Kazemi (2020).

(Source: Researcher's Findings)

Key Indicators for Effective Brand Integration in Advertising Experiences

With technological advancements, the way customers interact and develop loyalty has changed. Advertising in the digital space is interactive, and increased interaction in this type of advertising leads to more effective advertising (Salciuviene et al., 2017).

Overall, numerous studies have been conducted in various areas, including:

- Appropriate overlap between the message and game (Roettle et al., 2016);
- The impact of brand congruity and entertainment factors on attitudes (Adis et al., 2015);
- The effects of game speed in advergames on brand attitude and recall among young Indian players (Sharma, 2014)

- The influence of brand recall and brand attitude on Malaysian players' purchase intentions (Adis & Jun, 2013)
- A model of reactions generated by exposure to advergames among Mexicans, Peruvians, and Americans; "HISPANIC ATTITUDES TOWARD ADVERGAMES: A PROPOSED MODEL OF THEIR ANTECEDENTS"

Recent scientific studies have focused on product and brand presentation effectiveness in electronic games by evaluating brand recall and attitudes toward brand placement (Hernandez et al., 2004). However, at the time of this research, no study had examined this field from a technology acceptance perspective.

Methodology

To rank the indicators in advergames, we first reviewed previous studies. After identifying the indicators obtained from these studies, the Analytic Hierarchy Process (AHP) method was used to prioritize these indicators. AHP is one of the most widely used multi-criteria decision-making methods with numerous advantages. This method structures complex problems hierarchically, allowing decision-makers to examine and analyze different factors at various levels (de FSM Russo & Camanho, 2015). Other advantages of this method include the capability for pairwise comparison, the ability to combine quantitative and qualitative data, and flexibility in application across different problems. Additionally, AHP is highly effective in managerial and strategic issues where precise and complete data is unavailable, due to its calculation of relative weights of criteria based on decision-makers judgments (de FSM Russo & Camanho, 2015).

To improve the accuracy and performance of the AHP method in dealing with ambiguities and uncertainties in human judgments, the fuzzy version of this method was used. Fuzzy AHP, utilizing fuzzy logic, provides the ability to model and manage uncertainty ranges. In this version, decision-makers judgments are expressed as fuzzy values rather than exact numbers, creating more flexibility in data analysis (Nezhad et al., 2023). Moreover, using fuzzy logic allows decision-makers to manage uncertainty and fluctuations in data better. Consequently, Fuzzy AHP increases accuracy in prioritization and makes the outputs closer to actual conditions (Gupta et al., 2024). This approach provides more optimal solutions, especially in complex problems with unclear data.

This research used opinions from five experts specialized in advergaming and digital marketing. Experts were selected based on their expertise and experience. They had at least five years of practical or research experience in the related field, held master's or doctoral degrees, and were sufficiently familiar with concepts related to multi-criteria decision-making and fuzzy logic. Additionally, these individuals were selected based on criteria such as diversity of perspectives, access to up-to-date information, and willingness to collaborate in the research process. The presence of these experts ensures the quality and validity of input data and final research results. The stages of the Fuzzy AHP method are presented in sequence below.

In addition to the general criteria mentioned, the expertise of the selected

professionals was defined based on the following: these individuals had at least five years of practical experience in the advergaming and digital marketing industry, with specializations in areas such as designing advergames, developing digital marketing strategies, and integrating brands within gaming environments. Furthermore, their current roles included project management for advertising campaigns, designing branded games, or serving as consultants in the advergaming field. These experts also had a track record of published academic papers or significant professional accomplishments, further validating their expertise level.

The statistical validation process has been elaborated further to enhance the credibility and reliability of the FAHP results. First, the consistency ratio (CR) test was conducted to ensure the logical coherence of the pairwise comparison matrices. Next, a sensitivity analysis was performed on the derived weights to assess the robustness of the results. This analysis revealed that slight changes in the input priorities had no significant impact on indicators' ranking, indicating method stability. Additionally, a comparison of the results obtained with those of similar studies was conducted to verify the alignment and consistency of the findings.

Step One: Determining Indicators

In the first step of the Fuzzy AHP method, indicators were determined as the ranking basis. For this purpose, previous studies were first identified and reviewed to extract a comprehensive set of proposed indicators. Then, these indicators were reviewed and evaluated by expert specialists in advergaming and digital marketing fields. Finally, the following 11 indicators were confirmed as final indicators and selected for ranking. These indicators are presented in Table 3.

Table 3.
Advergaming Indicators

Code	Criterion
C1	Matching game type with product/brand
C2	Creating player engagement with the brand
C3	Matching advertising content with target players
C4	Providing information about product/brand features
C5	Offering comparison capability between different brand products in-game
C6	Facilitating brand selection through gameplay
C7	Providing positive social experience for players
C8	Offering various rewards to players
C9	Using visually-appealing games
C10	Using celebrities in games
C11	Designing competitive game in brand acceptance

(Source: Researcher's Findings)

Step Two: Pairwise Comparison Matrix

After determining the indicators, the pairwise comparison process began to evaluate and prioritize them. In this stage, each indicator was evaluated and compared to other

indicators in pairs to determine their relative importance. For this purpose, Saaty's 9-point scale was used, which is widely applied in the Analytic Hierarchy Process (AHP) due to its high precision and interpretability. This scale enables more precise judgments and meaningful comparisons between indicators. Data for pairwise comparison was collected through the opinions of five expert specialists. These experts provided their judgments using the 9-point scale, considering each indicator's characteristics, relationships, and impacts. This stage plays a key role in determining the relative weight of each indicator and serves as the basis for subsequent analyses. Expert opinions were obtained based on the 9-point scale provided in Table 4.

Table 4.
Saaty's 9-Point Scale

Judgment	Equal Preference	Slightly Better	Better	Much Better	Absolutely Better
Row importance relative to the column	1	3	5	7	9
Column importance relative to row	1	0.33	0.2	0.142	0.111

(Source: Researcher's Findings)

Step Three: Formation of Fuzzy Integration Matrix

This step collects and integrates expert opinions and judgments to obtain a comprehensive view of indicator prioritization. The integrated numbers represent triangular fuzzy numbers. A triangular fuzzy number is one of the main tools in fuzzy logic that is defined by a range including three specific values: minimum value (lower bound), most likely value (middle bound or highest probability), and maximum value (upper bound). This range accurately and flexibly shows the degree of uncertainty in human judgments.

This method's use of triangular fuzzy numbers enables a more precise calculation of weights, as subtle differences in expert opinions are appropriately considered. This approach reduces ambiguity in judgments and increases the accuracy and reliability of the ranking process. Thus, the triangular fuzzy number serves as a powerful tool in combining opinions and decision-making in situations where ambiguity and uncertainty exist.

(1)

$$\widetilde{a_{ij}} = [a_{ij}, b_{ij}, c_{ij}]$$

The three components are:

1. Minimum of expert opinions (a)
2. Geometric mean of expert opinions (b)
3. Maximum of expert opinions (c)

Step Four: Calculating Fuzzy Weights from the Integration Matrix

In this step, the score for each criterion is obtained by calculating the geometric mean of the values in each row of the integrated pairwise comparison matrix. Due to its use of geometric mean, this method provides high accuracy in combining values and minimizes potential inconsistencies in pairwise judgments. The geometric mean of each row

represents the relative weight of each criterion compared to other criteria and serves as a key step in the prioritization process. The advantage of this method is creating balanced weights that align with the structure of the initial matrix, ensuring that the final output is presented with minimal distortion of input data. The results obtained in this stage form the basis for the final ranking and analysis of criteria.

(2)

$$Z_i = \left[\frac{a_{i1} \times a_{i2} \times a_{i3} \times, \ldots}{n}\right]$$

The score of each indicator is divided by the sum of all scores to convert it to a weight (a number between 0 and 1).

(3)

$$W_i = \frac{Z_i}{(Z_1 + Z_2 + Z_3 + \cdots)}$$

Step Five: Defuzzification

A definite value can be obtained using a simple arithmetic mean between the three components of a fuzzy number (i.e., the minimum, middle, and maximum values). This process is designed to reduce the inherent uncertainty of fuzzy numbers and present a real number as its representative by combining these three values. This method is one of the most widely used approaches in analyzing fuzzy numbers because it provides easier interpretation and direct comparison of results in addition to its simplicity. This technique, particularly in problems requiring final decision-making or ranking based on definite values, helps increase accuracy and clarity in the output.

(4)

$$W_i = \frac{W_{ai} + W_{bi} + W_{ci}}{3}$$

Step Six: Normalization

The weight normalization process is performed to determine the weighted nature of each indicator. In this process, the weight assigned to each indicator is divided by the sum of total weights to determine the relative share of each indicator. Then, for a better and more understandable representation of the indicators' importance, the obtained value is multiplied by 100. Thus, the importance of each indicator is expressed as a percentage of total weights, where this percentage shows the relative share and role of each indicator compared to other indicators.

In addition to its simplicity, this normalization method enables comparing indicators and provides a clearer view of their prioritization and importance. Using percentage as the final scale increases the capability for result analysis and more precise decision-making. Such an approach in analyzing indicators, especially in multi-criteria problems, enhances the accuracy and transparency of results and provides a suitable framework for strategic decision-making.

(5)

$$NW_i = \frac{W_i}{\sum_{i=1}^{n} W_i} \times 100$$

Findings

The Fuzzy AHP method was used to rank advergaming indicators. Initially, expert opinions in this field were collected and then combined. Expert opinions were defuzzified to remove ambiguity and convert fuzzy data to more precise values. The results from defuzzification were presented as non-normalized weights in Table 5. The normalization process was performed to convert these weights into comparable and standardized values. In this stage, non-normalized weights were divided by the total sum of weights, and finally, normalized weights were obtained, which were used for ranking the indicators. This process significantly increases the model's accuracy because using the Fuzzy AHP method enables consideration of uncertainties and ambiguities that may exist in expert evaluations. Converting opinions to fuzzy values and then defuzzifying them allows the researcher to analyze data more flexibly and with greater precision.

Table 5.
Non-normalized and Normalized Weights

Code	Criterion	Non-normalized Weight	Normalized Weight
C1	Matching game type with product/brand	1.124	0.207
C2	Creating player engagement with the brand	1.292	0.237
C3	Matching advertising content with target players	1.023	0.188
C4	Providing information about product/brand features	0.415	0.076
C5	Offering comparison capability between different brand products in-game	0.132	0.024
C6	Facilitating brand selection through gameplay	0.105	0.019
C7	Providing good social experience to player	0.139	0.025
C8	Offering various rewards to players	0.256	0.047
C9	Using visually-appealing game	0.517	0.095
C10	Using celebrities in games	0.125	0.023
C11	Designing competitive game in brand acceptance	0.315	0.058

(Source: Researcher's Findings)

Following the weight normalization process, the weight percentage of each indicator was calculated and extracted to increase accuracy and ease of comparison between indicators. These percentages represent the relative importance of each indicator in the decision-making and prioritization process. Then, based on these weight percentages, the final ranking of indicators was performed and displayed in Table 6. In addition to helping decision-makers identify indicator prioritization, this stage of analysis aids in more precise comparison between different indicators in complex conditions. As a result, this method can be used to optimize decision-making processes and determine more accurate weights for each indicator.

Table 6.
Weight Percentages and Final Rankings

Code	Criterion	Weight Percentage	Rank
C1	Matching game type match with product/brand	20.656	2
C2	Creating player engagement with the brand	23.735	1
C3	Matching advertising content with target players	18.806	3
C4	Providing information about product/brand features	7.619	5
C5	Offering comparison capability between different brand products in-game	2.431	9
C6	Facilitating brand selection through gameplay	1.923	11
C7	Providing good social experience to player	2.545	8
C8	Offering various rewards to players	4.711	7
C9	Using visually-appealing game	9.499	4
C10	Using celebrities in games	2.295	10
C11	Designing competitive game in brand acceptance	5.780	6

(Source: Researcher's Findings)

The game type matching with the product or brand (20.656%) emerged as a crucial factor, as aligning the game's theme with the brand creates a coherent and engaging experience. Creating player engagement with the brand (23.735%) was ranked highest, highlighting the importance of immersing players and fostering brand connection. Matching advertising content with target players (18.806%) ensures that the promotional messages resonate with the intended audience, boosting advergaming effectiveness. Providing information about product or brand features (7.619%) supports informed decision-making while offering comparison capability between brand products in-game (2.431%) adds depth by enabling product evaluation. Facilitating brand selection through gameplay (1.923%) reflects the potential of interactive choices to influence player preferences.

Ensuring a good social experience (2.545%) emphasizes the value of community and interaction during gameplay. Offering various rewards (4.711%) motivates players and reinforces positive brand associations. The game's visual appeal (9.499%) plays a significant role in capturing attention and retaining interest. Using celebrities in games (2.295%) leverages their influence to strengthen brand credibility, while game competitiveness in brand acceptance (5.780%) underscores the role of challenge and achievement in fostering positive brand attitudes. These indicators collectively outline a comprehensive framework for designing effective advergames that enhance brand integration and audience engagement.

Discussion and Conclusion

In summary, from analyzing the existing literature on advergames, it can be inferred that game-related characteristics act as either primary or conditional causes. These characteristics play a central role in influencing the effectiveness of brand implementation and delivery. This research has examined and ranked key indicators for

effective brand integration in advergaming experiences using the Fuzzy AHP method. In today's world, advergames have become one of the influential tools in marketing strategies. These tools can convey the brand message in an attractive and lasting way by capturing the audience's attention and creating interactive experiences. Therefore, identifying and ranking key indicators for the success of this type of advertising is essential so that brands can best utilize the potential of advergames and create a distinct and effective experience for their audience. The Fuzzy AHP method was used to rank indicators and clarify their priorities. This method, combining expert judgments and fuzzy logic, helps analyze and evaluate indicators in complex and uncertain conditions.

The ranking results indicated that the top three indicators were: creating player engagement with the brand (C2), matching the game type with the product/brand (C1), and aligning advertising content with the target players (C3), which ranked first, second, and third, respectively.

Creating player engagement with the brand (C2) achieved the first rank. This indicator is highly important because player engagement with the brand can have a profound impact on audience memory and willingness to interact more with the brand. To improve this indicator, brands should use game designs where players play an active role in the game's story, and the brand is naturally and attractively incorporated into the game flow. This can be achieved through interactive stories, rewards, and challenges that align with brand identity.

Matching game type with product/brand (C1) achieved the second rank. The integration of game type with the product or brand can have a significant impact on the audience's experience and their perception of the brand. Improving this indicator requires designing games that showcase the brand or product's nature in an attractive way that relates to the target audience. This can be accomplished by creating games where product features are utilized throughout different game levels, or brand messages are effectively conveyed through in-game interactions.

Matching advertising content with target players (C3) achieved the third rank. Advertising content must align with the needs and interests of target players to be impactful and effective. More precise research about the demographic and psychological characteristics of target players is necessary to improve this indicator. This way, advertising can be designed to be attractive and relevant for each group of players, thereby introducing the brand more precisely and effectively.

These results can help brands create more optimal strategies for advertising in the gaming world and provide more engaging interactive experiences for their audiences. Generally, advergames increase brand memory, have a positive effect on brand evaluation, and influence product selection. Advergames can transfer the pleasure of gaming to the brand placed in the game through psychological mechanisms. Through gaming experiences, games can help children acquire knowledge and behavioral norms; consequently, gaming can be described as a learning process in which entertaining content enhances the persuasive messages embedded within the game, thereby positively influencing the evaluation and preference for the presented product and brand.

This study contributes significantly to the theoretical understanding of brand integration in advergames, mainly through applying the Fuzzy AHP method to rank key indicators. By highlighting the importance of player engagement with the brand, the match between game type and product, and the alignment of content with target players, the research adds a structured framework for understanding how advergames can be optimized for maximum marketing impact.

From an academic perspective, this work advances the field of digital marketing by providing a methodologically sound approach to assessing advergaming effectiveness. It also offers a conceptual framework for future studies examining how different factors such as game mechanics, player behavior, and brand storytelling affect brand memory and preference. From a practical standpoint, the findings offer actionable insights for marketers seeking to leverage advergames as part of their digital strategy. By focusing on these ranked KPIs, brands can create more targeted, engaging, and memorable experiences for their audiences, leading to stronger brand connections and increased loyalty.

Managerial Recommendations

1. Player Engagement Strategy Development: Brand managers should prioritize fostering deep player engagement with the brand. This can be achieved by designing captivating levels and advergame challenges that seamlessly integrate the brand into the gameplay. Employing game mechanics such as competition, brand-related rewards, and customizable content can further enhance player engagement and strengthen the brand connection.
2. Game Alignment with Brand Identity: For the brand to be effectively integrated into games, the game type must align with brand and product characteristics. Brand managers should ensure that the brand message is consistent with the gaming experience and is naturally introduced throughout the gameplay process.
3. Precise Player Targeting: Matching advertising content with target audiences is another key factor. For this purpose, managers can use audience analysis data to ensure that advergames are accessible to target groups and that the advertising content is appropriate and attractive.
4. Designing Attractive and Non-Intrusive Advergames: Since advergames can become a highly effective advertising tool, managers should focus on designing entertaining and engaging games for audiences. These games should be designed to convey the brand message indirectly and avoid causing player irritation or annoyance.
5. Integration of Multimedia Experiences: Alongside gaming, content such as promotional videos, social campaigns, and online surveys can help strengthen advertising effectiveness and establish the brand in players' minds.

These recommendations can help marketers and game developers establish more effective and lasting connections with their audiences through advergames.

Research Limitations

While the study presents valuable insights into the ranking of KPIs for effective brand integration in advergaming, it is important to address several limitations:

- The research may be limited by the sample size and context, as it focuses on a specific group of players or types of games.This could limit the generalizability of the findings to broader populations or game types.
- The dynamic nature of digital marketing and gaming means that trends and effective strategies may evolve quickly, making the findings time-sensitive.
- Emotional engagement, a crucial element in advergaming, is challenging to quantify, which may have constrained the depth of analysis in certain aspects.
- This research is mainly based on qualitative analyses and expert opinions and does not use extensive empirical or test data in a real environment.

Future Research Directions

- *Emerging Technologies*: Future research can investigate the influence of augmented reality (AR) and virtual reality (VR) on advergaming to understand their potential to enhance user engagement and brand integration.
- *Personalization Strategies*: Future research can explore the impact of data-driven and customized advergaming experiences on improving brand connection and fostering consumer loyalty.
- *Psychological Mechanisms*: Future research can study the psychological aspects of player-brand interactions, such as the role of gamification elements in long-term brand preference.
- *Demographic Variability*: Future reseach can examine the effectiveness of advergaming across diverse demographics, focusing on how cultural, age or gender differences shape brand perception and player engagement.

REFERENCES

Adis, A. A. A., Kim, H. J., Majid, M. R. A., Osman, Z., Razli, I. A., & Ing, G. P. (2015). Purchase behavior in advergame and the effect of brand attitude as a mediator. *Asian Social Science, 11*(5), 249-257.

Adis, A. A., & Jun, K. H. (2013). Antecedents of brand recall and brand attitude towards purchase intention in advergames. *European Journal of Business and Management, 5*(18), 58-67.

Agustina, Y., & Ardiyanto, F. (2020). An Investigation of Consumer Brand Engagement Antecedents on iPhone Smartphone Users. *Journal of Management and Entrepreneurship Research, 1*(1), 56-66.

Amiri Sardari, Z., Abdoli Mohamadabadi, T., Nazarian-Jashnabadi, J., Tesoriere, G., & Campisi, T. (2024). Smart Experience and Green Health Tourism: The Moderating Role of Content Marketing. *Sustainability, 16*(11), 45-56. https://doi.org/10.3390/su16114546

Basile, V., Luongo, S., & Reinhard, K. (2023). Marketing Metrics in the Wine Retailing Industry. *Symphonya, (2),* 78-96.

Bilro, R. G., & Loureiro, S. M. C. (2020). Exploring Consumer-Brand Engagement in Online Environments Designed for Tourism. *Management Tourism Culture*, 247-264.

Çadırcı, T. O., & Gungor, A. S. (2019). Gap between mobile and online advergames: the possible effects of the optimal gaming experience-flow. In Application of Gaming in New Media Marketing (pp. 125-150). IGI Global.

Catalán, S., & Martínez, E. (2020). Influyen las partidas jugadas en la efectividad de los advergames? El papel de la familiaridad con la marca. *Cuadernos de Gestion, 20*,149-168. 10.5295/cdg.180966sc.

Catalán, S., Martínez, E., & Wallace, E. (2019). Analysing mobile advergaming effectiveness: the role of flow, game repetition and brand familiarity*. Journal of Product & Brand Management (No. ART-2019-111294)*.

Cheung, M. L., Pires, G., & Rosenberger, P. J. (2020). The influence of perceived social media marketing elements on consumer–brand engagement and brand knowledge. *Asia Pacific Journal of Marketing and Logistics, 32* (3), 695-720.

Choi, Y. K., S. Yoon, and C. R. Taylor. 2015. "How character presence in advergames affects brand attitude and game performance: A cross-cultural comparison*." Journal of Consumer Behaviour*, 14 (6): 357-365.

Cicchirillo, V., & Mabry, A. (2016). Advergaming and healthy eating involvement. *Internet Research, 26* (3), 587-603.

Dahl, S., Eagle, L., & Baez, C. (2009). Analyzing advergames: active diversions or actually deception. An exploratory study of online advergames content. *Young Consumers*, 10(1), 46-59.

De FSM Russo, R., & Camanho, R. (2015). Criteria in AHP: A systematic review of literature. *Procedia Computer Science, 55*, 1123-1132.

Elsayeh, Y. (2020). Investigating the Effectiveness of Applying Mobile Advergames in Tourism Marketing-An Exploratory Study about Egypt. *International Journal of Research in Tourism and Hospitality (IJRTH)*, 2455-0043.

Eyice Başev, S. (2024). A General Overview of the Impact of Advergames on Consumer Purchase Behavior: A Literature Review*. International Journal of Eurasia Social Sciences, 15,* 260-275. 10.35826/ijoess.4428.

Farías, P. (2018). The effect of advergames, banners and user type on the attitude to brand and intention to purchase. Revista Brasileira de Gestão de Negócios, 20, 194-209.

Folkvord, F., Anschütz, D. J., & Buijzen, M. (2020). Attentional bias for food cues in advertising among overweight and hungry children: An explorative experimental study. *Food Quality and Preference,* 79, 103792.

Goh, K. Y., & Ping, J. W. (2014). Engaging consumers with advergames: An experimental

evaluation of interactivity, fit and expectancy. Journal of the Association for Information *Systems, 15*(7), 2-15.

Grace, L. D., & Coyle, J. (2011). Player performance and in game advertising retention. In *Proceedings of the 8th International Conference on Advances in Computer Entertainment Technology* (pp. 1-5).

Gupta, S., Modibbo, U. M., & Ali, I. (2024). Fuzzy AHP Approach for Multi-Criteria Stress Analysis During COVID-19: A Case Study. *Decision Making Advances, 2*(1), 238-266.

Gura, S., & Gura, K. (2016). The use of mobile advergame as brand communication tool: case study "Vodafon City". *American Journal of Marketing Research, 2*(2), 61-72.

Ham, C. D., Yoon, G., & Nelson, M. R. (2016). The interplay of persuasion inference and flow experience in an entertaining food advergame. *Journal of Consumer Behaviour, 15*(3), 239-250.

Hennyeyová, K., Janšto, E., Šilerová, E., & Stuchlý, P. (2021). Influence of Key Performance Indicators in Marketing on the Financial Situation of Wine Producers Using ICT. *AGRIS on-line Papers in Economics and Informatics, 13*(3), 49-58.

Hernandez, M. D., Chapa, M. S., Minor, Maldonado, C. & Barranzuela, F. (2004). Hispanic attitudes toward advergames: A proposed model of their antecedents. *Journal of Interactive Advertising, 5* (1), 74-83.

Jami Pour, M., Kazemi, Z., & Moeini, H. (2023). Understanding customer attitude toward advergames: an extended TAM approach. *Arts and the Market, 13*(2), 94-116.

Jami Pour, M., Sadeghi, S., & Yahyaei, E. (2020). Identifying the success factors of advergames: a mixed-method approach. *Arts and the Market, 1* (3), 205-220.

Jashnabadi, J. N., Pooya, A., & Bagheri, R. (2023). Provide a model for budget policy in university-community communication programs with a system dynamics approach (case study: Ferdowsi University of Mashhad). *Journal of Independent Managment Perspective, 13*(1), 9–39. https://doi.org/10.48308/jimp.13.1.9

Lee, H., & Cho, C. H. (2017). An application of brand personality to advergames: The effect of company attributes on advergame personality. *Computers in Human Behavior,* 69, 235-245.

Liu, W. L., and H. Y. Jang. 2011. "Factors affecting consumer's perceived advertising value and attitude toward mobile advertising: Focus on company-factors and consumer-factors." *Asian Journal of Business and Management Sciences*, 3(2): 44-55.

Marques, I.R., Casais, B., & Camilleri, M.A. (2021). The Effect of Macrocelebrity and Microinfluencer Endorsements on Consumer–brand Engagement in Instagram, Camilleri, M.A. (Ed.) *Strategic Corporate Communication in the Digital Age*, Emerald Publishing Limited, 131-143.

Nazarian-Jashnabadi, J., Haseli, G., & Tomaskova, H. (2024). Digital transformation for the sustainable development of business intelligence goals. In *Decision Support Systems for Sustainable Computing* (pp. 169–186). Elsevier. https://doi.org/10.1016/B978-0-443-23597-9.00008-1.

Nazarian-Jashnabadi, J., Ronaghi, M., Alimohammadlu, M., & Ebrahimi, A. (2023). The framework of factors affecting the maturity of business intelligence. *Business Intelligence Management Studies, 12*(46), 1–39. https://doi.org/10.22054/ims.2023.74305.2346

Nezhad, M. Z., Nazarian-Jashnabadi, J., Rezazadeh, J., Mehraeen, M., & Bagheri, R. (2023). Assessing dimensions influencing IoT implementation readiness in industries: A fuzzy DEMATEL and fuzzy AHP analysis. *Journal of Soft Computing and Decision Analytics, 1*(1), 102–123. https://doi.org/10.31181/jscda11202312

Patel, J. D., Gadhavi, D. D., & Shukla, Y. S. (2017). Consumers' responses to cause related marketing: moderating influence of cause involvement and skepticism on attitude and purchase intention. *International Review on Public and Nonprofit Marketing 14* (1), 1-18.

Rese, A., D. Baier, A. Geyer-Schulz, and S. Schreiber. 2017. "How augmented reality apps are accepted by consumers: A comparative analysis using scales and opinions." *Technological Forecasting and Social Change*, 124: 306-319.

Rese, A., S. Schreiber, and D. Baier. 2014. "Technology acceptance modeling of augmented reality at the point of sale: Can surveys be replaced by an analysis of online reviews?." *Journal of Retailing and Consumer Services*, 21 (5): 869-876.

Research and markets (2021). Global In-Game Advertising Market 2021-2025. Accessed May 2021. https://www.researchandmarkets.com/reports/5011378/global-in-game-advertising-market-2021-2025#.

Reyes-Menendez, A., Saura, J. R., & Palos-Sanchez, P. (2020). Identifying key performance indicators for marketing strategies in mobile applications: A systematic literature review. *International Journal of Electronic Marketing and Retailing, 11*(3), 259-277.

Rifon, N. J., Taylor Quilliam, E., Paek, H. J., Weatherspoon, L. J., Kim, S. K., and Smreker, K. C. (2014). Age-dependent effects of food advergame brand integration and interactivity. *International Journal of Advertising*, 33(3), 475-508.

Rodrigues, L. F., C. J. Costa, and A. Oliveira. 2017. "How does the web game design influence the behavior of e-banking users?." *Computers in Human Behavior*, 74: 163-174.

Roettl, J., M. Waiguny, and R. Terlutter. 2016. "The persuasive power of advergames: A content analysis focusing on persuasive mechanisms in advergames." *Australasian Marketing Journal*, (AMJ) 24 (4): 275-287.

Salciuviene, L., Miller, C. E., Reardon, J., Mikoliunas, T., Lee, K., & Miller, K.E. (2017). Media involvement and consumer attitude formation towards digital advertising, Academy of Marketing.

Sharma, M. (2014). Advergaming–The Novel Instrument in the Advertsing. Procedia Economics and Finance, 11, 247-254.

Smith, R., Kelly, B., Yeatman, H., Moore, C., Baur, L., King, L., & Bauman, A. (2020). Advertising Placement in Digital Game Design Influences Children's Choices of Advertised Snacks: A Randomized Trial. *Journal of the Academy of Nutrition and Dietetics*, 120(3), 404-413.

Sreejesh, S., Anusree, M. R., & Ponnam, A. (2018). Does game rules work as a game changer? Analyzing the effect of rule orientation on brand attention and memory in advergames. *Computers in Human Behavior*, 81, 325-339.

Statista. (2021). Digital Advertising Report 2021. Accessed January December 2021. https://www.statista.com/study/42540/digital-advertising-report/.

Sychrová, L., & Šimberová, I. (2012). Key performance indicators as a basic element for a marketing efficiency measurement. *Theory Into Practice*, 13(4), 124-136. 10.3846/bm.2012.064

Terlutter, R., & Capella, M. L. (2013). The gamification of advertising: analysis and research directions of in-game advertising, advergames, and advertising in social network games. *Journal of advertising, 42*(2-3), 95-112.

Tina, W., and K. Buckner. (2013). Receptiveness of Gamers to Embedded Brand Messages in Advergames. *Journal of Interactive Advertising, 7*(1), 3-32.

Unal, S., A. Ercis, and E. Keser. 2011. "Attitudes towards mobile advertising–A research to determine the differences between the attitudes of youth and adults." *Procedia-Social and behavioral sciences*, 24 (1): 361-377.

Van Berlo, Z. M., & Chen, X. (2024). Advergames and Consumer Brand Engagement: Experiential Satisfaction as a Mediator of Gamified Advertising Effects*. Journal of Interactive Advertising*, 24(3), 1-9.

Vanwesenbeeck, I., Walrave, M., & Ponnet, K. (2017). Children and advergames: the role of product involvement, prior brand attitude, persuasion knowledge and game attitude in purchase intentions and changing attitudes. *International Journal of Advertising, 36*(4), 520-541.

Vashisht, D., & Royne, M. B. (2016). Advergame speed influence and brand recall: The moderating effects of brand placement strength and gamers' persuasion knowledge. *Computers in Human Behavior*, 63, 162-169.

Vashisht, D., & Sreejesh, S. (2015). Effects of brand placement strength, prior game playing experience and game involvement on brand recall in advergames. *Journal of Indian Business Research*, 7(3), 292-312.

Waiguny, M. K., Nelson, M. R., & Marko. B. (2013). How advergame content influences explicit and implicit brand attitudes: When violence spills over. *Journal of Advertising*, 42 (2-3), 155-169.

Waiguny, M. K., Nelson, M. R., & Terlutter, R. (2012). Entertainment matters! The relationship between challenge and persuasiveness of an advergame for children. *Journal of Marketing Communications*, 18(1), 69-89.

Wang, C. H., K. C. Wu, and S. Y. Tsau. 2018. "Flow Learning Experience: Applying Marketing Theory to Serious Game Design." *Journal of Educational Computing Research*.

The Social Media Value Creation on Home-Based Businesses: A Systematic Literature Review

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ABSTRACT

This study investigates the impact of social media on the growth of Home-Based Buisinesses (HBBs), focusing on identifying and prioritizing the key factors that contribute to value creation through social media. A systematic review of the literature from 2000 to 2021 was conducted, analyzing 24 articles using the Meta-Synthesis method. The identified value-creating factors were coded and ranked using the Shannon entropy method. The analysis revealed three main categories of value creation: the development of business infrastructure, the enhancement of business processes, and the improvement of market-oriented behaviors. These factors were ranked in the order of their importance. While research on social media's role in business has grown significantly in the past two decades, there has been no comprehensive study addressing value creation through social media in HBBs or prioritizing these factors. This study provides new insights into this underexplored area of research.

KEYWORDS

Businesses, HBBs, Social Media, Systematic Literature Review.

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Introduction

In today's digital world, Home-Based Businesses (HBBs) are increasingly realizing the important role of social media in reaching new customers and improving their online presence. This can result in greater brand recognition, better customer interaction, and, increased sales and revenue (Lestari, 2024). Effective social media strategies for HBBs involve choosing the right platforms and creating engaging content, such as attractive graphics, videos, informative blog posts, tutorials, and product reviews, to connect with their target audience. Social media can also offer special promotions, discounts, and loyalty programs, building a loyal community and encouraging repeat business for sustained growth (Skoric, 2024). Moreover, social media platforms offer valuable data and analytics that enable businesses to track the effectiveness of their campaigns, assess customer engagement, and gain a deeper insight into their target audience's needs, preferences, and behaviors (Morales, 2022).

This information can be used to improve their marketing strategies, make data-driven decisions, enhance their online presence, and create content that directly appeals to their target audience, ultimately increasing website traffic and boosting sales and revenue (Ihemebiri et al., 2022). By focusing on social media, HBBs can establish a strong online presence, improve visibility, attract new customers, and drive business growth and profitability (Shukla et al., 2020). Effective use of social media allows HBBs to expand their reach globally, connect with a wider audience, and stay ahead of the competition in the ever-changing digital environment (Agarwal et al., 2021). Leveraging social media helps HBBs remain competitive, adapt to market changes, take advantage of emerging trends, tap into new market segments, gain a unique advantage, and position themselves for long-term success (Etetafia, 2023).

The significance of social media for business development, including HBBs, is extensively documented. For instance, Saleh (2020) explores the role of Information and Communication Technology (ICT) and social media in Kuwait's HBBs during the COVID-19 pandemic, finding that these businesses rely on platforms such as Instagram, WhatsApp, Snapchat, email, and websites to engage with customers. In Australia, Burgess and Paguio (2016) studied the use of ICT in HBBs, concluding that the application of communication technologies varies depending on the type of business. Similarly, Andry and Loisa (2016) examined the role of e-commerce in HBBs and found that a web-based system could enhance their market share. Furthermore, Clark and Douglas (2011) highlighted that various Internet, email, and mobile phone uses can benefit HBBs.

The diverse perspectives in this field prompted the researchers to conduct a systematic review of the literature on the value of social media in HBBs. By synthesizing findings and viewpoints from various empirical studies, a Systematic Literature Review (SLR) can offer insights that no single study could achieve (Snyder, 2019). The SLR is a valuable approach for exploring entrepreneurship and business research, as it goes beyond merely summarizing and drawing inferences from previous studies. Additionally, the principles of SLR ensure clarity and reproducibility, making it a robust research method (Secundo et al., 2021).

Although SLRs have been conducted on the role of social media in various specific areas, such as entrepreneurship (Secundo et al., 2021), marketing (Alalwan et al., 2017; Alves et al., 2016), tourism (Leung et al., 2013), higher education (Tess, 2013), and chronic disease management (Merolli et al., 2013), no such review has focused on the value creation of social media in HBBs. Anwar and Daniel (2017) research on HBBs explored the key characteristics of entrepreneurs in online home businesses through a systematic review. In another study, they conducted a systematic review of existing research on entrepreneurs in HBBs, discussing the suitability of entrepreneurship and investment as well as the positive and negative interactions between them (Anwar & Daniel, 2016). Given the lack of systematic reviews on social media's role in value creation within HBBs, this research presents a novel contribution to the field.

Therefore, the present research aims at addressing the following questions:

1. What is the role of social media in value creation for HBBs?
2. How can the values recognized in the previous step be prioritized?

Literature Review

Meta-Synthesis requires the researcher to conduct an in-depth review and combine the findings of the relevant qualitative research. By examining the findings of the main research articles, the researchers reveal and create words that show a more comprehensive representation of the phenomenon under study. Meta-Synthesis provides results that are larger than the sum of its parts (Chenail & Weiss, 2007). To achieve this goal, the seven-step method of Sandelowski which is summarized in Figure 1 (Sandelowski et al., 2007), is used:

Figure 1.
Seven-Step Method of Sandlowski and Barroso (2007)

(Source: Researcher's Findings)

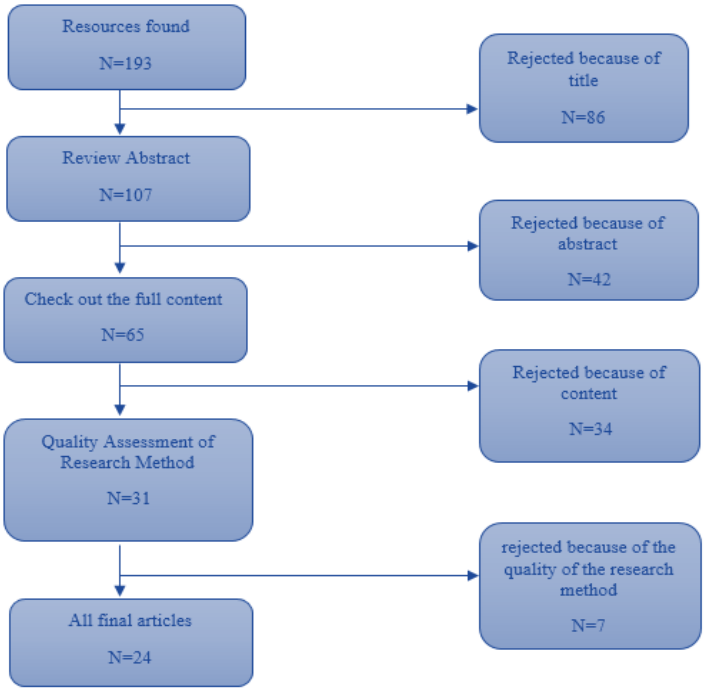
The First step is determining the questions that the researcher intends to answer. The questions of this research, mentioned above, are as follows:

1. What is the role of social media in value creation for HBBs?
2. How can the values recognized in the previous step be prioritized?

The Second step is the systematic review of texts. After determining the research questions, in the second step, the background should be systematically searched; the search scope should be specified before any action. In this step, the journal articles that have been published between 2000 and 2021 in scientific databases such as Science Direct, Emerald, Springer, and Scopus are reviewed. Keywords used for article search are a combination of terms, such as social media, Businesses, HBBs, Systematic literature review, the impact of social media, Benefits of social media, and Social Media value creation.

The Third step is screening and selecting appropriate articles. This study only reviews English articles published in prestigious journals and ignores conferences, dissertations, and published books. At this stage, to determine whether the found articles are relevant to the research questions or not, some of the studies were reviewed by the research team in terms of the relevance of the title to the purpose, the relevance of the abstract, the relevance of the content, and the quality of research methodology. Figure 2 shows different search steps according to the instructions of Moher et al. (2009).

Figure 2.
Results of Article Screening



(Source: Researcher's Findings)

In the article screening phase, researchers also employed the Critical Assessment Skills Program (CASP) evaluation tool to ensure the quality of the selected articles. It is one of

the most commonly used tools for evaluating the quality of qualitative research studies. It consists of 10 questions designed to help researchers understand the core aspects of qualitative research. The tool aids in determining the accuracy, validity, and significance of qualitative studies. The 10 questions focus on the following aspects: 1) Research objectives, 2) Methodology logic, 3) Research design, 4) Sampling method, 5) Data collection, 6) Reflection, which includes the relationship between the researcher and participants, 7) Ethical considerations, 8) Accuracy of data analysis, 9) Clear expression of findings, and 10) The value of the research. At this stage, the researchers assigned scores to each question for every article, totaled the points, and briefly reviewed the collected articles to assess the evaluation results. The results of this evaluation, based on ten sample articles, are presented in Table 1.

Table 1.
Evaluation results of sample articles

Row	Author and year of publication	The value of research	Clear expression of findings	Ethical considerations	Reflexivity	sampling	Research design	Method logic	aims of research	Accuracy and analysis	data Collecting	Total
1	Saleh (2020)	5	4	4	3	4	3	4	4	5	5	14
2	Anwar & Daniel (2017)	5	3	5	4	4	5	5	4	5	5	47
3	Latiff & Safiee (2015)	5	5	5	5	5	5	4	4	4	5	47
4	van Gelderen et al. (2008)	5	5	5	4	4	5	5	5	4	5	47
5	Andry & Loisa (2016)	4	5	5	4	4	5	5	4	4	4	44
6	Daniel et al. (2018)	5	5	5	4	5	5	4	5	5	5	48
7	Reuschke & Mason (2020)	5	5	5	4	5	4	5	5	5	5	48
8		۳	4	4	4	3	4	5	4	3	4	39
9	Philip & Williams (2019)	4	5	5	4	4	5	5	4	5	5	42
10	Annett (2020)	5	5	5	5	5	5	4	5	5	5	49

(Source: Researcher's Findings)

In summary, out of 31 articles reviewed in this process, 7 articles scored less than 20 (average and poor) and were removed from the research process.

The fourth step included extracting textual statements from the articles, coding them, and identifying the value added to home businesses by social media. The results are shown in Table 2.

Table 2.
Textual Statements

Row	Author name and publication year	The Social Media value creation for HBBs (Textual propositions)	Code
1	Saleh (2020)	Respondents use Instagram, WhatsApp, Snapchat, email, and websites to connect with customers and interact with business partners.	- Communicating with customers - Interacting with business partners

Row	Author name and publication year	The Social Media value creation for HBBs (Textual propositions)	Code
2	Anwar & Daniel (2017)	Online HBBs offer new opportunities for ethnic entrepreneurs to take advantage of their ethnicity and overcome spatial and temporal constraints.	- Taking advantage of new opportunities - Overcoming spatial and temporal constraints
3	Latiff & Safiee (2015)	The benefits of Instagram in HBBs include increasing popularity, filtering good audience, and word-of-mouth marketing (WOM).	- Increasing popularity - Choosing the right target Market Word of mouth marketing
4	van Gelderen et al. (2008)	HBBs working on the Internet and social media diversify the business model. Because of their unique working styles and reasons for starting work. Their characteristics include: increasing speed, generating multiple revenues, reducing product prices, and fostering business intelligence.	- Having variety in business model - Increasing speed - Generating multiple revenue - Reducing products' price - Fostering business intelligence
5	Andry & Loisa (2016)	A web-based system can help HBBs expand their market share by leveraging the Internet as a business development option.	- Developing business - Expanding market share
6	Sulaiman et al. (2009)	HBBs utilize social media platforms on the internet as research tool to explore market trends and create content, such as developing new promotional material for their products and services. Some entrepreneurs argue that the Internet helps reduce research time and enhances the quality of their work. Additionally, it serves as a means of communication with suppliers and potential customers, enabling businesses to advertise their products or services, sell them, and assess customer satisfaction with their offerings.	- Improving the research and development process - Improving relationships with suppliers and potential customers - Increasing sales - Measuring customer satisfaction more efficiently
7	Reuschke & Mason (2020)	Digital technologies on the Internet remove many HBBs' limitations, including physical space, transportation, order fulfillment services, and marketing.	- Reducing distance and transportation restrictions - Improving distribution process - Improving marketing
8	Daniel et al. (2018)	Despite enjoying their work and the mental and virtual mobility facilitated by internet connectivity, entrepreneurs in HBBs still seek face-to-face, social, and professional interactions. However, their isolation often leads to feelings of loneliness, which, paradoxically, can sometimes foster creativity and innovation.	Increasing job and social interactions Reducing isolation from markets Increasing creativity and innovation
9	Philip & Williams (2019)	The use of web-based media offers significant opportunities for home-based and rural businesses, such as supporting local revenue growth, opening new markets, enhancing branding, increasing competition, and helping to overcome distance-related challenges. It also addresses issues commonly faced by rural areas, including isolation from markets and relatively smaller networks.	- Increasing revenue - Creating new markets - Improving the brand - Overcoming the distance of jobs with customers - Reducing isolation from markets - Creating a large network of customers and partners
10	Annett (2020)	Housewives and even grandmothers use these technologies to earn extra money for their families. Social media reduces the cost of advertising home products, and increases the emotional and opportunistic benefits of home-based business owners.	- Reducing advertising costs - Creating opportunities - Motivating and feel successful
11	Nathan et al. (2019)	IT knowledge and the use of social media by home-based business owners increases their understanding of risk, online trust, and their capabilities.	-Increasing risk understanding -Increasing trust in online sales -Increasing the empowerment of home business owners

Row	Author name and publication year	The Social Media value creation for HBBs (Textual propositions)	Code
12	Andry & Loisa (2016)	The web-based social media system has expanded home-based business's market share and replaced physical development. This system is an online catalog for product marketing, especially for a loyal customer who trusts the store.	- Increasing market share - Developing business instead of physical expansion - Making online catalog for product marketing
13	Clark & Douglas (2011)	HBBs utilize websites for various activities, including marketing, advertising, and conducting business transactions. Social media serves as a tool for managing customer relationships and facilitating pre-sales communication with customers and suppliers. The acceptance of websites by HBBs increases as geographic access expands, making it easier to facilitate digital commerce and online transactions.	- Doing many activities such as marketing, advertising and commercial transactions - Serving as a tool for communicating with customers and suppliers - Facilitating communication in digital commerce and online transactions
14	Malik & Mantas (2021)	The results showed that social media, particularly Instagram, as an advertising and marketing tool, plays a crucial role for HBBs in Kuwait. It supports the launching of new informal ventures by home-based business owners and helps acquire necessary business resources. Additionally, social media accounts serve as catalogs, allowing business owners to display photos and videos showcasing their informal home-based business activities.	- Developing advertising and marketing - Facilitating the start of a new business - Making online catalog for product marketing
15	Zhou et al. (2021)	The results of this study indicate that YouTube is an effective advertising medium and has a strong connection to sales across all types of businesses, including small and HBBs.	- Advertising development - Increasing sales
16	Tyas & Hutama (2021)	The benefits of adopting digital technology and social media in home-based entrepreneurship include improved performance efficiency, enhanced productivity, increased revenue, easier access to information and communication, simplified transactions, heightened competitiveness, expanded sales reach, and opportunities for foreign trade (exports).	- Performing efficiency - Increasing Productivity - Increasing revenue - Making communication easy - Facilitating exchanges - Increasing competitiveness - Expanding sales areas -Providing foreign trade opportunities - Developing home businesses
17	Jambulingam, et al. (2021)	Social media networks such as Facebook, Instagram, WhatsApp have created tremendous opportunities to start a home-based business for people. Despite many negative ripples effects on global business due to pandemics, home-based digital businesses have been accelerated extremely.	- Increasing the opportunity of starting a new business
18	Mehtap et al. (2019)	women entrepreneurs' main motivations for in HBBs are making a profit and helping the household income. Business advertising relied more on word of mouth or social media.	- Making profit and helping the household income - Developing advertising
19	Steel (2017)	Social media have created numerous opportunities for Muslim women to expand their social and economic influence. Online platforms have facilitated a transition from working outside the home to working from home, allowing them to stay economically active without compromising social expectations related to class, gender, and religion.	- Increasing the space of social and economic maneuver - Doing economic activity without compromising social expectations

Row	Author name and publication year	The Social Media value creation for HBBs (Textual propositions)	Code
20	Chaudhry & Paquibut (2021)	Young Omani women are trained on social media, allowing them to participate in online jobs and contribute to the country's economy while doing their traditional duties at home.	- Doing economic activity while performing your traditional tasks at home
21	Mathew (2010)	ICT empowers women entrepreneurs working from home to contribute equally alongside men to the growth and development of the nation's economy.	Providing equal participation for women in their homes compared to men in economic growth and development
22	Niehm et al. (2010)	In the case of small family-owned HBBs, information technology (IT) offers an opportunity to compete on equal terms with larger competitors, while also enhancing efficiency and effectiveness. IT serves as an essential platform to harness innovation and resources, which can positively influence business and family productivity.	- Providing equal competition environment for competitors - Increasing business productivity - Increasing efficiency and effectiveness - Increasing innovation
23	Reuschke et al. (2021)	Mobile technology and social networking applications have empowered small businesses and solo entrepreneurs to cooperate, collaborate, and coordinate with independent workers and companies, regardless of geographical distances.	- Facilitating remote cooperation and overcoming geographical distances - Reducing the harms of accumulation (such as wages and living expenses)
24	Haefner & Sternberg (2020)	With the increasing internet engagement of most start-ups and their founders and greater independence from geographical locations, rural areas can benefit more from such ventures than in the past—assuming adequate broadband infrastructure is available. This has been evidenced in small HBBs or firms within creative industries. In rural regions, start-ups can circumvent the disadvantages of agglomeration (such as higher wages and living costs) that typically affect small, low-capital ventures more than established companies.	- Increasing remote independence

(Source: Researcher's Findings)

The fifth step is the analysis and integration of qualitative findings. During this process, the researcher identifies emerging themes or codes across the studies included in the meta-synthesis. In this research, validation was ensured through various procedures implemented during research process. These include reviewing all key channels of accessing related studies, conducting frequent review of scientific databases, and holding regular meetings among team members to discuss search and retrieval process. Additionally, communication with original researchers was established, when necessary, to clarify study details. The validation of qualitative research, particularly in the Meta-Synthesis method, can be achieved using specific criteria. These criteria assess the validity of qualitative research findings and include the following:

Using different data collection methods, using multiple data sources, using different methodologies, and consulting with other analysts with related experience (Leung, 2015). Hence, three faculty members with more than ten years of academic experience in this field were asked to comment on the obtained results and interpretations. Finally, through discussions on the interpretation and classification of the codes, ambiguities were resolved, and the analyses were approved after implementing the agreed-upon changes.

Methodology

One of the key drivers of HBBs growth is the use of social media platforms. While research on social media in business has expanded over the past two decades, no comprehensive study has been conducted on social media value creation in HBBs or its prioritization. Therefore, the aim of this study is to identify and prioritize the value creation of social media in HBBs using the Meta-Synthesis method. In this approach, the researcher systematically selects a set of articles relevant to the research questions and then presents the findings within a framework. Meta-Synthesis helps identify aspects of the theoretical framework that have not been adequately explored, thereby guiding future research (Kirchherr et al., 2016). The primary goal is to integrate, develop theory, and summarize findings at a high level to make qualitative results more accessible for practical application (Sandelowski & Barroso, 2007).

This research is applied in nature with a descriptive approach for information collection. The data collection method follows a qualitative approach, and the Meta-Synthesis process is based on the seven-step method outlined by Sandelowski and Barroso (2007). The research's statistical population consists of journal articles published in English, which were retrieved and reviewed from reputable scientific databases such as Science Direct, Emerald, Springer, and Scopus, covering the period from 2000 to 2021. The study only includes articles published in established journals, excluding conferences, dissertations, and books. This approach ensures the validity of the articles, as is standard in systematic reviews (Arun & Joseph, 2020). The sampling process was carried out by the researcher.

The keywords used for article search included a combination of terms such as social media, businesses, HBBs, and systematic literature review. To assess the reliability of the research, the coders' agreement method was employed, which is a widely recognized technique for evaluating the reliability of qualitative research. During the article screening stage, the CASP Critical Assessment Tool was used to evaluate the methodological quality of the studies. Finally, the Shannon entropy analysis method was utilized to determine and rank the level of support for each concept and category from previous studies.

Findings

The articles were initially reviewed to identify their social media values for HBBs, with each value being assigned a code. These codes were then grouped into new concepts based on thematic similarities and categorized according to their orientation. The objective was to develop a new and integrated interpretation of the findings. This approach was chosen to clarify concepts, patterns, and results, refine existing knowledge, and facilitate the development of operational models and theories (Finfgeld, 2003). As a result, 46 codes, 10 concepts, and 3 categories were formed. A summary of the process of categorizing, concept formation, and classification is presented in Table 3.

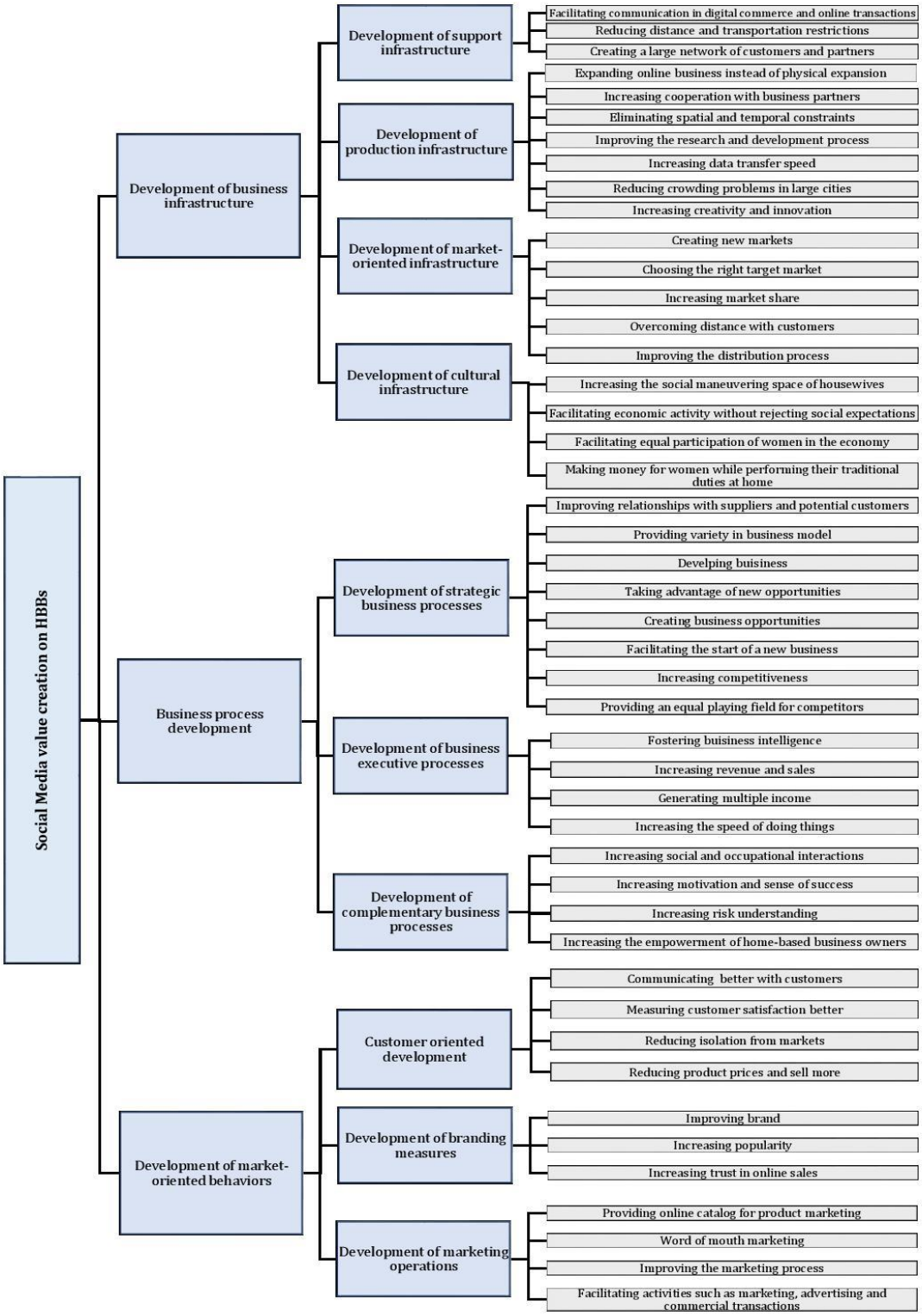
Table 3.
Classification of Codes, Concepts and Categories

Code	Concept	Category
Facilitating communication in digital commerce and online transactions	Development of support infrastructure	Development of business infrastructure
Creating a large network of customers and partners		
Reducing distance and transportation restrictions		
Expanding online business instead of physical expansion	Development of production infrastructure	
Increasing cooperation with business partners		
Eliminating spatial and temporal constraints		
Improving the research and development process		
Increasing data transfer speed		
Reducing crowding problems in large cities (such as wages and living costs)		
Increasing creativity and innovation		
Creating new markets	Development of market-oriented infrastructure	
Choosing the right target market		
Increasing market share		
Overcoming distance with customers		
Improving the distribution process		
Increasing the social maneuvering space of housewives	Development of cultural infrastructure	
Fostering economic activity without rejecting social expectations (family level, gender and religion)		
Facilitating equal participation of women in the economy (in their homes) compared to men		
Making money for women while performing their traditional duties at home		
Improving relationships with suppliers and potential customers	Development of strategic business processes	Business process development
Providing variety in business model		
Developing business		
Taking advantage of new opportunities		
Creating business opportunities		
Facilitating the starting of a new business		
Increasing competitiveness		
Providing an equal playing field for competitors		
Fostering business intelligence	Development of business executive processes	
Increasing revenue and sales		
Generating Multiple Income		
Increasing the speed of doing things		
Increasing social and occupational interactions	Development of complementary business processes	
Increasing motivation and sense of success		
Increasing risk understanding		
Increasing the empowerment of home-based business owners		
Providing better communication with customers	Customer oriented development	Development of market-oriented behaviors
Measuring customer satisfaction better		
Reducing isolation from markets		
Reducing product prices and sell more		
Improving brand	Development of branding measures	
Increasing popularity		
Increasing trust in online sales		
Providing an online catalog for product marketing	Development of marketing operations	
Word of mouth marketing		
Improving the marketing process		
Facilitating activities such as marketing, advertising and commercial transactions		

(Source: Researcher's Findings)

According to Table 3, 47 codes were identified, and were divided into the following three categories: the development of business infrastructure, the development of business processes, and the development of market-oriented behaviors. Figure3 shows a tree diagram of this classification.

Figure 3.
Tree Diagram of the Classification



(Source: Researcher's Findings)

Findings from this stage show that each of the previous studies focused only on a specific aspect of the role of social media in HBBs without considering its multiple value-added dimensions in a comprehensive and integrated manner.

The sixth step of this research ensured the quality assurance through the coder agreement method, a standard approach for evaluating the reliability of qualitative research. The researchers compared their findings with those of another expert to validate the extracted concepts. Six articles were randomly selected from the reviewed articles and re-coded by another expert. The Kappa coefficient was used to calculate the agreement between the two coders. The Kappa coefficient, calculated using SPSS software, measured the agreement between the two coders and was found to be 0.884. Since the Kappa coefficient ranges from -1 to +1- where values closer to +1 indicate a high level of agreement, values close to -1 suggest inverse agreement, and values near zero reflect disagreement- the result of 0.884, indicates strong agreement between the coders and confirms the reliability of the research.

The seventh step of the Meta-Synthesis method involves presenting the findings from the previous stages. This includes a summary of the grouping of each code derived from the social media value creation background. Based on the studies, 37 identified values were classified into 9 concepts and 3 categories. To determine the level of support from previous studies for each of the categories and concepts, Shannon entropy analysis was used. This analysis ranks the concepts and categories based on the support they received from the literature. The results are displayed in Table 4.

Table 4.
Calculate with Shannon Entropy

Significance factor $w_j = \frac{E_j}{\sum_{j=1}^{n} E_j}$	Information load $E_j = -K\sum_{i=1}^{m}[P_{ij}L_nP_{ij}]$	Abundance	Code	Concept	Category
0.036611085	0.570685803	9	Facilitating communication in digital commerce and online transactions	Development of support infrastructure Weight: 0.089565161	Development of business infrastructure Weight: 0.416407182 Rating: 1
0.023099023	0.360062653	4	Creating a large network of customers and partners		
0.029855054	0.465374228	6	Reducing distance and transportation restrictions		
0.026817135	0.418019795	5	Expanding online business instead of physical expansion	Development of production infrastructure Weight: 0.158392833	
0.023099023	0.360062653	4	Increasing cooperation with business partners		
0.023099023	0.360062653	4	Eliminating spatial and temporal constraints		
0.018305542	0.285342902	3	Improving the research and development process		
0.032423577	0.505411831	7	Increasing data transfer speed		
0.011549511	0.180031327	2	Reducing crowding problems in large cities (wages and living costs)		

Significance factor $w_j = \frac{E_j}{\sum_{j=1}^{n} E_j}$	Information load $E_j = -K \sum_{i=1}^{m} [P_{ij} L_n P_{ij}]$	Abundance	Code	Concept	Category
0.023099023	0.360062653	4	Increasing creativity and innovation		
0.023099023	0.360062653	4	Creating new markets	Development of market-oriented infrastructure Weight: 0.122251144	
0.034648534	0.54009398	8	Choosing the right target market		
0.011549511	0.180031327	2	Increasing market share		
0.034648534	0.54009398	8	Overcoming distance with customers		
0.018305542	0.285342902	3	Improving the distribution process		
0.011549511	0.180031327	2	Increasing the social maneuvering space of housewives	Development of cultural infrastructure Weight: 0.046198045	
0.011549511	0.180031327	2	Facilitating economic activity without rejecting social expectations (family level, gender and religion)		
0.011549511	0.180031327	2	Providing equal participation of women in the economy (in their homes)		
0.011549511	0.180031327	2	Making money for women while performing their traditional duties at home		
0.026817135	0.418019795	5	Improving relationships with suppliers and potential customers	Development of strategic business processes Weight: 0.171091933	Business process development Weight: 0.338203348 Rating: 2
0.029855054	0.465374228	6	Providing variety in business model		
0.011549511	0.180031327	2	Developing business		
0.011549511	0.180031327	2	Taking advantage of new opportunities		
0.011549511	0.180031327	2	Creating business opportunities		
0.023099023	0.360062653	4	Facilitating the start of a new business		
0.026817135	0.418019795	5	Increasing competitiveness		
0.029855054	0.465374228	6	Providing an equal playing field for competitors		
0.011549511	0.180031327	2	Fostering business intelligence	Development of business executive processes Weight: 0.092133684	
0.018305542	0.285342902	3	Increasing revenue and sales		
0.032423577	0.505411831	7	Generating multiple income		
0.029855054	0.465374228	6	Increasing the speed of doing things		
0.018305542	0.285342902	3	Increasing social and occupational interactions	Development of complementary	

Significance factor $w_j = \frac{E_j}{\sum_{j=1}^{n} E_j}$	Information load $E_j = -K\sum_{i=1}^{m}[P_{ij}L_nP_{ij}]$	Abundance	Code	Concept	Category
0.018305542	0.285342902	3	Increasing motivation and sense of success	business processes Weight: 0.07497773	
0.011549511	0.180031327	2	Increasing risk understanding		
0.026817135	0.418019795	5	Increasing the empowerment of home-based business owners		
0.026817135	0.418019795	5	Communicating with customers better	Customer oriented development Weight: 0.091320722	Development of market-oriented behaviors Weight: 0.24538947 Rating: 3
0.029855054	0.465374228	6	Measuring customer satisfaction more efficiently		
0.011549511	0.180031327	2	Reducing isolation from markets		
0.023099023	0.360062653	4	Reducing product prices and sell more		
0.018305542	0.285342902	3	Improving brand	Development of branding measures Weight: 0.048160596	
0.018305542	0.285342902	3	Increasing popularity		
0.011549511	0.180031327	2	Increasing trust in online sales		
0.029855054	0.465374228	6	Providing online catalog for product marketing	Development of marketing operations Weight: 0.105908152	
0.023099023	0.360062653	4	Word of mouth marketing		
0.023099023	0.360062653	4	Improving the marketing process		
0.029855054	0.465374228	6	Facilitating activities such as marketing, advertising and commercial transactions		

(Source: Researcher's Findings)

The sum of the importance coefficients of the codes within a concept constitutes the importance coefficient of that concept, while the total importance coefficients of the concepts determine the importance coefficient of the category. According to the results of the Shannon entropy analysis, among the social media values, 'development of business infrastructure,' 'development of business processes,' and 'development of market-oriented behaviors' ranked first, second, and third, respectively.

Discussion and Conclusion

In recent years, HBBs have been able to use social media to launch new ideas into their products or services. Social media reduces barriers to market entry, leads to easier marketing and distribution, and helps to develop the brand and increase the business identity. Social media can be a source of collaborative networks that enable businesses to collaborate with other network members on new products, services, and networks

(Drummond et al., 2018). Despite the increasing use of social media in HBBs, the value creations of social media for HBBs and their prioritization have not been fully investigated. Therefore, the present research is innovative since it aims to identify and rank the values created by social media for HBBs using the Meta-Synthesis method, providing comprehensive insight for business owners to use social media effectively. Notably, the researcher did not encounter any negative effects or anti-value factors of social media in HBBs. From the 24 reviewed articles, 46 values were identified, and classified into 10 concepts and 3 categories. These three categories are: the development of business infrastructure, the development of business processes, and the development of market-oriented behaviors.

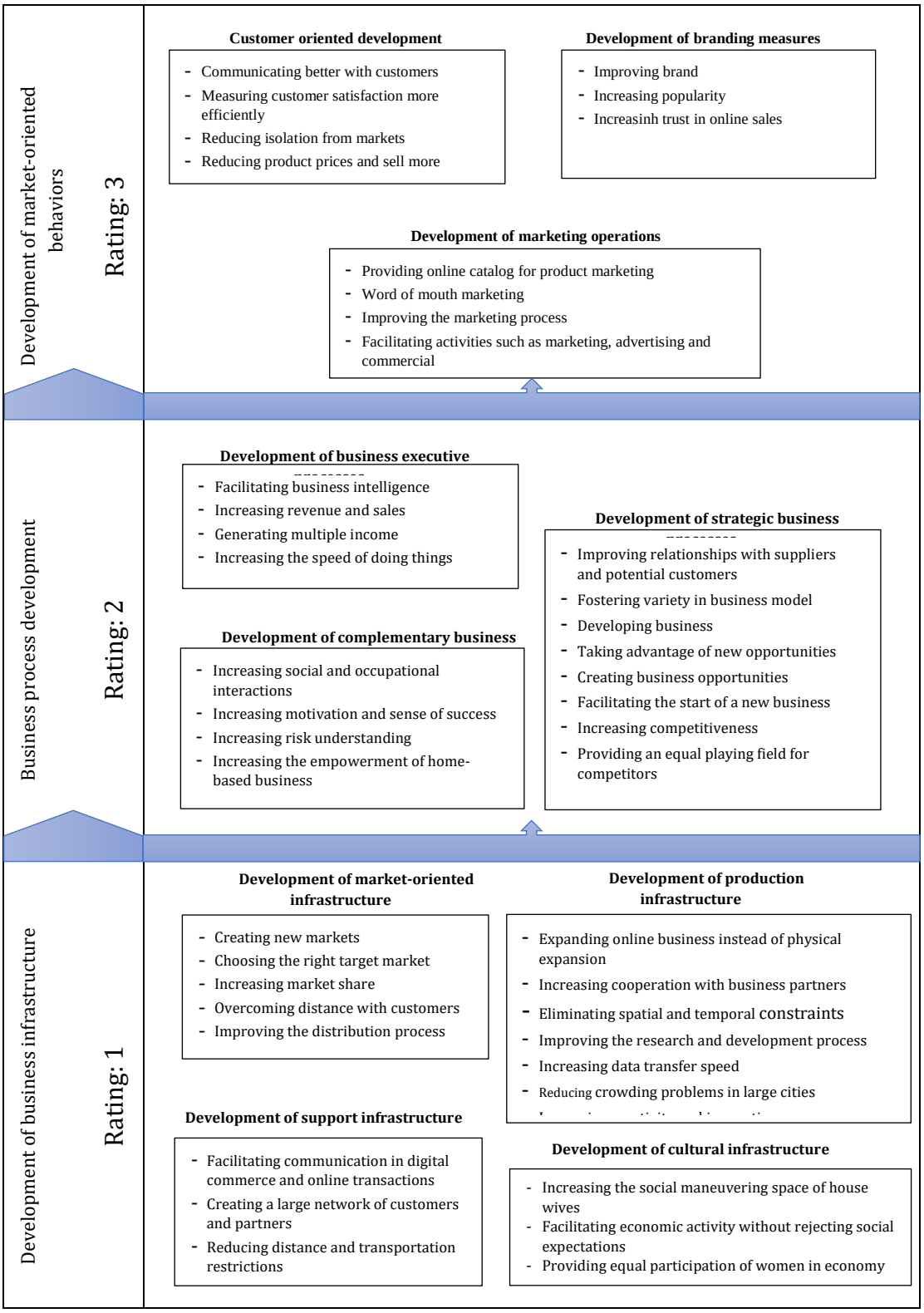
As for business infrastructure development, including concepts such as the development of production infrastructure and market-oriented support, researchers such as Anwar and Daniel (2017), Andry and Loisa (2016), Philip and William (2019), and Reuschke and Mason (2020) have regarded social media as a factor contributing to the development of home-based businesses' infrastructure. Reuschke and Mason (2020), for example, have concluded that social media has reduced distance and transportation limitations (market-oriented concepts) because it can use social networking technology to reach groups of people with distinctive characteristics at any time and place.

The category of business process development, including a concept such as the development of strategic, executive, and complementary processes, is mentioned by researchers such as van Gelderen et al. (2008), Sulaiman et al. (2009), Annett (2020) and Nathan et al., (2019). van Gelderen et al. (2008), for example, have examined the increasing intelligence and diversity in home-based business models using social media.

The other category, called the development of market-oriented behaviors, includes concepts such as the development of branding practices, the development of customer orientation, and the development of marketing operations. This category is mentioned by researchers such as Saleh (2020), Latiff and Safiee (2015), Daniel et al. (2018), Andry and Loisa (2016), and Clark and Douglas (2011). For example, Andry and Loisa (2016) believe that advertising on social media through online catalogs (though perhaps more influential) is cheaper than advertising on television or street billboards.

Thus, this study, based on a systematic review of previous studies, has attempted to provide a model for value-added social media in HBBs, and the developed model is shown in Figure 4.

Figure 4.
The Social Media Value Creation on HBBs



(Source: Researcher's Findings)

After identifying the codes, concepts, and categories, the ranking was done using the

Shannon entropy method. According to the results, among the values created by social media in HBBs, the greatest emphasis is placed on the development of business infrastructure. Therefore, maintaining a positive attitude towards social media and using it efficiently in businesses will lead to significant success. The second-highest ranked value is the development of business processes. This study did not distinguish between service and manufacturing businesses. Therefore, it is recommended that future research focus on each of them separately.

The lowest weight in entropy is allocated to the development of market-oriented behaviors. the researchers did not examine each social media platform individually and instead considered social media as a whole. Therefore, it is recommended that future research focus on identifying and examining the value creation of each social media platform separately within HBBs.

In general, to more accurately rank the value creations of social media and achieve clearer results, further studies are needed in the field of business and social media usage. This research does not focus on a specific industry or profession; therefore, future researchers are encouraged to examine specific industries as case studies.

REFERENCES

Agarwal, M., Pol, C. B. V. D., Patlas, M. N., Udare, A., Chung, A. D., & Rubino, J. G. (2021). Optimizing the radiologist work environment: Actionable tips to improve workplace satisfaction, efficiency, and minimize burnout. *La radiologia medica,* 126(10), 3-20.

Alalwan, A.A., Rana, N.P., Dwivedi, Y.K. and Algharabat, R. (2017). SocialMedia in marketing: a review and analysis of the existing literature. *Telematics and Informatics*, 34(7). 1177-1190.

Ali, Sh. (2011). Motivations of Home-Based Business Operators, Their Support Needs and Awareness about Existing Support Programs. *International Journal of Business Research,* 11(1) 175-187.

Alves, H., Fernandes, C., & Raposo, M. (2016). Social media marketing: a literature review and implications. Psychology & Marketing, 33(12), 1029-1038.

Andry, J. F., Loisa, J. (2016). The e-Commerce Potential for HBBs: A Case Study. *Jurnal Ilmiah FIFO*, 8(2), 139- 146.

Annett, M. (2020). Understanding the Home preneurship Opportunities Afforded by Social Networking and Personal Fabrication Technologies. *Proceedings of the ACM on Human-Computer Interaction*, 4(99), 1–48.

Anwar, M. N. & Daniel, E. M. (2016). The Role of Entrepreneur-Venture Fit in Online Home-Based Entrepreneurship: A Systematic Literature Review. *Journal of Enterprising Culture,* 24(4), 419-451.

Anwar, M. N. & Daniel, E. M. (2017). Ethnic entrepreneurs and online HBBs: an exploratory study. *Journal of Global Entrepreneurship Research,* 7(6), 1-21.

Arun T. M., Rojers P., J. (2020). Gender and firm innovation: A systematic literature review and future research agenda. *International Journal of Entrepreneurial Behavior & Research,* 27 (2), 301-333.

Burgess, S. & Paguio, R. (2016). Examining ICT application adoption in Australian HBBs: An innovation-decision process approach. *Journal of Enterprise Information Management*, 29(2), 276-299.

Chaudhry, I. S., Paquibut, R.Y. (2021). Women Empowerment Through Micropreneurship in Online Businesses in the Sultanate of Oman. *Academy of Entrepreneurship Journal*, 27(1), 1-14.

Chenail, R. J., & Weiss, A. D. (2007). Utilizing qualitative meta synthesis to conduct systematic reviews of primary healthcare research. Workshop presented at *the 21st Annual Primary Care Research Methods & Statistics Conference*, San Antonio, TX.

Clark, D. N., & Douglas, H. (2011). Information and communication technology adoption and diffusion in micro-enterprises: the case of techno-savvy HBBs. *International Journal of Entrepreneurship and Small Business,* 14(3), 349-368.

Daniel, E., Domenico, M. D., & Nunan, D. (2018).Virtual Mobility and the Lonely Cloud: Theorizing the Mobility-Isolation Paradox for Self-Employed Knowledge-Workers in the Online Home-Based Business Context. *Journal of Management Studies*, 55(1), 1-56.

Drummond, C., McGrath, H., & O'Toole, T. (2018). The impact of social media on resource mobilisation in entrepreneurial firms. *Industrial Marketing Management,* 70, 68-89.

Etetafia, J. (2023). Effects of COVID-19 on Supply Chains. *International Journal of Latest Engineering and Management Research*, 8(5), 166-180.

Finfgeld, D.L. (2003). Meta synthesis: The state of the art so far. *Qualitative Health Research,* 13 (7), 893-904.

Haefner, L., Sternberg, R. (2020). Spatial implications of digitization: State of the field and research agenda. Journal of Geography Compass, 14 (2), 12544.

Hofacker, C.F., Belanche D. (2016). Eight social media challenges for marketing managers. *Spanish Journal of Marketing, 20(2),* 73-80.

Ihemebiri, C., Ukwandu, E., Ofusori, L. O., & Olebara, C. (2022). The Role of Social Media on Selected Businesses in Nigeria in the Era of COVID-19 Pandemic. *Journal of social media Marketing, 1(1),* 1-17.

Jambulingam, M., Dorasamy, M., Xavier, J.R.A. (2021). homse-based digital entrepreneurs' social media use: identifying the success factors. *Journal of Content, Community and Communication,* 13(7), 273-281.

Khajeheian, D., & Ebrahimi, P. (2021). Media branding and value co-creation: effect of user participation in social media of newsmedia on attitudinal and behavioural loyalty. *European Journal of International Management*, 16(3), 499-528.

Kirchherr, J., Pohlner, H., & Charles, K. J. (2016). Cleaning up the big muddy: A meta-synthesis of the research on the social impact of dams. *Environmental Impact Assessment Review*, 60, 115-125.

Krishnamoorthi, S., & Mathew, S. K. (2018). Business analytics and business value: A comparative case study. Information & Management, 55(5), 643-666.

Kuma, A., & Ayedee, N. (2018). Social media tools for business growth of SMEs. *Journal of Management (JOM),* 5(3), 137–142.

Lestari, Y. D. (2024). Optimization of Digital Marketing in Increasing Sales BAKPIA Masaji Kediri UMKM Products. *Jurnal Manajemen Bisnis Akuntansi Dan Keuangan,* 3(1), 77-86.

Leung, D., Law, R., Van Hoof, H. & Buhalis, D. (2013). SocialMedia in tourism and hospitality: a literature review. *Journal of Travel and Tourism Marketing*, 30(1-2), 3-22.

Leung, L. (2015). Validity, reliability, and generalizability in qualitative research. *Journal of family medicine and primary care*, 4(3), 324-327.

Malik, S., Mantas, C. (2021). The adoption of social media platforms in informal HBBs in Kuwait. *Humanities and Social Sciences Letters,* 9 (3), 273-287.

Mason C.M., Carter S., & Tagg S. (2010). Invisible businesses: The characteristics of HBBs in the United Kingdom. *Regional Studies,* 45(5), 625–639.

Mason, C. (2010). Home-based business: Challenging their Cinderella status. *The Journal of SEAANZ, 17 (2),* 104-111.

Mathew, V. (2010). Women entrepreneurship in Middle East: Understanding barriers and use of ICT for entrepreneurship development. *International Entrepreneurship and Management,* 6,163–181.

Mehtap, S., Ozmenekse, L., Caputo, A. (2019). I'm a stay at home businesswoman: an insight into informal entrepreneurship in Jordan. *Journal of Entrepreneurship in Emerging Economies,* 11 (1), 44-65.

Merolli, M., Gray, K., & Martin-Sanchez, F. (2013). Health outcomes and related effects of using SocialMedia in chronic disease management: a literature review and analysis of affordances. *Journal of Biomedical Informatic*s, 46(6), 957-969.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G, & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta- analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097.

Morales, A. R. (2022). A Multimodal Critical Discourse Analysis on News Posts About Andres Manuel López Obrador Across Facebook. *Open Journal for Studies in Arts*, 5(1), 21-30.

Nathan, R. J., Victor, V., Gan, C. L., & Kot, S. (2019). Electronic commerce for HBBs in emerging and developed economy. *Eurasian Business Review*, 9, 463–483.

Niehm, L. S., Tyner, K., Shelley, M. C., & Fitzgerald, M. A. (2010). Technology Adoption in Small Family-Owned Businesses: Accessibility, Perceived Advantage, and Information Technology Literacy. *Journal of Family and Economic,* 31, 498–515.

Philip, L. & Williams, F. (2019). Remote rural home based businesses and digital inequalities: Understanding needs and expectations in a digitally underserved community. *Journal of Rural Studies*, 68, 306-318.

Pratono, A.H. (2018). Does firm performance increase with risk-taking behavior under information technological turbulence? Empirical evidence from Indonesian SMEs. *Journal of Risk Finance*, 19(4), 361-378.

Reuschke, D., & Mason, C. (2020). The engagement of HBBs in the digital economy. *Journal of Futures*, 125, 1-13.

Reuschke, D., Mason, C., & Syrett, S. (2021). Digital futures of small businesses and entrepreneurial opportunity. *Journal of futures*, 128, 102714.

Roozbehani, M., Sarukhani, B. & Parvin, S. (2019). Sociological study of the use of virtual social networks and ethnic tolerance among the citizens of Tehran (with emphasis on social dialogue). *Quarterly Journal of New Media Studies*, 20, 313-356.

Saleh, Y. (2020). ICT, social media and COVID-19: evidence from informal home-based business community in Kuwait City. *Journal of Enterprising Communities: People and Places in the Global Economy*, https://doi.org/10.1108/JEC-07-2020-0131. Sandelowski, M., Barroso, J., & Voils, C. I. (2007). Using qualitative metasummary to synthesize qualitative and quantitative descriptive findings. Research in nursing & health, 30(1), 99-111

Secundo, G., Del Vecchio, P., & Mele, G. (2021). Social media for entrepreneurship: myth or reality? A structured literature review and a future research agenda. *International Journal of Entrepreneurial Behavior & Research*, 27(1), 149-177.

Shukla, A., Sharma, J., Kumar, S., Mahala, A., & Tripathi, M. (2020). Library and Information Science Research in India during the Last Four Decades 1980 2019. *Desidoc Journal of Library & Information Technology*, 40 (6), 360-368.

Skoric, M. M. (2024). Introduction to the Research Handbook on Social Media and Society: social media scholarship reaches maturity. 10.4337/9781800377059.00007.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104(2019),* 333-339.

Steel, G. (2017). Navigating (im) mobility: Female entrepreneurship and social media in Khartoum. *Journal of Africa*, 87(2), 233-252.

Sulaiman, R., Shariff, S. S. M., & Ahmad, M. S. (2009). The e-Business Potential for HBBs in Malaysia: A Qualitative Study. *International Journal of Cyber Society,* 2(1), 21-36.

Tess, P. A. (2013). The role of SocialMedia in higher education classes (real and virtual)–A literature review. *Computers in Human Behavior*, 29(5), 60-68.

Tyas, W. P., Hutama, J. K. P. (2021). Strategy and innovation of home-based enterprises for local development in the 4.0 era: A bibliographic study. In *IOP Conference Series: Earth and Environmental Science,* 673(1), 012054

Van Gelderen, M., Sayers, J., & Keen, C. (2008). Home-based internet businesses as drivers of variety. *Journal of Small Business and Enterprise Development*, 15(1), 162-177.

Vorley, T., & Rodgers, P. (2014). Home is where the business is: Incidents in everyday life and the formation of HBBs. *International Small Business Journal*, 32(4), 428-448.

Zhou, Y., Ahmad, Z., Alsuhabi, H., Yusuf, M., Alkhairy, I. & Sharawy, A. M. (2021). Impact of YouTube Advertising on Sales with Regression Analysis and Statistical Modeling: Usefulness of Online Media in Business. *Computational Intelligence and Neuroscience*, 2021, 1-10.

The Role of Materialism in Using Banking Applications Based on the Extended Theory of Planned Behavior

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ABSTRACT

Banking applications serve as mobile tools enabling users to carry out essential banking tasks on their mobile devices. Materialism, defined as a focus on acquiring materialistic goods and physical comforts, is the central theme of this study, which investigates its influence on the use of banking applications. The research is grounded in the extended theory of planned behavior, with a practical and descriptive survey methodology. Data were collected from 282 users of banking apps via questionnaires, and the analysis was conducted using Structural Equation Modeling. The findings showed that attitude, subjective norms, and perceived behavioral control together explained 56% of the variance in behavioral intention. By incorporating the three dimensions of materialism—success, centrality, and happiness—the research extended the theory of planned behavior, increasing its effectiveness in explaining the intention to use banking apps. Moreover, the findings revealed that attitude played a mediating role between the three dimensions of materialism and the intention to use banking apps. Additionally, the subjective norms mediated the relationship between success and happiness and the intention to use the apps. However, perceived behavioral control did not act as a mediator between the dimensions of materialism and the intention to use mobile apps. These findings offer valuable insights for the users of banking apps, policymakers, and bank managers.

KEYWORDS

Banking Applications, Extended Theory of Planned Behavior, Materialism.

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Introduction

Materialism, as a prevailing mindset, influences user behavior across various domains including banking applications (Ahamed & Limbu, 2018). Numerous studies in Economic Psychology and Marketing have examined how materialism affects consumers' purchasing, consumption, and saving behaviors (e.g., Fitzmaurice & Comegys, 2006; Donnelly et al., 2013; Helm et al., 2019). For instance, Pandya and Pandya (2020) investigated the compulsive buying behavior of consumers, while Kilbourne et al. (2005) analyzed the connection between materialism and individualistic values among consumers in the United States, Canada, and Germany. Additionally, research has been conducted on the interplay between materialism and consumer behavior in other countries including Turkey (Karabati & Cemalcilar, 2010) and Pakistan (Islam et al., 2017).

However, there is little research on the effects of materialism on the behavior of Iranian users of banking applications. Compared to collectivist cultures, materialism is more important in individualistic cultures (Watchravesringkan, 2012). This is encouraged in cultures that emphasize saving rather than borrowing (Ahamed & Limbu, 2018). Although, spirituality and idealism are ideologically emphasized in Asian countries, the evidence shows that materialism is growing in these countries (Tatzel, 2002). According to Jafari (2007), the tendency of Iranians towards materialism is increasing. In recent decades, materialism has increased in developing countries (Masoom & Moniruzzaman Sarker, 2017). Consequently, it is crucial to comprehend how materialism and its various dimensions influence users' attitudes and their engagement with banking applications in developing nations like Iran.

Materialism consists of three important values of success, centrality, and happiness. Having material goods is considered one of the success criteria for people, and therefore, its acquisition has become an important value in many people's lives. Furthermore, most believe owning more assets could bring more happiness (Isham et al., 2022). Furthermore, there is a positive correlation between materialism and both attitude and using banking applications (Cakarnis & D'Alessandro, 2015). However, in collectivist societies, responses to materialism might differ. For instance, the centrality dimension may hold less significance compared to dimensions such as success and happiness.

This study seeks to contribute to the existing literature by investigating the specific effects of the three dimensions of materialism on users' attitudes and behavioral intentions toward banking applications. These dimensions, previously examined in studies by Islam et al. (2010), Jayatilleke et al. (2018), and Mariano et al. (2022), are analyzed within the framework of Ajzen's (1991) theory of planned behavior. The research aims to assess whether the dimensions of materialism can act as precursors to the theory of planned behavior. It also examines how these dimensions of materialism indirectly influence the intention to use banking applications through the constructs of theory—attitudes, subjective norms, and perceived behavioral control.

Iranian society, predominantly collectivist which is marked by social complexities

(Shirkhodaei et al., 2016), includes a large, young, and educated population, making it an ideal setting to explore the impact of materialism on the attitudes and behavioral intentions of banking app users. This study makes three key contributions to the literature: (1) examining the intentions of Iranian consumers in using banking apps using the theory of planned behavior; (2) proposing an extended model of the theory by incorporating the dimensions of materialism as antecedents; (3) illustrating how the theory's constructs mediate the influence of the dimensions of materialism on behavioral intentions. These findings provide valuable insights for banks and policymakers in understanding the factors shaping user behavior, especially given the diversity of the users' material values.

Literature Review

The theory of reasoned action (Ajzen & Fishbein, 1980) and its later adaptation, the theory of planned behavior (Ajzen, 1991), emphasize the significant role of attitudes, subjective norms, and perceived behavioral control in shaping individuals' intentions and actions. Attitude refers to a person's overall positive or negative assessment of a behavior, while subjective norms involve the perceived social pressure to perform or avoid the behavior. The perceived behavioral control reflects how easy or difficult an individual believes it is to carry out the behavior. Both theories serve as effective frameworks for understanding various behaviors, including the adoption of banking applications (Aboelmaged & Gebba, 2013; Yousafzai et al., 2010).

This study presents an extended model that integrates the dimensions of materialism as antecedents to attitude, subjective norms, and perceived behavioral control, based on the theory of planned behavior. These constructs then serve as strong predictors of the intention to use banking applications.

Attitude refers to an individual's positive or negative evaluation of a specific behavior, including his/her perceptions of the potential outcomes of engaging in that behavior. Research has consistently shown that attitude is a strong predictor of behavioral intentions in various areas including the use of banking applications (Ajzen & Fishbein, 1980; Ajzen, 1991). Subjective norms represent the social expectations regarding appropriate behaviors and affect the intention to use banking apps positively. Perceived behavioral control reflects an individual's perception of how easy or difficult it is to perform the behavior (Li et al., 2023). This study aims to examine the positive effects of these three constructs from the theory of planned behavior on consumers' intentions to adopt banking applications. Therefore, the following hypothesis is proposed:

H1: Attitude, subjective norms, and perceived behavioral control positively influence consumers' intentions to use banking applications.

According to Ajzen (1991), new constructs can be integrated into the theory of planned behavior if they are supported by a strong theoretical foundation. This extension aims to offer a more accurate assessment of the individuals' behavioral intentions (Baker & White, 2010). Materialism has the theoretical basis needed to be considered as a potential

predictor within this framework. Belk (1985, p. 266) defines materialism as "the importance that a consumer places on material possessions", while Richins and Dawson (1992, p. 308) describe it as "a set of deeply held beliefs about the importance of possessions in one's life". Materialism, as a philosophical stance, asserts that only physical matter and its movements exist. It is a complex, multi-dimensional concept that incorporates both socio-cultural and individual perspectives (Sirgy, 1999). In this study, materialism is explored through three dimensions of success, centrality, and happiness (Richins, 2004). The success dimension posits that acquiring material goods is essential for achieving success in life. The centrality dimension suggests that the primary goal in life is to acquire material possessions. Lastly, the happiness dimension emphasizes that owning desirable items can enhance an individual's sense of well-being.

In order to apply the three dimensions of materialism to predict the intention to use banking applications, it is crucial to establish that these applications reflect materialistic values. Banking apps allow users to manage and transfer money, which inherently carries materialistic importance (Mishra et al., 2022). Money is a clear example of a material possession, serving as a powerful tool that enables individuals to efficiently carry out their financial activities (Tatzel, 2002). This highlights people's attitudes towards money, which corresponds with the first component of the theory of planned behavior. Therefore, a positive relationship exists between the dimensions of materialism and attitudes towards banking applications.

Furthermore, material possessions are often seen as symbols of ambition, linking materialism to aspirational behaviors (Goldsmith & Clark, 2012). In many cultures, consumerism is viewed as a reflection of ambition (Ahuvia & Wong, 1998). Individuals who score higher on the dimensions of materialism may perceive social norms as powerful drivers for accumulating wealth and acquiring material goods. On the other hand, those with lower levels of perceived behavioral control might find it challenging to engage in specific behaviors (Ajzen, 1991). As a result, the three dimensions of materialism could negatively affect the perceived control construct. Based on this reasoning, the following hypotheses are proposed:

H2: The success dimension is positively correlated with both attitude and subjective norms, while showing a negative correlation with perceived behavioral control.

H3: The centrality dimension has a positive relationship with attitude and subjective norms, but it has a negative relationship with perceived behavioral control.

H4: The happiness dimension is positively linked to attitude and subjective norms, yet it is negatively associated with perceived behavioral control.

Several studies suggest that materialism impacts purchase intention positively (Heaney et al., 2005; Kaur et al., 2022), although some research indicates that materialism does not directly influence purchase intention (Nga et al., 2011). Given these conflicting results concerning the role of materialism in shaping consumer intentions and behaviors, this study seeks to explore both the direct and indirect effects of the dimensions of

materialism on the individuals' intentions. Therefore, the following hypotheses are proposed:

H5: The success, centrality, and happiness dimensions positively influence individuals' intention to use banking applications.

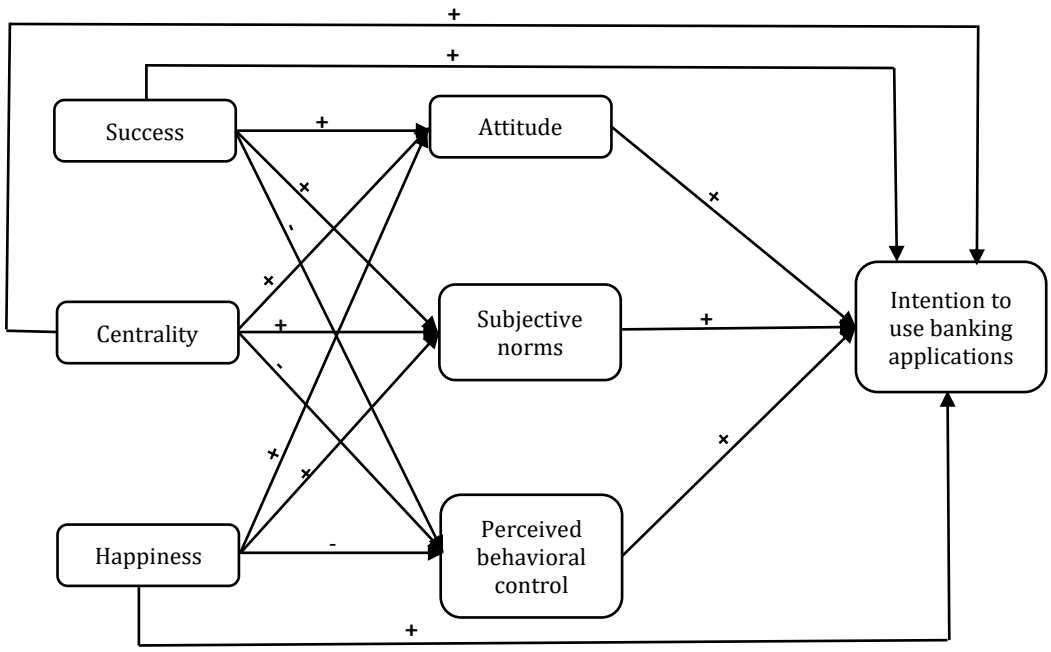
H6: Attitude acts as a mediator between success, centrality, and happiness and the intention to use banking applications.

H7: Subjective norms mediate the relationship between success, centrality, and happiness and the intention to use banking applications.

H8: Perceived behavioral control mediates the relationship between success, centrality, and happiness and the intention to use banking applications.

Based on the existing literature and the proposed hypotheses, the conceptual model for the research can be outlined as follows:

Figure 1.
The Conceptual Model



(Source: Researcher's Findings)

Methodology

This study utilized a cross-sectional method, employing non-probabilistic convenience sampling along with a snowball sampling technique. The target population consisted of mobile application users aged 18 and older from Kurdistan province. To determine the sample size, the following formula was applied (Alipour et al., 2012).

$$5q \leq n \leq 15q$$

In this study, the questionnaire comprised 28 questions, excluding those related to demographics. Based on the aforementioned formula, the minimum and maximum sample sizes were established at 140 and 420, respectively. Additionally, several

researchers recommend that the sample size for Structural Equation Modeling should exceed 200 cases (Kline, 2023). Out of 291 distributed questionnaires, 282 were deemed usable. The data collection period spanned the second quarter of 2024. The questionnaire was a five-point Likert scale instrument (1 = strongly disagree to 5 = strongly agree), and respondents were assured of the anonymity of their answers, rendering any potential non-response bias irrelevant in this study (Rubin & Babbie, 2016).

This study focuses on two main constructs including the theory of planned behavior and materialism. The theory of planned behavior is divided into three sub-constructs of attitude, subjective norms, and perceived behavioral control. Questions pertaining to these constructs and behavioral intention were adopted from Ajzen (2006). Materialism is measured through three sub-constructs of success, centrality, and happiness, with questions derived from Richins (2004). Data analysis was conducted using Structural Equation Modeling techniques in SPSS (version 26) and AMOS (version 24) software.

Findings

Descriptive Statistics

In this section, descriptive statistics are mentioned first.

Table 1.
Demographic Description of the Survey Sample

Variable	Category	%	Variable	Category	%
Gender	Male	52.1	Marital status	Single	47.2
	Female	47.9		Married	52.8
Age	Under 30 years old	20.2	Education	Diploma and below	16.7
	30-40 years old	37.2		Associate	11.7
	40-50 years old	30.1		Bachelor	45.0
	Above 50 years old	12.5		Master and above	26.6

Note: the sample size was 282 accountants
(Source: Researcher's Findings)

Table 1 shows that 52.1% of the respondents were male and 47.9% were female. The largest group of participants (45.0%) held a Bachelor degree. Furthermore, most respondents (52.8%) were married, and a notable proportion (37.2%) was between the ages of 30 and 40 years.

Before testing the model and the research hypotheses, it is important to verify the model's reliability and validity. Composite reliability (CR) was used to assess the reliability of the constructs, while convergent and divergent validity were used to evaluate the model's overall validity. Composite reliability measures the internal consistency of a construct, convergent validity indicates the degree to which the items within a construct are correlated and consistent, and divergent validity evaluates how well the items distinguish between different constructs. The results of the reliability and validity of the model are provided in Table 2.

Table 2.
The Reliability and Validity of the Research Model

		ATT	CEN	HAP	SUC	BINT	PBC	SBN
Attitude	ATT	0.746						
Centrality	CEN	0.299	0.725					
Happiness	HAP	0.336	0.299	0.723				
Success	SUC	0.394	0.298	0.151	0.728			
Behavioral Intentions	BINT	0.720	0.425	0.394	0.503	0.746		
Perceived Behavioral Control	PBC	0.383	0.077	-0.055	0.079	0.601	0.737	
Subjective Norms	SBN	0.564	0.207	0.280	0.228	0.685	0.600	0.746
CR		0.833	0.815	0.808	0.818	0.834	0.826	0.833
AVE		0.557	0.526	0.522	0.530	0.556	0.543	0.557
MSV		0.518	0.181	0.155	0.253	0.518	0.361	0.469
ASW		0.223	0.083	0.077	0.096	0.323	0.147	0.220

Note: The calculations were done using the macro designed by James Gaskin and in Excel software.
(Source: Researcher's Findings)

Table 3.
Minimum Requirements for Reliability and Validity Indicators

Index	Threshold Value
Composite Reliability (CR)	CR>0.7
Convergent Validity	AVE>0.5 ؛ CR>AVE
Divergent Validity	MSV < AVE ؛ ASV < AVE

(Source: Researcher's Findings)

Since the values presented in Table 2 exceed the threshold values outlined in Table 3, the reliability and validity of the research model are considered satisfactory. Specifically, all values of composite reliability (CR) are above 0.7, and all extracted (AVE) values of average variance are greater than 0.5. Moreover, both the maximum shared variance (MSV) and average shared variance (ASV) are lower than the AVE, confirming the model's divergent validity.

Another method to assess divergent validity is shown on the right side of Table 2. This involves comparing the values along the main diagonal of the matrix to those below and to the left. If the values on the diagonal are higher, it indicates that the constructs have a stronger relationship with their own indicators than with other constructs, further validating the model's divergent validity.

Goodness of Fit: The goodness of fit evaluates how closely the theoretical model matches the empirical data. Various indicators can be used to assess this alignment. Table 4 presents the results of the model fit indices. According to Hair et al. (2010), the research model is considered to have a good fit if at least three or four fit indices exceed the recommended threshold values.

Table 4.
Various Indicators of the Model Fit

Index	$\frac{X^2}{df}$	RMSEA	RMR	GFI	CFI	IFI
Threshold Value	≤ 3	≤ 0.05	≤ 0.05	0.90 ≥	0.90 ≥	0.90 ≥
Calculated value	1.383	0.037	0.018	0.904	.966	0.966
Result	Desirable	Desirable	Desirable	Desirable	Desirable	Desirable

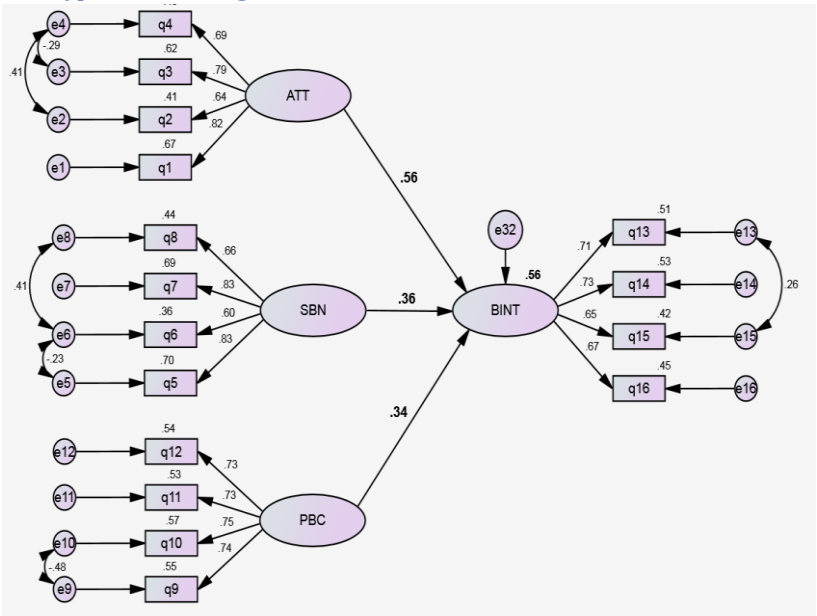
(Source: Researcher's Findings)

According to Table 4, the values of the calculated indices are higher than the threshold value, and therefore, the model fits well.

Hypothesis Testing

After ensuring the adequacy of the model fit, the research hypotheses can be tested. Figure 2 and Table 5 show the results of the first hypothesis testing:

Figure 2.
The Results of the First Hypothesis Testing



(Source: Researcher's Findings)

Table 5.
The Results of the First Hypothesis Testing

Relationship			B	Beta	C.R.	P
ATT	→	BINT	0.413	0.563	7.773	0.000
SBN	→	BINT	0.233	0.362	5.597	0.000
PBC	→	BINT	0255	0.338	5.139	0.000

(Source: Researcher's Findings)

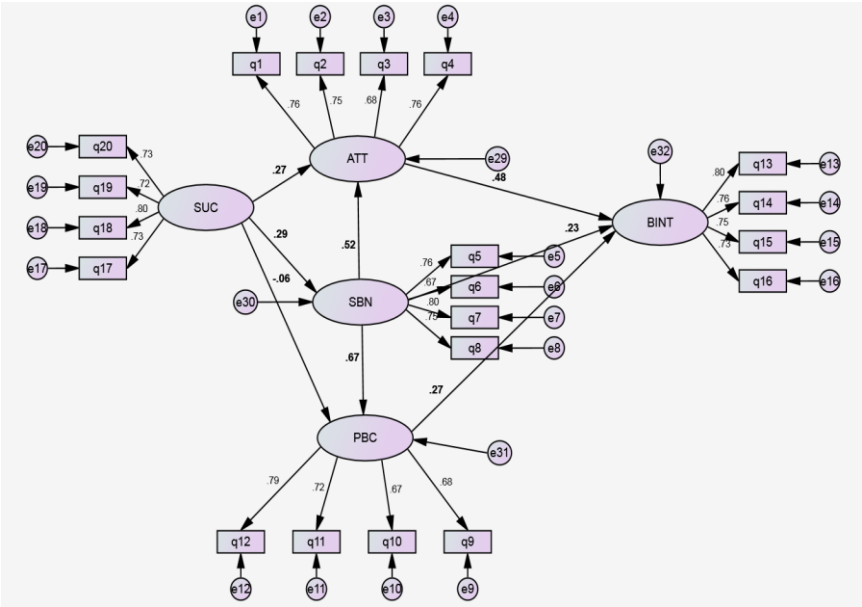
Table 5 shows that the first research hypothesis is confirmed, at 99% confidence level. Unstandardized coefficients (B) are the default coefficients obtained from the analysis of the main variables. These coefficients are indicated in terms of units and have a real scale.

According to Table 5, the dependent variable (behavioral intention) increases by 0.413, 0.233, and 0.255 units, respectively, per unit increase in attitude, subjective norms, and perceived behavioral control.

Standardized coefficients (beta) are calculated based on standardized data so that in this case, the variance of independent and dependent variables is equal to one. The standardized coefficient shows the effect of the independent variables on the dependent variable. The higher the value of this coefficient, the more effective it will be. According to Table 5, the highest impact rate belongs to the attitude (0.56), and the lowest one to the perceived behavioral control (0.33).

Figure 3 and Table 6 show the results of the second hypothesis testing.

Figure 3.
The Results of the Second Hypothesis Testing



(Source: Researcher's Findings)

Table 6.
The Results of the Second Hypothesis Testing

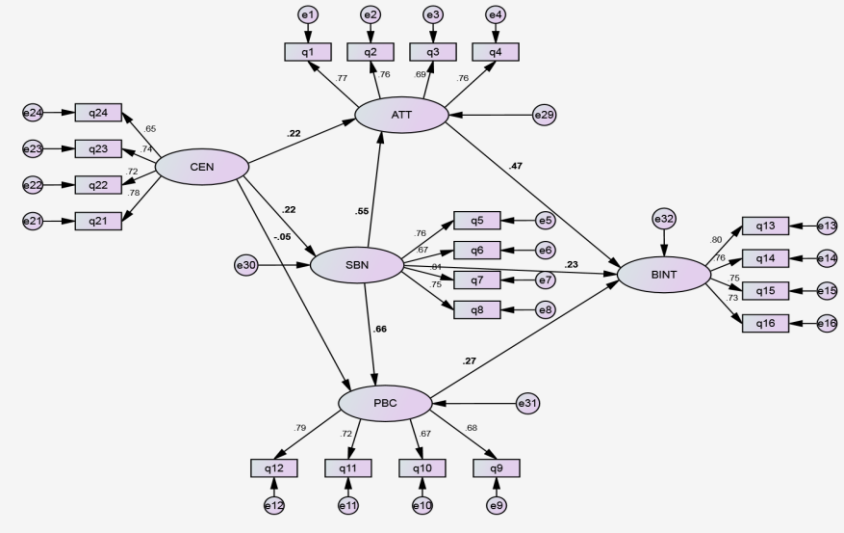
Relationship			B	Beta	C.R.	P
SUC	→	ATT	0.291	0.268	4.055	0.000
SUC	→	SBN	0.346	0.287	3.960	0.000
SUC	→	PBC	-0.064	-0.062	-0.950	0.342

(Source: Researcher's Findings)

According to Table 6, success has a significant positive effect on attitude and subjective norms. But it has no significant effect on perceived behavioral controls. Table 6 shows that for one unit increase in success, attitude and mental norms increase by 0.29 and 0.34 units, respectively.

Figure 4 and Table 7 show the results of the third hypothesis testing.

Figure 4.
The Results of the Third Hypothesis Testing



(Source: Researcher's Findings)

Table 7.
The Results of the Third Hypothesis Testing

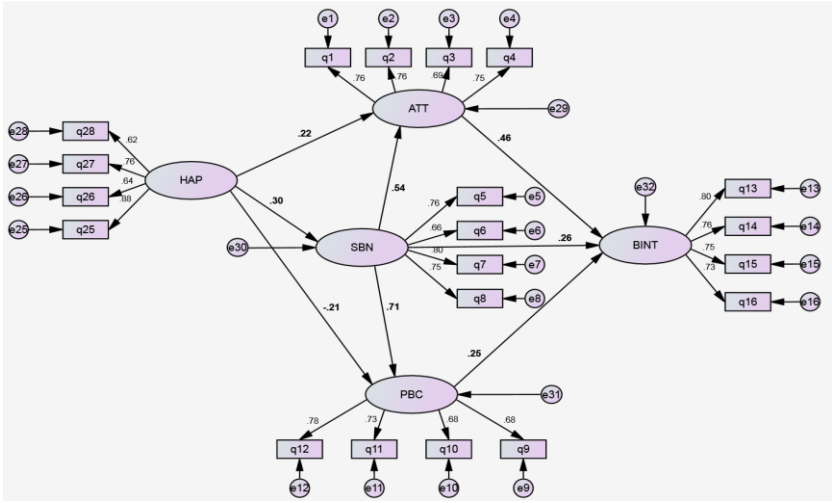
Relationship			B	Beta	C.R.	P
CEN	→	ATT	0.230	0.219	3.386	0.000
CEN	→	SBN	0.254	0.217	3.006	0.003
CEN	→	PBC	-0.053	-0.053	-0.826	0.409

(Source: Researcher's Findings)

According to Table 7, centrality has a significant positive effect on attitude and subjective norms. But it has no significant effect on perceived behavioral controls. Table 7 shows that for one unit increase in success, attitude, and mental norms increase by 0.23 and 0.25 units, respectively.

Figure 5 and Table 8 show the results of the fourth hypothesis testing.

Figure 5.
The Results of the Fourth Hypothesis Testing



(Source: Researcher's Findings)

Table 8.
The Results of the Fourth Hypothesis Testing

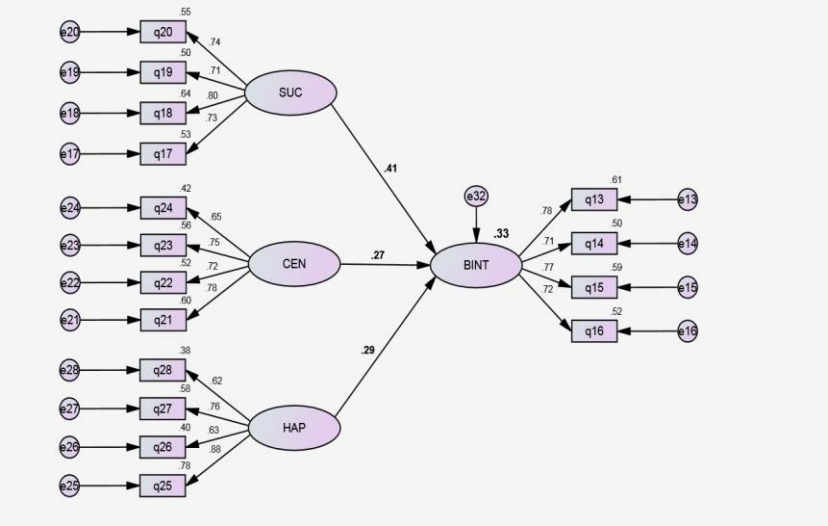
Relationship			B	Beta	C.R.	P
HAP	→	ATT	0.208	0.217	3.371	0.000
HAP	→	SBN	0.319	0.298	4.224	0.000
HAP	→	PBC	-0.196	-0.214	-3.231	0.001

(Source: Researcher's Findings)

As shown in Table 8, happiness has a significant positive impact on both attitude and subjective norms. Additionally, it has a significant negative effect on perceived behavioral control. The table indicates that a one-unit increase in success results in an increase of 0.20 units in attitude and 0.29 units in subjective norms. Conversely, a one-unit rise in happiness leads to a decrease of 0.19 units in perceived behavioral control.

Figure 6 and Table 9 show the results of the fifth hypothesis testing.

Figure 6.
The Results of the Fourth Hypothesis Testing



(Source: Researcher's Findings)

Table 9.
The Results of the Fourth Hypothesis Testing

Relationship			B	Beta	C.R.	P
SUC	→	BINT	0.410	0.413	5.905	0.000
CEN	→	BINT	0.259	0.270	4.082	0.000
HAP	→	BINT	0.252	0.290	4.510	0.000

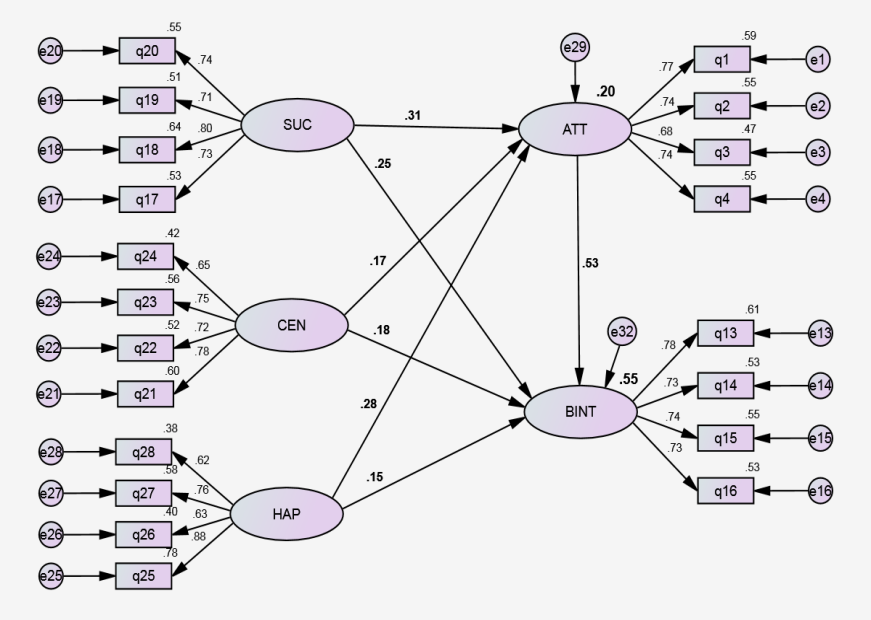
(Source: Researcher's Findings)

As indicated in Table 5, success, centrality, and happiness influence individuals' intention to use mobile applications significantly. According to Table 9, a one-unit increase in success, centrality, and happiness leads to an increase of 0.41, 0.259, and 0.25 units, respectively, in people's behavioral intention.

Figure 7 and Table 10 display the results of testing the sixth hypothesis, which explores the mediating role of the attitude variable. As indicated by the fifth hypothesis, a

significant relationship exists between materialism (the independent variable) and the intention to use banking applications (the dependent variable). Therefore, it is appropriate to evaluate the mediating effect of the attitude variable in this relationship.

Figure 7.
The Mediating Effect of Attitude Variable



(Source: Researcher's Findings)

Table 10.
The Mediating Effect of the Attitude Variable (ATT)

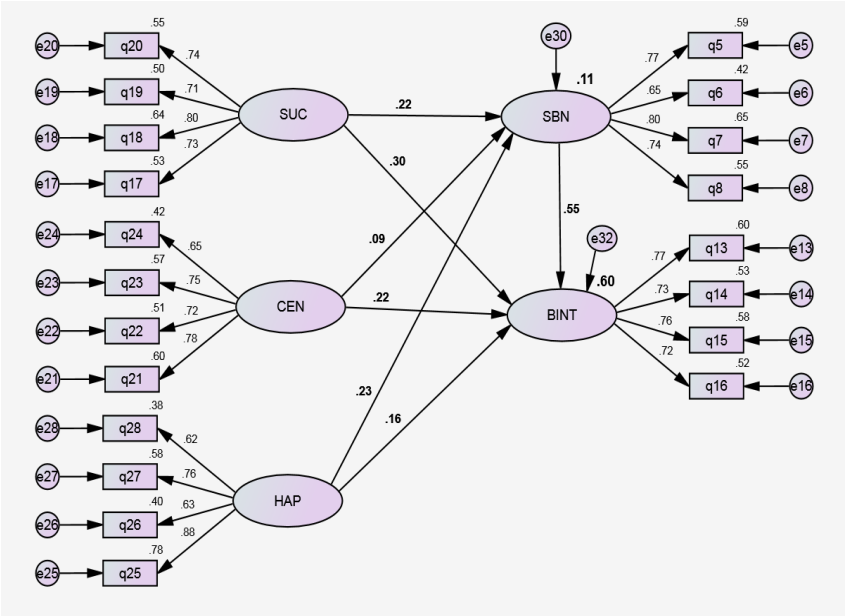
Relationship			Direct Effect		Indirect Effect		Total Effect		Type of Mediation
			Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	
SUC	→	BINT	0.246	0.001	0.165	0.001	0.411	0.000	Partial
CEN	→	BINT	0.170	0.003	0.086	0.014	0257	0.001	Partial
HAP	→	BINT	0.126	0.010	0.127	0.001	0.254	0.001	Partial

(Source: Researcher's Findings)

Figure 7 and Table 10 display the results of testing the sixth hypothesis, which explores the mediating role of the attitude variable. To assess a variable's mediating effect, it is crucial to first confirm a statistically significant relationship between the independent and dependent variables. As indicated by the fifth hypothesis, a significant relationship exists between materialism (the independent variable) and the intention to use banking applications (the dependent variable). Therefore, it is appropriate to evaluate the mediating effect of the attitude variable in this relationship.

Figure 8 and Table 11 present the results of testing the seventh hypothesis, which examines the mediating role of the subjective norms variable. As indicated in the fifth hypothesis, a significant relationship exists between materialism (the independent variable) and the intention to use banking applications (the dependent variable). Hence, the mediating effect of the subjective norms variable on this relationship can be assessed.

Figure 8.
The Mediating Effect of Subjective Norms Variable



(Source: Researcher's Findings)

Table 11.
The Mediating Effect of Subjective Norms (SBN)

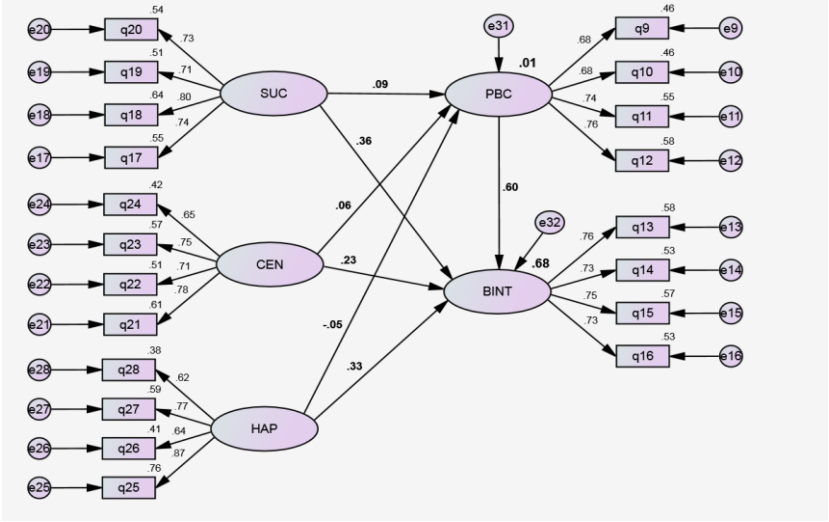
Relationship			Direct Effect		Indirect Effect		Total Effect		Type of Mediation
			Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	
SUC	→	BINT	0.291	0.001	0.116	0.003	0.407	0.000	Partial
CEN	→	BINT	0.207	0.001	0.048	0.234	0255	0.001	NIR
HAP	→	BINT	0.139	0.005	0.110	0.001	0.249	0.001	Partial

Note: NIR stands for the natural indirect effect
(Source: Researcher's Findings)

Subjective norms act as a mediator in the relationship between success and happiness concerning the intention to use banking applications, but they do not mediate the relationship between centrality and the intention to use these applications. For example, the path coefficient between happiness and individuals' intention to use banking applications is 0.24, with 0.11 attributed to the direct effect and 0.13 to the indirect effect.

Figure 9 and Table 12 display the results of testing the eighth hypothesis, which explores the mediating role of the perceived behavioral control variable. As shown in the fifth hypothesis, there is a significant relationship between materialism (the independent variable) and the intention to use banking applications (the dependent variable). Therefore, the mediating effect of the perceived behavioral control variable on this relationship can be evaluated.

Figure 9.
The Mediating Effect of the Perceived Behavioural Control Variable



(Source: Researcher's Findings)

Table 12
The Mediating Effect of the Perceived Behavioural Control Variable (PBC)

Relationship			Direct Effect		Indirect Effect		Total Effect		Type of Mediation
			Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	
SUC	→	BINT	0.346	0.001	0.054	0.151	0.400	0.000	NIR
CEN	→	BINT	0.219	0.001	0.032	0.523	0251	0.001	NIR
HAP	→	BINT	0.279	0.001	-0.027	0.481	0.253	0.001	NIR

Note: NIR stands for the natural indirect effect
(Source: Researcher's Findings)

Since the indirect effect in all three relationships is not significant, therefore, the perceived behavioral controls do not have a mediating effect on these relationships. There is only a direct relationship here.

Discussion and Conclusion

This study provides strong evidence for using the theory of planned behavior in predicting the behaviors of banking application users. The constructs of attitude, subjective norms, and perceived behavioral control explain about 56% of the variance in behavioral intention (see Figure 1). As a result, banks can utilize the theory of planned behavior to understand the factors influencing the users' intentions. In line with previous research, attitude emerged as a more powerful predictor of behavioral intention (Ajzen, 1991; Arvola et al., 2008).

Subjective norms reflect a wide range of social influences, including those from family, friends, peers, and colleagues, which can sometimes be conflicting (Melnyk et al., 2010). Nonetheless, this study shows that subjective norms are also a significant predictor of behavioral intention. This finding is consistent with findings from other studies (e.g., Jermsittiparsert et al., 2023; Li et al., 2023).

The present study extends the theory of planned behavior by integrating three dimensions of materialism. The results demonstrate that this expanded model effectively

explains how these dimensions of materialism influence using banking applications. However, the impact of each dimension on the intention to use banking applications varies.

Among the dimensions, success emerges as the most significant one, showing a strong positive correlation with attitude, subjective norms, and behavioral intention. On the other hand, it presents a negative but statistically insignificant relationship with perceived behavioral control (as shown in the second hypothesis). These findings align with previous studies by Watson (2003) and Hurst et al. (2013), which also found a positive association between success and attitude. Moreover, success boosts the users' attitudes toward banking applications by reinforcing economic incentives.

The centrality dimension revealed a significant positive correlation with attitude, subjective norms, and behavioral intention. However, it also showed a non-significant negative link with perceived behavioral control (as discussed in the third hypothesis). This suggests that centrality may drive individuals to prioritize material possessions and wealth as key life objectives, positioning banking applications as useful tools to achieve this goal.

Similarly, the happiness dimension demonstrated a significant positive connection with attitude, subjective norms, and behavioral intention, but also exhibited a significant negative relationship with perceived behavioral control (as outlined in the fourth hypothesis). When wealth and material consumption are viewed as essential for a happy life, this outlook can lead to dissatisfaction with current life circumstances and overall well-being. Additionally, happiness is closely associated with the perception of social approval (i.e., social norms). Social comparison can boost feelings of happiness by motivating the individuals to pursue wealth or higher income (Coleman, 2019). Therefore, it is logical to observe a significant positive relationship between happiness and social norms.

This study emphasizes the important role of materialism in shaping the attitudes and behavioral intentions of users of banking applications. The results suggest that the success dimension has a particularly strong impact. Individuals who place greater importance on this aspect of materialism tend to hold more favorable attitudes toward banking applications, which in turn leads to a higher likelihood of using these applications in different contexts.

These findings provide valuable insights into the materialistic values that drive banking application users. Banks can leverage this knowledge by focusing on various dimensions of materialism that influence the users' attitudes and, consequently, their behavioral intentions. Materialistic users are more inclined to engage with banking applications, allowing banks to implement targeted strategies that promote responsible use among these individuals. By demonstrating the relevance of the theory of planned behavior in various contexts, this research highlights the significance of attitude, subjective norms, and perceived behavioral control as key factors in influencing the intention to use banking applications. Additionally, the findings can help banks and financial advisors gain a deeper understanding of customer attitudes and behaviors.

The results of this study show that the constructs of the theory of planned behavior serve as effective mediators in the relationship between various dimensions of materialism and the intention to use banking applications. Both attitude and subjective norms successfully mediated the relationships between success and centrality with behavioral intention, whereas perceived behavioral control did not have a significant mediating effect in this context. Furthermore, the research uncovered that subjective norms play a mediating role in linking different dimensions of materialism to behavioral intention, influenced by attitudes and perceived behavioral control. This emphasizes the impact of social norms—whether approval or disapproval—on the other constructs of the theory of planned behavior. Similarly, social norms were found to mediate the connection between happiness and behavioral intention through attitude and perceived behavioral control.

This study supports the theoretical extension of the theory of planned behavior (Ajzen, 1991) by incorporating the dimensions of materialism as the predictors of the theory's constructs. The findings illustrate that the dimensions of materialism—success, centrality, and happiness—have significant causal effects on the constructs of the theory of planned behavior. Moreover, the study suggests that these dimensions can shape the individuals' intentions to use banking applications by influencing their attitudes, subjective norms, and perceived behavioral control, offering important insights for managerial strategies.

Limitations and Recommendations

While the current study offers valuable experimental and managerial insights, it also has several limitations that warrant further exploration by future researchers.

Sample Population: The study mainly concentrated on residents of Kurdistan province. Had the sample population included individuals from across the entire country, the results might have differed. As a result, the findings should be interpreted carefully. Future studies should seek to incorporate participants from smaller towns and villages, as their views on dimensions of materialism could differ substantially from those of individuals living in larger cities.

Causality Issues: The use of cross-sectional data in this research poses challenges in establishing causality. Longitudinal studies would be beneficial as they allow for time series analysis, offering more accurate insights into the relationships among variables over time.

Perceptions of Materialism: Materialism is commonly linked to negative personality traits, such as selfishness, self-centeredness, and extrinsic motivation (Van Boven et al., 2010). However, this study focused on socially desirable responses, implementing measures to ensure anonymity and minimize socially desirable biases. Future research could offer valuable insights by examining the economic, social, and psychological impacts of materialism in a more comprehensive manner, considering both its positive and negative aspects.

REFERENCES

Aboelmaged, M., & Gebba, T. R. (2013). Mobile banking adoption: an examination of technology acceptance model and theory of planned behavior. *International journal of business research and development*, *2*(1).

Ahamed, A. J., & Limbu, Y. B. (2018). Dimensions of materialism and credit card usage: an application and extension of the theory of planned behavior in Bangladesh. *Journal of Financial Services Marketing*, *23*, 200-209.

Ahuvia, A., & Wong, N. (1998). The effect of cultural orientation in luxury consumption. *Advances in Consumer Research*, *25*(1), 29-32.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

Ajzen, I. (2006). *Constructing a theory of planned behavior questionnaire*. University of Massachusetts Amherst.

Ajzen, I., and M. Fishbein. (1980). *Understanding attitudes and predicting social behaviour*. Eglewood Cliffs, NJ: Prentice Hall.

Alipour Shirsavar, H., Gilaninia, S., & Mohammadi Almani, A. (2012). A Study of factors influencing positive word of mouth in the Iranian banking industry. *Middle-East Journal of Scientific Research, 11*(4), 454-460.

Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lähteenmäki, L., & Shepherd, R. (2008). Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite*, 50(2-3), 443-454.

Baker, R. K., & White, K. M. (2010). Predicting adolescents' use of social networking sites from an extended theory of planned behaviour perspective. *Computers in Human Behavior*, *26*(6), 1591-1597.

Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer research*, *12*(3), 265-280.

Cakarnis, J., & D'Alessandro, S. P. (2015). Does knowing overcome wanting? The impact of consumer knowledge and materialism upon credit card selection with young consumers. *Young Consumers*, *16*(1), 50-70.

Coleman, M. (2019). Exploring the relationship between wealth and happiness in an international context. *Intuition: The BYU Undergraduate Journal of Psychology*, *14*(2), 5.

Donnelly, G., Ksendzova, M., & Howell, R. T. (2013). Sadness, identity, and plastic in over-shopping: The interplay of materialism, poor credit management, and emotional buying motives in predicting compulsive buying. *Journal of Economic Psychology*, *39*, 113-125.

Fitzmaurice, J., & Comegys, C. (2006). Materialism and social consumption. *Journal of marketing theory and practice*, *14*(4), 287-299.

Goldsmith, R. E., & Clark, R. A. (2012). Materialism, status consumption, and consumer independence. *The Journal of social psychology*, *152*(1), 43-60.

Hair Joseph, F., Black William, C., Babin Barry, J., & Anderson Rolph, E. (2010). *Multivariate data analysis: A global perspective*.

Heaney, J. G., Goldsmith, R. E., & Jusoh, W. J. W. (2005). Status consumption among Malaysian consumers: Exploring its relationships with materialism and attention-to-social-comparison-information. *Journal of International Consumer Marketing*, *17*(4), 83-98.

Helm, S., Serido, J., Ahn, S. Y., Ligon, V., & Shim, S. (2019). Materialist values, financial and pro-environmental behaviors, and well-being. *Young Consumers*, *20*(4), 264-284.

Hurst, M., Dittmar, H., Bond, R., & Kasser, T. (2013). The relationship between materialistic values and environmental attitudes and behaviors: A meta-analysis. *Journal of Environmental Psychology*, *36*, 257-269.

Isham, A., Verfuerth, C., Armstrong, A., Elf, P., Gatersleben, B., & Jackson, T. (2022). The

problematic role of materialistic values in the pursuit of sustainable well-being. *International journal of environmental research and public health*, *19*(6), 3673.

Islam, R., Islam, R., & Mazumder, T. (2010). Mobile application and its global impact. *International Journal of Engineering & Technology*, *10*(6), 72-78.

Islam, T., Wei, J., Sheikh, Z., Hameed, Z., & Azam, R. I. (2017). Determinants of compulsive buying behavior among young adults: The mediating role of materialism. *Journal of adolescence*, *61*, 117-130.

Jafari, A. (2007). Two tales of a city: An exploratory study of cultural consumption among Iranian youth. *Iranian Studies*, *40*(3), 367-383.

Jayatilleke, B. G., Ranawaka, G. R., Wijesekera, C., & Kumarasinha, M. C. (2018). Development of mobile application through design-based research. *Asian Association of Open Universities Journal*, *13*(2), 145-168.

Jermsittiparsert, K., Wongsuwan, N., & Akkaya, B. (2023). Subjective norms and behavioural intention of e-banking adoption: mediating role of perceived usefulness. In *Two Faces of Digital Transformation: Technological Opportunities versus Social Threats*. Emerald Publishing Limited, Leeds, 177-193.

Karabati, S., & Cemalcilar, Z. (2010). Values, materialism, and well-being: A study with Turkish university students. *Journal of economic psychology*, *31*(4), 624-633.

Kaur, J., Parida, R., Ghosh, S., & Lavuri, R. (2022). Impact of materialism on purchase intention of sustainable luxury goods: an empirical study in India. *Society and Business Review*, *17*(1), 22-44.

Kilbourne, W., Grünhagen, M., & Foley, J. (2005). A cross-cultural examination of the relationship between materialism and individual values. *Journal of Economic Psychology*, *26*(5), 624-641.

Kline, R. B. (2023). *Principles and practice of structural equation modeling*. Guilford publications, NewYork.

Li, X., Dai, J., Zhu, X., Li, J., He, J., Huang, Y., & Shen, Q. (2023). Mechanism of attitude, subjective norms, and perceived behavioral control influence the green development behavior of construction enterprises. *Humanities and Social Sciences Communications*, *10*(1), 1-13.

Mariano, A. M., Silva, M. C., Mello, T. M., & Santos, M. R. (2022). The importance of mobile applications for companies' brand image: A study using structural equations. *Procedia Computer Science*, *214*, 1128-1135.

Masoom, M. R., & Moniruzzaman Sarker, M. (2017). Rising materialism in the developing economy: Assessing materialistic value orientation in contemporary Bangladesh. *Cogent Business & Management*, *4*(1), 1345049.

Melnyk, V., van Herpen, E., & Van Trijp, J. C. M. (2010). The influence of social norms in consumer decision making: A meta-analysis. *Advances in consumer research*, *37*, 463-464.

Mishra, V., Walsh, I., & Srivastava, A. (2022). Merchants' adoption of mobile payment in emerging economies: the case of unorganised retailers in India. *European Journal of Information Systems*, *31*(1), 74-90.

Nga, J. K., Yong, L. H., & Sellappan, R. (2011). The influence of image consciousness, materialism and compulsive spending on credit card usage intentions among youth. *Young Consumers*, *12*(3), 243-253.

Pandya, P., & Pandya, K. (2020). An empirical study of compulsive buying behaviour of consumers. *Alochana Chakra J*, *9*(6), 4102-4114.

Richins, M. L. (2004). The material values scale: A re-inquiry into its measurement properties and the development of a short form. *Journal of Consumer Research*, *31*, 209-219.

Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its

measurement: Scale development and validation. *Journal of consumer research*, *19*(3), 303-316.

Rubin, A, & Babbie, ER (2016). *Empowerment series: Research methods for social work.* Cengage Learning.

Shirkhodaei, M., Ghasemi Hamdani, I., Habibnejad Lojandi, L. (2016). The effect of the value of pluralism, trust, quality and risk perception in the consumer's intention to purchase organic products (Case study: consumers of organic products Hormozgan Province). *Journal of Hormozgan Cultural Research Review*, *7*(12), 75-89. (In Persian).

Sirgy, M. J. (1999). Materialism: The construct, measures, antecedents, and consequences. *Academy of Marketing Studies Journal*, *3*(2), 78-110.

Tatzel, M. (2002). "Money worlds" and well-being: An integration of money dispositions, materialism and price-related behavior. *Journal of Economic Psychology*, *23*(1), 103-126.

Van Boven, L., Campbell, M. C., & Gilovich, T. (2010). Stigmatizing materialism: On stereotypes and impressions of materialistic and experiential pursuits. *Personality and Social Psychology Bulletin*, *36*(4), 551-563.

Watchravesringkan, K. (2012). Cross-cultural equivalence of materialistic values scale (MVS): An exploratory study between the United States and Thailand. *Journal of Targeting, Measurement and Analysis for Marketing*, *20*, 235-253.

Watson, J. J. (2003). The relationship of materialism to spending tendencies, saving, and debt. *Journal of economic psychology*, *24*(6), 723-739.

Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. (2010). Explaining internet banking behavior: theory of reasoned action, theory of planned behavior, or technology acceptance model? *Journal of applied social psychology*, *40*(5), 1172-1202.

Identifying and Prioritizing the Fifth-generation Wireless Mobile Communication (5G) Projects in Smart Tourism

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ABSTRACT

With the development of communication and information technologies, smart tourism is developing rapidly, and the tourism industry is gradually changing. In this regard, the fifth generation Internet (5G) network, due to its higher transmission rate and less latency, can meet the needs of tourism applications using the latest 5G-based technologies such as the Internet of Things, Virtual Reality and Augmented Reality, and Artificial Intelligence. It can meet the problem of low population access to the network during the trip and help to improve and develop smart tourism. To this end, in this article, we present several 5G-based projects for smart tourism that can help improve the application of this technology in terms of integrated interoperability, low cost, high speed and low latency, and increased efficiency in smart tourism. Therefore, this article, with emphasis on the fifth generation of the Internet and with the aim of identifying 5G-based smart tourism projects, seeks to prioritize these projects using the Hierarchical Analysis Method. Therefore, after reviewing the literature and interviewing experts, 5 main criteria for project prioritization were selected and weighted by AHP method using an expert questionnaire. Then, using the experts' opinions, 17 identified smart tourism projects were prioritized according to the criteria weight. The construction of smart tourist city, smart transportation, and the use of virtual reality and augmented reality in tourism were identified as the most important smart tourism projects that managers need to pay attention to.

KEYWORDS

Smart Hotel, Smart Tourism, Technology, The Fifth-Generation Wireless Mobile Communications (5G).

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Introduction

Tourism is one of the world's largest and fastest-growing economic sectors, contributing significantly to global GDP and employment. According to the World Tourism Organization (UNWTO), international tourism recovered 88% of its pre-pandemic level in 2023, with over 1.3 billion international arrivals. The sector generated approximately $1.4 trillion in export revenues in 2023, demonstrating the massive scale and economic importance of this industry (Singh, 2023). Tourism not only drives economic growth through direct spending but also stimulates development in related industries such as hospitality, transportation, and retail. The latest WTTC (World Travel & Tourism Council) data shows that the sector contributed 7.9% to global GDP in 2023 and supported over 330 million jobs worldwide (Singh, 2023). In recent years, the integration of advanced technologies has fundamentally transformed how tourism services are delivered and consumed, leading to the emergence of smart tourism as a new paradigm in the industry.

Mobile communication technology has evolved through four generations from 1G to 4G and is now moving towards the fifth generation (5G). 5G networks can deliver at least ten times the peak rate of 4G, millisecond-level transmission delays, and 100-billion connectivity capabilities, which will usher in a new era of widespread connectivity and deep human-machine interaction (Agiwal et al., 2016; Nuriev, 2024). From a global perspective, 5G is driving a new wave of information development. Currently, 5G networks have officially begun commercial use. Thus, 5G networks have just begun (Agiwal et al., 2016).

The evolution of tourism technology has undergone several transformative phases, from basic computerized reservation systems in the 1970s to today's integrated smart tourism ecosystems. The industry has consistently adapted to technological advances, with each new generation of mobile communications bringing significant changes to tourist experiences and industry operations. The transition from 3G to 4G enabled mobile booking systems and location-based services, while the emergence of 5G technology provides unprecedented opportunities for revolutionizing the entire tourism value chain. This technological progression, combined with changing tourist expectations and the increasing demand for personalized experiences, has created both challenges and opportunities for tourism stakeholders.

The integration of 5G technology into smart tourism has faced several challenges that need to be addressed. These include infrastructure readiness, implementation costs, security concerns, and the need for seamless integration with existing systems. While the potential benefits of 5G in tourism are significant, there is currently no comprehensive framework for evaluating and prioritizing smart tourism projects based on 5G capabilities. This study addresses this gap by developing a systematic approach to identify, evaluate, and prioritize 5G-based smart tourism initiatives, considering both technological feasibility and business impact.

Compared to 4G technology, 5G networks provide the key advantage of greater bandwidth and faster download speeds of up to 10 gigabits per second (Bai, 2024).

Although 4G's maximum data speed is satisfactory for most current applications, it is insufficient to support the growing number of devices being introduced to wireless networks daily (Kocher, 2023; Wang et al., 2020). 5G networks provide a solution for managing the connections of these devices and new applications. 5G networks not only create better connectivity for communications but also enable smart connectivity using Artificial Intelligence, Cloud Computing, Big Data, Internet of Things, and other platforms (Chen et al., 2020; Sun, 2024).

From a tourist experience perspective, 5G offers higher transmission rates that can meet the needs of tourist applications such as Virtual Reality, Augmented Reality, and ultra-high-quality video live streaming during travel (Huang et al., 2017; Jawad, 2024). 5G can address the problem of low population network access as it can comprehensively cover tourist area signals and provide high-bandwidth, low-latency network access services (Huang et al., 2017). Meanwhile, various 5G terminals can help achieve unique tourism projects like virtual tours. For example, combining 5G and AI in hotel industry can enable quick check-in and payment through facial recognition, leading to significant improvements in service efficiency and security. Thus, the online meetings hotel guests proceed smoothly and constructively (Chen, 2024; Lau, 2020). Hotels also support popular services such as 4K streaming or Virtual Reality and allow the meeting participants to share text, images, and even short videos in real time (Lau, 2020).

This paper makes several significant contributions to the field of smart tourism and 5G technology integration. First, it provides a comprehensive framework for identifying and evaluating 5G-based smart tourism projects, addressing a crucial gap in the literature where such systematic approaches are lacking. Second, it develops a novel multi-criteria decision-making model specifically tailored for smart tourism project selection, incorporating both technological and economic considerations. Third, it offers practical insights to stakeholders and policymakers in tourism industry by prioritizing projects based on their potential impact and feasibility. Finally, this study bridges the gap between theoretical concepts and practical implementation by providing concrete recommendations for developing smart tourism in the 5G era.

Smart tourism refers to the application of various information technologies in tourism experience, industrial development, and administrative management, enabling a highly systematic integration, deep development and utilization. It utilizes physical and informational tourism resources including mobile networks, Big Data, 5G, VR, Cloud Computing, Blockchain, Drones, IoT, complex networks, and AI (Buhalis, 2019).

In short, all these advanced communication and information technologies can be beneficial for developing smart cities and smart tourism. The ability to collect and aggregate massive data; and the capability to intelligently store, process, combine, analyze, and utilize tourism big data to provide information, operations, and services for the tourism industry can help improve and develop smart tourism (Chen et al., 2021). On the other hand, while existing wireless communication technology, namely 4G, can meet the requirements of some smart tourism applications, there will be others in the future

that require millisecond latency and massive bandwidth. To this end, in this article, we present 5G-based projects for smart tourism that can advance the application of this technology in terms of integrated interoperability, low cost, high speed, low latency, and increased efficiency for smart tourism.

Literature Review

Research Background

Recent studies on smart tourism and 5G integration reveal several key developmental phases. Kumar et al. (2023) identified three distinct waves of technological advancement in tourism including the digitization era (1990-2010), the smart tourism emergence (2010-2020), and the current 5G-enabled transformation (2020-present). This evolution has fundamentally changed how tourists interact with destinations, services, and information. According to Zhang and Lee (2024), the integration of 5G technology in tourism has grown exponentially, with global investment in smart tourism infrastructure reaching $127 billion in 2023.

The field has developed across multiple critical research areas. Studies by Wilson et al. (2023) have extensively explored infrastructure development and integration challenges, while Park et al. (2024) have focused on understanding the tourists'adaptation to smart technologies. A significant work by Rodriguez and Smith (2024) has examined the economic implications of 5G-enabled tourism services, and Chen et al. (2024) have investigated sustainability considerations in developing smart tourism.

Smart Tourism

Smart tourism fully integrates advanced communication technologies, smart terminal technology, and digital technology, bringing tourist destinations and travelers closer together. The provided information is smarter and matches the tourists'personal needs. With the continuous development of communication and information technologies, smart tourism is advancing at an accelerated pace. Today, security monitoring equipment, early warning systems, firefighting equipment, and WiFi coverage are visible everywhere (Huang et al., 2017). The high development of smart tourism leads the tourism industry to pay more attention to digital development, which not only provides greater convenience for the tourists but also makes full use of tourism resources from various attractions (Lin et al., 2020).

Recent developments in smart tourism have expanded beyond the basic technological integration. Kim and Johnson (2024) demonstrated how AI and machine learning algorithms are being used to predict tourist preferences and customize experiences in real time. Their research has shown significant advances in personalization capabilities, with systems which are now able to adapt to tourist preferences in real-time. Additionally, Thompson et al. (2023) have documented how Blockchain technology is increasingly being implemented to ensure secure transactions and maintain data privacy in smart tourism applications, creating a more secure and trustworthy environment for digital tourism interactions.

By analyzing various big data related to tourism, smart tourism can provide more personalized travelling services to tourists and enhance their travelling experiences (Attaran, 2020). Tourists can receive new service experiences brought by smart tourism throughout the entire process of collecting travel information, making travel plan decisions, paying for travel reservations, enjoying the trip, and reviewing and evaluating the journey (Wang et al., 2020). Meanwhile, smart tourism benefits not only tourists but also attraction managers. In the past, counting tourist sources in attractions was difficult. Only by counting license plates from different locations could one roughly analyze the tourist source composition. Now, by implementing IoT technology, the customer sentiment analysis system can accurately provide customer source composition for tourism management and promotion. At the same time, dynamic programming has become achievable (Chen et al, 2020).

The evolution of smart tourism has also led to the emergence of new theoretical frameworks. Martinez and Lee (2024) proposed a comprehensive model for evaluating smart tourism readiness, incorporating technological, social, and economic dimensions. Their model, validated across multiple destinations, provides a structured approach for assessing smart tourism implementation potential, enabling destinations toprepare for technological integration.

Application of 5G Internet in Smart Tourism

Recent studies have identified several key areas where 5G technology is transforming the implementation of smart tourism. Anderson et al. (2024) categorized these transformations into three main domains of infrastructure and connectivity enhancement, service delivery innovation, and tourist experience augmentation. According to Davis and Wang (2024), these domains represent the primary areas where 5G technology is creating a significant impact on tourism sector, fundamentally changing how tourism services are delivered and consumed.

Smart tourism IoT applications aim to connect emergency and service facilities in tourist areas in real time and provide personalized travel services based on users' needs to enhance the tourism experience (Attaran, 2021). This can meet the need for analyzing locations, vehicle status, emergency facilities, and service personnel in tourist areas to provide technical support for the applications of smart tourism. Some common IoT-based applications include self-guided tours, electronic navigation, smart shopping guides, and rapid information dissemination (Buhalis, 2019).

Self-guided tours aim to provide comprehensive and intelligent tour support using IoT technology. Through electronic terminal equipment, radio frequency identification technology, and other IoT devices, data and information about landscapes, facilities, and cultural backgrounds are stored in an integrated network in various formats including text, images, audio, video, and virtual reality (Chen et al., 2021). Tourists can obtain relevant information by using smart terminals like mobile phones. Additionally, it can provide popular routes and themed routes to tourists so the users can plan their travel itineraries based on these recommendations (Pribadi et al., 2021).

Recent advancements in self-guided tour technology have introduced more sophisticated features. Jackson and Kim (2024) demonstrated how 5G-enabled augmented reality has transformed the tourist experience by providing real-time cultural and historical contexts. Their comprehensive study revealed a 40% increase in tourist engagement when using these enhanced self-guided systems, with particularly strong results in heritage sites and cultural attractions.

Electronic navigation is a location-based service built on IoT technologies. By obtaining the tourists' geographical location information, it can provide mobile auxiliary services including landscape positioning, mobile tracking, route planning, landscape introduction, and so many other things(Chen et al., 2021). Meanwhile, this service can combine traditional graphical tourist information with mobile electronic maps so tourists can simultaneously understand the physical location of landscapes while browsing related information. These services can improve the tourists' comfort and satisfaction while providing better security and quality assurance (Katsaros, et al., 2019).

The integration of 5G with electronic navigation has revolutionized location-based services in tourism. According to Rahman et al. (2024), 5G-enabled navigation systems have achieved remarkable advances in accuracy and functionality. These systems now deliver sub-meter accuracy in indoor locations, while simultaneously providing real-time crowd density information. The technology also enables sophisticated augmented reality wayfinding and seamless integration with local emergency services, creating a comprehensive safety and navigation ecosystem that has significantly enhanced both tourist safety and overall experience quality.

Smart shopping guide service can locate tourists via GPS and quickly find the nearest shopping locations based on the tourists' geographical position. For example, it can provide restaurant information, including a three-dimensional real scene of the restaurant environment. At the same time, it can present all specific landscape products and introduce each specific product with features and effects. Meanwhile, it can find and discover the tourists' preferences through analysis and extraction of travel big data and provide more precise recommendation services (Wang et al., 2020).

The evolution of smart shopping services has been particularly notable with 5G integration. Liu and Thompson (2024) documented how high-speed, low-latency connections have transformed the shopping experience in tourist destinations. Their research demonstrates that 5G technology has enabled seamless real-time product visualization and virtual try-on experiences while facilitating instant mobile payment processing. Furthermore, the technology supports sophisticated personalized shopping recommendations based on real-time behavior analysis, creating a more engaging and efficient shopping experience for tourists.

Rapid information dissemination service is based on real-time information such as passenger flow information and vehicle management information in scenic spot management and operation. By conducting a comprehensive data analysis from various terminals, relevant information is published in real-time to large screens, mobile phones,

players, touch screens, and other IoT terminals (Vignaroli et al., 2020). Meanwhile, tourists can share their experiences during the travel process, landscape reviews, experiences, travel guides, and information in real-time. This service can make tourist sharing smarter and meet personalized tourism service needs fully (Psiha & Vlamos, 2017).

Recent developments in information dissemination have focused heavily on crisis management and sustainability aspects. González and Chen (2024) have documented significant advances in how 5G-enabled systems support tourism management. Their research shows that these systems now provide comprehensive emergency notification capabilities while effectively managing tourist flow during peak times. Additionally, the technology enables continuous environmental impact and implements dynamic pricing strategies based on real-time capacity data, leading to more sustainable tourism management practices.

One of the most important advances in information and communication technology expected to significantly impact the tourism industry today is Virtual Reality (VR). Many recent innovations such as VR platforms, devices, and content production tools enable VR evolution. Thus, VR technologies today offer unlimited potential for mass virtual visits to real tourist destinations. Moreover, the role of such technologies in the tourism and hospitality industry can demonstrate their sophisticated abilities to simulate real-life situations and contexts, sometimes becoming an alternative to actual travel to meet tourists' needs (Pestek & Sarvan, 2020).

The integration of 5G with VR has opened unprecedented possibilities in tourism experiences. Wilson and Park (2024) have documented how this technological convergence has transformed virtual tourism capabilities. Their research demonstrates that 5G's high bandwidth and low latency have made multi-user virtual tours with real-time interaction possible, allowing tourists to share immersive experiences with others regardless of physical locations. Additionally, the technology has enabled high-fidelity cultural heritage experiences that precisely recreate historical sites and events. The advancement has also revolutionized virtual event attendance, creating realistic social interaction opportunities that closely mirror physical presence.

These developments have had a particularly significant impact on tourism marketing and pre-visit experiences. Research by Martinez et al. (2024) has revealed compelling evidence of the technology's effectiveness, showing that destinations utilizing 5G-enabled VR marketing experience a 45% higher booking conversion rate compared to traditional marketing methods. Their comprehensive study demonstrated how immersive destination preview experiences help potential visitors make more informed travel decisions and increase their confidence in choosing destinations.

Furthermore, Baker and Zhao (2024) have identified emerging trends in 5G-VR tourism applications, including personalized virtual guided tours, interactive historical reenactments, and real-time language translation services. Their research suggests that these applications are particularly effective for cultural heritage sites, where virtual

reconstruction can provide visitors with unique perspectives on historical environments and events. The study also highlights how these technologies are becoming increasingly important for sustainable tourism development, allowing sites to manage visitor numbers while maintaining accessibility through virtual experiences.

Methodology

The research methodology follows a systematic, multi-phase approach that combines qualitative and quantitative methods to ensure comprehensive and reliable results. The philosophy of this research is pragmatism and its purpose is descriptive. This research is a type of applied research as it seeks to identify projects and applications of the fifth-generation Internet network in smart tourism. This research is mixed-method as it consists of both qualitative and quantitative phases. In the first phase, smart tourism projects based on the fifth-generation Internet network (5G) were identified in literature review, and in the second phase, data was weighted and analyzed using the Analytic Hierarchy Process (AHP).

Expert Selection and Validation Process

The 17 experts who participated in this study were carefully chosen based on specific criteria to ensure validity and reliability of the study. The selection criteria included:

Professional experience requirements mandated a minimum of 5 years in tourism technology implementation or other relevant information technology fields. The selected experts' educational backgrounds included Ph.D. or Master's degrees in tourism management, information technology, or other technical fields. Their current positions represented roles in tourism organizations, technology companies, or academic institutions.

The validation of the expert selection process was conducted through a three-stage process:

1. Initial qualification verification by conducting credential analysis;
2. Peer recommendation assessment;
3. Preliminary knowledge testing by conducting pilot interviews.

This rigorous selection process ensured that the expert panel possessed both the theoretical knowledge and practical experience necessary for meaningful contribution to the study.

This research consists of four main phases:

1. In the first phase, the literature related to the application of the fifth-generation Internet (5G) in smart tourism projects was reviewed in multiple articles. The search for articles began using the keywords "5G", "Application", "Smart Tourism" and "Smart Hotel". The geographical scope included all regions, time from the beginning to 2021, and all study methods, the study population was the Scopus scientific database in three areas of business, decision, and social, and article types included scientific journal articles and conferences. After analyzing and studying the articles, the applications of the fifth-generation Internet (5G) in smart tourism projects were identified and categorized.

The literature review process was systematically conducted using a structured protocol. Articles were evaluated using a quality assessment framework that considered methodological rigor, citation impact, and relevance to the research objectives. The initial search yielded 245 articles, which were narrowed to 87 after applying the inclusion and exclusion criteria. The final selection of 42 core articles formed the basis of project identification.

2. In the second phase, interviews were conducted with 17 experts related to the project topic in the field of smart tourism projects based on the fifth-generation Internet network. Their opinions about the identified projects were asked and matched with projects found from article reviews, merged with each other or some were replaced, and final projects were arranged in a framework.

The interview process followed a semi-structured format, with questions developed based on the findings of literature review. Each interview lasted approximately 60-90 minutes and was recorded with permission. The interviews were transcribed and analyzed using thematic analysis techniques. To ensure reliability, a member-checking process was implemented where experts reviewed their interview summaries and provided additional clarification where needed.

3. In the third phase, 5 criteria were selected from the articles to review and weight the projects, and these criteria were weighted using the Analytic Hierarchy Process (AHP). For this purpose, a questionnaire was given to 17 relevant experts to assign weights to each criterion according to their importance.

The criteria selection process underwent rigorous validation through multiple steps. Initially, a comprehensive list of potential criteria was developed from the literature review. This list was then refined through expert consultation using a Delphi technique with three rounds. The final five criteria demonstrated high internal consistency with a Cronbach's alpha of 0.85 and a content validity ratio of 0.78. The selection of these specific criteria was further validated through pilot testing with a subset of experts before full implementation.

4. In the fourth phase, after weighting and prioritizing the criteria, each project was scored against the 5 determined criteria. A questionnaire was designed and given to 17 experts where they evaluated each identified project in the field of the fifth-generation Internet application in smart tourism based on 5 criteria and assigned a number between 1 and 10 based on the 5 criteria.

Analytic Hierarchy Process

The selection of AHP as the primary analytical method was based on its proven effectiveness in multi-criteria decision-making processes and its particular suitability for tourism project evaluation, as demonstrated in recent studies (Thompson et al., 2023; Zhang & Liu, 2024). The Analytic Hierarchy Process (AHP) is a decision-making support method that analyzes problems and enables decision-makers to determine the mutual and simultaneous effects of many complex and uncertain situations. Its goal is to quantify relative priorities for a specific set of options on a ratio scale based on the decision-

maker's judgment (Saaty, 2008). This method organizes general and specific factors using a hierarchical tree and provides a solution for decision-making problems or choosing between multiple options by breaking down a general problem into several more specific issues, leading to a better understanding of the relationships and concepts of the problem at hand (Al-Harbi, 2001).

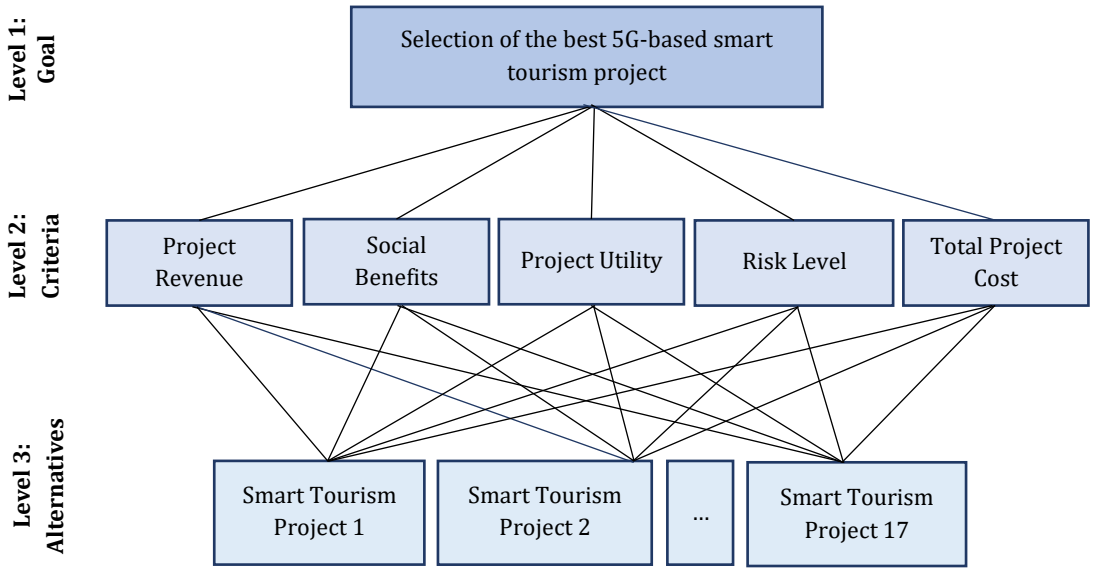
First Stage

Breaking down a general problem into several more specific issues is very helpful in problem identification and indicates the existence of relationships between smaller elements. This creates a hierarchical tree. According to Figure 1, the hierarchy is formed from top (objectives from decision-makers' perspective) to middle levels (criteria that subsequent levels depend on) to the lowest level, which includes the list of projects. In this research study, the first level, meaning the objective under review, is "selecting the best 5G-based smart tourism project". The second level includes the criteria by which project options are compared with each other, these criteria are: "project revenue", "project social benefits", "project utility", "project risk level", and "total project cost". These criteria were used from Bolat et al.'s research study (2014) for selecting the best project, each of which is explained below. The third level includes the selected projects in the field of smart tourism.

The criteria for this study were carefully defined and validated through expert consultation:

- *Project Revenue*: This criterion evaluates the potential financial returns from implementing the smart tourism project, including both direct revenue streams and indirect economic benefits for the destination.
- *Project Social Benefits*: This criterion assesses the broader societal impacts of the project, including improvements in tourist experience, local community benefits, and cultural preservation aspects.
- *Project Utility*: This criterion measures the practical applicability and usefulness of the project in addressing specific smart tourism needs and challenges.
- *Project Risk Level*: This criterion evaluates the potential implementation challenges, technical risks, and operational uncertainties associated with the project.
- *Total Project Cost*: This criterion encompasses all financial investments required for the project implementation, including infrastructure, maintenance, and operational costs.

Fig. 1.
A Decision Hierarchy for Selection of Smart Tourism Projects



(Source: Researcher's Findings)

Second Stage

In the second stage, a pairwise comparison between the specified research criteria must be conducted. Therefore, a pairwise comparison matrix is formed consisting of *n* columns and *n* rows. For this purpose, a questionnaire on a scale of 1 to 9 was designed, which is known as an expert questionnaire in the Analytic Hierarchy Process method, and was given to 17 experts. They performed pairwise comparisons between each two criteria elements on a scale of 1 to 9 and showed the superiority of each relative to the other.

The pairwise comparison process was conducted using structured interviews with experts. Each expert was provided with detailed descriptions of the criteria and clear instructions for the comparison process. To ensure consistency in judgments, the experts were asked to review and confirm their responses after completion.

Table 1 shows the 1 to 9 scale for pairwise comparisons and descriptions of each. The 1 to 9 scale is used to fill the pairwise comparison matrix to determine the relative importance of each criterion compared to other criteria. The matrix is formed such that the main diagonal contains number 1, and in each corresponding cell, the reciprocal of that number is placed.

Table 1.
Analytic Hierarchy Process (AHP) Scale

Description	Importance Level
Extremely more important or preferable	9
Very strongly more important or preferable	7
Strongly more important or preferable	5
Moderately more important or preferable	3
Equal importance or preference	1
Intermediate preferences between the above intervals	2-4-6-8

(Source: Researcher's Findings)

Third Stage

In the third stage, after constructing the pairwise comparison matrix, the matrix values are normalized, meaning that each matrix value is divided by the sum of its respective column, and the average of each row is calculated. This determines the relative weight of each criterion, and based on these weights, the priority of each criterion can be determined.

The normalization process followed these steps:

- Each element in the comparison matrix was divided by the sum of its column
- The arithmetic mean was calculated for each row of the normalized matrix
- The resulting values represented the relative weights of the criteria

To ensure the mathematical accuracy, all calculations were verified using specialized AHP software, and the results were cross-checked manually. This double-verification process helped maintain the integrity of the analysis.

Fourth Stage

In the final stage, it is necessary to calculate the inconsistency ratio to determine whether there is consistency between the pairwise comparisons. If this value is less than 0.1, it indicates the necessary consistency between comparisons. The inconsistency ratio for the pairwise comparisons in this research was calculated as 0.06, therefore the necessary consistency exists.

The consistency validation process involved multiple steps:

- Calculation of the Consistency Index (CI)
- Determination of the Random Index (RI)
- Computation of the final Consistency Ratio (CR)

The achieved consistency ratio of 0.06 demonstrates strong reliability in the experts' judgments, as it falls well below the accepted threshold of 0.1. This indicates that the experts maintained consistent logic throughout their pairwise comparisons, strengthening the validity of the results.

Findings

According to the research stages, in accordance with the first and second stages which reviewed the literature on the application of the fifth-generation Internet (5G) in smart tourism, multiple projects were identified from articles. Then, the opinions of 17 experts about these projects were solicited. After conducting the interviews and reviewing the experts' opinions, 17 projects were ultimately identified as shown in Table 5.

The project identification process followed a systematic approach combining both the findings of literature review and expert validation. The initial literature review identified 25 potential projects, which were then refined through expert interviews. The final list of 17 projects represents those that met both theoretical validity from the literature and practical feasibility according to the expert assessment.

After identifying smart tourism projects, according to the research methodology stages, 5 criteria were selected:

- Project Revenue
- Project Social Benefits
- Project Utility
- Project Risk Level
- Total Project Cost

These were weighted using the Analytic Hierarchy Process (AHP) method. First, pairwise comparisons were made using the expert questionnaire, where experts scored each pair of criteria on a scale of 1 to 9 by comparing their relative importance. Then, based on the given scores, the pairwise comparison matrix of criteria was formed according to Table 2.

The criteria weighting process involved comprehensive expert evaluation sessions where each criterion was carefully assessed against others. The experts were provided with detailed definitions and examples for each criterion to ensure consistent understanding. The evaluation process included both individual assessments and group discussions to capture diverse perspectives while maintaining the methodological rigor.

Table 2.
Pairwise Comparisons in Matrix of Criteria

Criteria	Revenue	Social Benefits	Utility	Risk Level	Cost
Revenue	1	1	2	2	0.33
Social Benefits	1	1	2	2	0.5
Utility	0.5	0.5	1	3	0.33
Risk Level	0.5	0.5	0.33	1	0.5
Cost	3	2	3	2	1
Sum	6	5	8.33	4.58	2.66

(Source: Researcher's Findings)

The pairwise comparison matrix demonstrates the relative importance of each criterion as determined through expert evaluation. The values reflect the collective judgment of the expert panel, with particular attention paid to the practical implications of each criterion in the context of smart tourism development. The matrix shows strong internal consistency, with reciprocal values properly maintained throughout the comparisons.

After forming the pairwise comparison matrix, the weight of each criterion was obtained, and based on these weights, the criteria were ranked. Table 3 shows the weight and rank of each criterion. According to the experts' opinions, project revenue has the highest weight and importance, meaning that they will seek projects with the highest revenue potential. After that, project cost and project risk level are tied for the second rank, indicating the significance of these two factors in any smart tourism project. Utility, meaning the usability of each project and its level of usefulness, ranked as the third one, while social benefits ranked as the fourth one. Additionally, the inconsistency ratio shows 0.021, and since this value is less than 0.1, there is consistency in pairwise comparisons.

Table 3.
Criteria Weighting

Criterion	Weight (%)	Rank
Project Cost	37	1
Project Social Benefits	20	2
Project Revenue	18.8	3
Project Utility	14.3	4
Project Risk Level	9.9	5

(Source: Researcher's Findings)

The weight distribution among criteria reveals interesting patterns in expert priorities for smart tourism projects. The dominant weight of project cost (37%) reflects the practical reality of budget constraints in tourism development initiatives. The relatively high weight assigned to social benefits (20%) indicates the growing recognition of tourism's broader societal impacts. The balanced distribution between revenue (18.8%) and utility (14.3%) suggests a pragmatic approach to project evaluation that considers both financial returns and practical usefulness.

In the next stage, after weighting and ranking the criteria, a questionnaire on a scale of 1 to 10 was given to 17 experts to score each of the 17 smart tourism projects based on the 5 mentioned criteria. The scoring method was such that, for example, the projects that experts considered to have the highest cost received the lowest score in the 1-10 range, while the projects with the highest social benefits received the highest score in the 1-10 range.

The project scoring process incorporated several quality control measures:

- Each expert received detailed scoring guidelines with specific examples;
- Initial pilot scoring was conducted to ensure consistent interpretation;
- Statistical analysis was performed to identify and address any scoring anomalies;
- Follow-up discussions were held to clarify significant scoring variations.

After collecting the questionnaires, the scoring was analyzed based on the 5 weighted criteria. The mean scores for the projects were determined based on the 5 criteria, and considering the weight of each criterion calculated in the previous stage, the weighted average of each project was obtained by summing the products of each project's mean score and criteria weights. Based on this, the final weight of each project was calculated and projects were prioritized.

Table 4 shows the weighted averages and rankings of smart tourism projects:

1. Construction of Smart Tourist City has the highest weighted average (7.03) and can therefore be considered as the top priority among 5G-based smart tourism projects.
2. Smart Transportation ranks as the second among smart tourism project priorities with a weighted average of 6.91.
3. The third project that experts consider necessary to focus on is the development of Virtual and Augmented Reality-based tourism, with a weighted average of 6.59.

The ranking results demonstrate clear patterns in the prioritization of smart tourism

initiatives. The top three projects share common characteristics of broad impact, strong infrastructure foundation, and clear technological integration paths. The high ranking of Smart Tourist City development (7.03) indicates expert recognition of the need for comprehensive, integrated approaches to smart tourism implementation. Smart Transportation's second-place ranking (6.91) reflects the critical role of mobility infrastructure in tourism development. The strong showing of VR/AR-based tourism (6.59) suggests growing confidence in immersive technology applications.

Table 4.
Weighted Average and Ranking of Smart Tourism Projects

No.	Project	Revenue	Social Benefits	Utility	Risk Level	Total Cost	Weighted Average	Rank
1	Smart Hotel Management	7	6	6	6	5	6.168	6
2	Construction of Smart Tourist City	9	8	8	6	4	7.033	1
3	VR/AR-based Tourism Development	7	8	7	6	6	6.598	3
4	Smart Transportation	8	9	8	6	5	6.917	2
5	Tourist Data Collection and Analysis	6	7	7	7	6	3.378	4
6	Tourism Systems Integration	6	7	6	6	5	5.825	8
7	Tourist Relationship Management	4	8	7	6	6	5.413	11
8	Financial Systems Integration for Tourists	4	7	8	5	6	5.233	13
9	Social Media Development	4	5	6	4	5	4.477	17
10	E-Tourism Development	5	6	6	5	4	4.924	15
11	Tourism Centers Control and Protection	6	9	5	4	5	5.376	12
12	Service Customization	6	6	6	7	6	6.277	5
13	Smart Advertising	5	3	5	7	7	5.804	9
14	VR/AR-based Reservation	4	6	6	6	5	4.983	14
15	Ecotourism Development	6	7	6	5	5	5.598	10
16	Health Tourism Development	4	7	6	5	4	4.581	16
17	Tourist Behavior Analysis	6	7	8	6	5	6.023	7
	Average	5.705	6.823	6.528	5.705	5.235	5.738	
	Rank	3.5	1	2	3.5	5		

(Source: Researcher's Findings)

Detailed project scores reveal nuanced considerations in the evaluation process. For instance, the Smart Tourist City project scored particularly high in revenue potential (9) and utility (8), offsetting its moderate cost score (4). This suggests experts prioritized long-term benefits over initial implementation costs. Similarly, Smart Transportation's balanced scores across all criteria indicate its role as a foundational element of smart tourism infrastructure.

The middle-ranked projects demonstrate the importance of supporting infrastructure and systems in smart tourism development. Tourist Data Collection and Analysis (Rank 4) received consistently moderate scores across all criteria, highlighting the growing importance of data-driven decision-making in tourism management. Tourism Systems Integration (Rank 8) shows the recognized need for seamless connectivity between different tourism services and platforms.

Lower-ranked projects reveal interesting insights about the expert priorities. Despite the growing importance of social media in tourism, Social Media Development (Rank 17) received relatively low scores, possibly indicating that experts view this as a mature technology less dependent on 5G capabilities. E-Tourism Development (Rank 15) similarly scored lower, suggesting that basic digital tourism services are seen as already well-established.

The final group of projects reveals several significant patterns in expert evaluation. VR/AR-based Reservation systems (Rank 14) received moderate scores across all criteria, suggesting that while the technology has potential, it may not be seen as a top priority for immediate 5G implementation. Ecotourism Development (Rank 10) scored notably well in social benefits (7), reflecting growing awareness of sustainable tourism practices.

The overall averages across criteria (bottom row) provide valuable insights into expert priorities. Social Benefits achieved the highest average score (6.82), followed by Utility (6.528), indicating that experts prioritized broader societal impact and practical usefulness over purely financial considerations. The relatively lower average for Total Cost (5.23) suggests that while the cost is important, it was not the primary determining factor in project evaluation.

An interesting observation is the consistent moderate-to-high scoring for Tourist Behavior Analysis (Rank 7, weighted average 6.02), which reflects the growing importance of data-driven decision-making in tourism management. Its relatively high utility score (8) indicates strong practical value for tourism planning and operations.

Discussion and Conclusion

The findings of this research study reveal several significant patterns in the prioritization of 5G-based smart tourism projects. The emergence of Smart Tourist City as the highest priority reflects a fundamental understanding that successful smart tourism requires comprehensive infrastructure development rather than isolated technological solutions. This finding aligns with a recent research study by Chen et al. (2024) emphasizing the importance of integrated urban systems in tourism development.

The high ranking of Smart Transportation as the second priority demonstrates the critical role of mobility in tourist experiences. This finding supports the work of Wilson and Park (2024) on the relationship between transportation efficiency and tourist satisfaction. The prioritization of VR/AR-based tourism development as the third most important project suggests the growing recognition of immersive technologies' potential, particularly when enabled by 5G's high-speed, low-latency capabilities.

An interesting pattern emerges in the relationship between project costs and perceived benefits. Projects with higher implementation costs were generally ranked lower, except when they offered substantial social benefits or revenue potential. This suggests that stakeholders are willing to invest in expensive infrastructure projects if they perceive long-term benefits for both tourists and local communities.

The relatively lower ranking of technology-focused projects such as social media development and e-tourism development suggests that these areas are viewed as already well-developed under the existing infrastructure. This challenges some existing literature that emphasizes social media as a primary driver of smart tourism development.

The prioritization findings also reveal a clear preference for projects that enhance the physical tourist experience rather than purely digital solutions. This suggests that stakeholders view 5G technology primarily as an enabler of improved real-world experiences rather than as a substitute for traditional tourism activities.

The study provides valuable insights into the prioritization of 5G-based smart tourism projects, highlighting the importance of integrated infrastructure development over isolated technological solutions. The findings demonstrate that successful smart tourism implementation requires a balanced approach that considers both technological capabilities and practical benefits for stakeholders.

Infrastructure development, particularly in the form of Smart Tourist Cities and transportation systems, forms the foundation for successful smart tourism implementation. The integration of advanced technologies like VR/AR shows promise, but must be supported by robust infrastructure and clear practical applications. While cost remains an important consideration, projects that demonstrate strong social benefits and revenue potential can justify higher investments. Basic digital services, while important, may not require significant additional investment in 5G infrastructure, suggesting resources might be better allocated to more transformative projects.

These findings contribute to both theoretical understanding and practical implementation of smart tourism initiatives. They provide a framework for decision-makers to evaluate and prioritize smart tourism investments, while also highlighting the importance of considering both technological capabilities and practical benefits in project selection. The research suggests that future smart tourism development should focus on creating integrated systems that enhance real-world tourist experiences rather than developing isolated technological solutions. This approach will likely lead to more sustainable and effective smart tourism implementations that better serve both tourists and local communities.

Limitations and Further Research

This research offers several important implications for different stakeholders in smart tourism ecosystem:

Theoretical Implications: The study extends the existing smart tourism literature by providing an empirical framework for project prioritization. It challenges traditional views that emphasize standalone technological solutions, instead highlighting the importance of integrated infrastructure development. The findings contribute to a theoretical understanding of how 5G technology can transform tourism experiences when implemented as part of a comprehensive smart city strategy.

Practical Implications for Destination Managers: Investment Planning: Destination managers should prioritize foundational infrastructure projects before implementing specific technological solutions. The high ranking of Smart Tourist City projects suggests that creating a robust infrastructure base is crucial for successful smart tourism development.

Integration Strategy: When implementing new projects, managers should focus on how these initiatives integrate with existing systems and contribute to the overall tourist experience. The success of projects like Smart Transportation demonstrates the importance of seamless integration.

Resource Allocation: While some projects may require significant initial investment, those with clear long-term benefits for both tourists and local communities should be prioritized. The findings suggest that expensive projects can be justified when they offer substantial social benefits and revenue potential.

Implications for Tourism Businesse: Business planners should align their technological investments with broader smart city initiatives rather than developing isolated solutions. Focus should be placed on enhancing physical tourist experiences through technology rather than creating purely digital alternatives. Existing digital services like social media and e-tourism platforms should be optimized within current infrastructure rather than requiring significant new investment.

Policy Implications: Government agencies should develop comprehensive frameworks for smart tourism development that emphasize infrastructure integration. Funding priorities should reflect the need for foundational infrastructure development before specific technological applications. Policies should encourage collaboration between different stakeholders to ensure an integrated development of smart tourism initiatives.

Recommendations for Implementation: 1. Adopt a phased approach to smart tourism development, starting with essential infrastructure and gradually adding more sophisticated applications; 2. Develop clear metrics for measuring project success that include both economic and social benefits; 3. Establish partnerships between public and private sectors to share resources and expertise in project implementation; 4. Create mechanisms for continuous feedback and adaptation as technology and tourist needs evolve.

These implications suggest that successful smart tourism development requires

careful planning, stakeholder coordination, and a balanced approach to technology implementation. The findings can guide decision-makers in creating more effective and sustainable smart tourism initiatives.

Future research could focus on developing specific implementation frameworks for each project, including detailed cost-benefit analyses and technical requirements. Furthermore, comparative studies examining the implementation of these projects across different geographical regions and cultural contexts would be valuable. Future studies could also investigate the integration of 5G with emerging technologies like 6G and examine the long-term impacts of these projects on tourist satisfaction, environmental sustainability, and economic development. Research is also needed to address privacy and security concerns, regulatory frameworks, and infrastructure requirements specific to different regions and contexts.

REFERENCE

Agiwal, M., Roy, A., & Saxena, N. (2016). Next generation 5G wireless networks: A comprehensive survey. *IEEE Communications Surveys & Tutorials, 18*(3), 1617-1655.

Al-Harbi, K. M. A. S. (2001). Application of the AHP in project management. *International journal of project management, 19*(1)-19-27.

Anderson, K. L., Thompson, R. B., & Wilson, J. M. (2024). Smart tourism project prioritization: A multi-stakeholder analysis. *Tourism Technology, 15*(2), 78-92.

Attaran, M. (2020). Digital transformation and economic contributions of 5G networks. *International Journal of Enterprise Information Systems (IJEIS), 16*(4), 58-79.

Attaran, M. (2021). The impact of 5G on the evolution of intelligent automation and industry digitization. *Journal of Ambient Intelligence and Humanized Computing*, 1-17.

Baker, R., & Zhao, L. (2024). VR-AR applications in cultural heritage tourism: A systematic review. *Journal of Cultural Heritage Management, 12*(1), 45-60.

Bai, W. (2024). The symbiotic influence of 5g and IoT on ultra-reliable low latency communications solutions. *Applied and Computational Engineering, 62*(1), 258-262.

Bolat, B., Çebi, F., Temur, G. T., & Otay, İ. (2014). A fuzzy integrated approach for project selection. *Journal of Enterprise Information Management, 27*(3), 247–260. https://doi.org/10.1108/jeim-12-2013-0091.

Buhalis, D. (2019). Technology in tourism-from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article. *Tourism Review, 75*(1), 267-272.

Chen, H., Mo, Y., Qian, Q., & Xia, P. (2020). Research on 5G Wireless Network Deployment in Tourist Cities. In *2020 International Wireless Communications and Mobile Computing (IWCMC)* (pp. 398-402). IEEE.

Chen, S., Law, R., Zhang, M., & Si, Y. (2021). Mobile Communications for Tourism and Hospitality: A Review of Historical Evolution, Present Status, and Future Trends. *Electronics, 10*(15), 1804.

Chen, W., Li, M., Liu, R., Sun, S., Chen, M., & Jiang, X. (2024). Radio altimeter compatibility analysis with 5g systems. In *Ninth International Symposium on Sensors, Mechatronics, and Automation System.*

Chen, K., Wang, L., & Liu, Y. (2024). Smart cities and tourism infrastructure: Integration challenges and solutions. *Smart Cities Review, 8*(1), 15-30.

Davis, M., & Wang, H. (2024). Transformative impacts of 5G on tourism services. *International Journal of Tourism Technology, 11*(2), 112-128.

González, M., & Chen, P. (2024). Crisis management in smart tourism: The role of real-time data. *Tourism Management Studies, 18*(3), 325-340.

Huang, C. D., Goo, J., Nam, K., & Yoo, C. W. (2017). Smart tourism technologies in travel planning: The role of exploration and exploitation. *Information & Management, 54*(6), 757-770.

Jackson, T., & Kim, S. (2024). Augmented reality in self-guided tours: User engagement analysis. *Journal of Tourism Innovation, 9*(1), 67-82.

Jawad, A. M. and Abu-AlShaeer, M. J. (2024). Revolutionizing communication: how 5g, uavs, and cloud technologies are shaping the new telecommunications landscape. *Pidvodni Tehnologii, 1*(14), 75-84.

Katsaros, K., Gkounis, D., Kaleshi, D., Thomas, B., Harris, J., Falaki, H., & Simeonidou, D. (2019). Enhancing Tourist Experiences through 5G-The 5G Smart Tourism Case Study. In *2019 IEEE 2nd 5G World Forum (5GWF)* (pp. 471-476). IEEE.

Kocher, I. S. (2023). Addressing the issues and developments correlated with envisaged 5g mobile technologies: comprehensive solutions. *Computers, Materials & Continua, 77*(2), 2205-2223.

Kumar, R., Smith, B., & Jones, A. (2023). Evolution of smart tourism technologies: A three-wave analysis. *Tourism Management, 45*(2), 234-249.

Lau, A. (2020). New technologies used in COVID-19 for business survival: Insights from the Hotel Sector in China. *Information Technology & Tourism, 22*(4), 497-504.

Lin, H. J., Mo, M. J., & Tang, Y. G. (2020). Pain Points in Tourism and its 5G-based Intelligent Solution. In *2020 International Conference on Computer Engineering and Application (ICCEA)* (pp. 448-453). IEEE.

Liu, C., & Thompson, E. (2024). Smart shopping experiences in tourism destinations. *Journal of Tourism Marketing, 16*(4), 178-192.

Martinez, A., & Lee, B. (2024). Smart tourism readiness: A comprehensive evaluation model. *Tourism Planning & Development, 14*(2), 89-104.

Nuriev, M., Kalyashina, A., Smirnov, Y., Gumerova, G., & Gadzhieva, G. (2024). The 5g revolution transforming connectivity and powering innovations. In *E3S Web of Conferences, 515, 04008.*

Park, J., Wilson, M., & Chen, R. (2024). Tourist behavior adaptation to smart technologies. *International Journal of Tourism Research, 22*(1), 45-60.

Pestek, A., & Sarvan, M. (2020). Virtual reality and modern tourism. *Journal of Tourism Futures*, *7*(2), 245-250.

Pribadi, T. I., Tahir, R., & Yuliawati, A. K. (2021). The Challenges in Developing Smart Tourism: A Literature Review. *InfoTekJar: Jurnal Nasional Informatika dan Teknologi Jaringan, 5*(2), 254-258.

Psiha, M. M., & Vlamos, P. (2017). IoT Applications with 5G connectivity in medical tourism sector management: third-party service scenarios. In *GeNeDis 2016* (pp. 141-154). Springer, Cham.

Rahman, S., Kim, J., & Lee, N. (2024). 5G-enabled navigation systems in tourism: Accuracy and implementation. *Journal of Location Based Services, 13*(2), 156-171.

Rodriguez, C., & Smith, P. (2024). Economic implications of 5G tourism services. *Tourism Economics Quarterly, 19*(1), 78-93.

Saaty, T. L. (2008). Decision making with the analytic hierarchy process. *International Journal of Services Sciences, 1*(1), 83-98.

Singh, R. and Nazki, A. A. (2023). The measurement of crisis management strategies in tourism. development and validation of a scale. *Turyzm/Tourism, 33*(2), 133-144. https://doi.org/10.18778/0867-5856.33.2.11.

Sun, J., Chen, D., Wang, Q., Lei, C., Wang, M., Li, Z., & Liu, J. (2024). Key issues on integrating 5g into industrial systems. *Electronics, 13*(11), 2048.

Thompson, K., Lee, M., & Wilson, R. (2023). Blockchain technology in tourism applications. *Journal of Travel Technology, 10*(4), 234-249.

Vignaroli, L., Gramaglia, M., Fuentes, M., Casella, A., Odarchenko, R., Natale, L., & D'Andria, F. (2020). The touristic sector in the 5G technology era: The 5G-TOURS project approach. In *2020 IEEE Globecom Workshops (GC Wkshps)* (pp. 1-6). IEEE.

Wang, W., Kumar, N., Chen, J., Gong, Z., Kong, X., Wei, W., & Gao, H. (2020). Realizing the potential of the internet of things for smart tourism with 5G and AI. *IEEE Network, 34*(6), 295-301.

World Tourism Organization (UNWTO). (2023). "International Tourism Highlights, 2023 Edition." Retrieved from UNWTO website (https://www.unwto.org).

World Travel & Tourism Council (WTTC). (2023). "Economic Impact Reports." Retrieved from WTTC website (https://wttc.org).

Wilson, M., & Park, S. (2024). VR tourism experiences: Impact on destination marketing. *Journal of Destination Marketing, 15*(3), 145-160.

Zhang, L., & Lee, K. (2024). Investment patterns in smart tourism infrastructure. *Tourism Management Perspectives, 20*(1), 112-127.

Zhang, X., & Liu, Y. (2024). Smart tourism development frameworks: A global perspective. *International Journal of Tourism Research, 17*(2), 178-193.

Financial Insights: Harnessing Recommender Systems through Bibliometric Analysis

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Research Article

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ABSTRACT

As science and technology advance rapidly, vast amounts of structured, semi-structured, and unstructured data are generated daily from various sources. This data, produced by diverse users, often exhibits common patterns that can be filtered and analyzed to offer valuable recommendations for products or services that interest these users. Recommender systems emerged in the mid-1990s and gained significant attention following the Netflix Prize. Today, these systems are applied in diverse fields, such as movie recommendations (Netflix), book suggestions (Amazon), and music selections (Spotify). Recommender systems (RS) are software applications and methods created to suggest items that may be valuable or relevant to users. This study aims to identify, evaluate, and synthesize research on the application of recommender systems in finance. To achieve this objective, we employed the bibliometric method, a robust approach for collecting research data. All relevant articles in this field were initially gathered from the Scopus database. Subsequently, we conducted an analysis using the bibliometrix package in R software to process the collected articles. In this study, we review the historical background of research conducted on recommender systems, explore their applications in the financial domain, and elaborate on the inputs and outputs of such systems. Additionally, we introduce different recommender systems and discuss their advantages, disadvantages, and challenges. Finally, we offer suggestions for the implementation of this method. The findings of this research serve as a valuable toolkit to assist researchers in their work within this area of study.

KEYWORDS

Bibliometrix, Data Mining, Finance, Recommender System.

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Introduction

In today's fast-paced world, the amount of information we access and utilize rapidly increases. Data mining, involving the extraction of relevant data from vast datasets and discovering meaningful patterns within them, plays a crucial role in this process. The primary objective of data mining is to transform extensive datasets into understandable structures. A specific subset of data mining is the recommendation system (Patel et al., 2017).

Recommendation systems emerged in the mid-1990s but gained significant attention following the Netflix Award. Nowadays, these systems are widely used across diverse fields, such as movie recommendations (Netflix), book suggestions (Amazon), and music selections (Spotify). Given the abundance of choices within these systems and users' limited interest in only a tiny fraction of items, recommendation systems are valuable in virtually any domain (Zibriczky, 2016). The application of recommendation systems extends to various domains, including recommending news, tours, articles, videos, music, books, documents, and e-commerce products, as well as e-learning and e-management services (Patel et al., 2017).

Recommendation systems, viewed as software tools and techniques, are designed to offer users useful suggestions for items. These recommendations are relevant to various decision-making scenarios, including proposing items to buy, movies to watch, music to enjoy, or news articles to read. Most recommendation systems are tailored to suit different applications, with their primary goal being to offer the most relevant items to real users. These systems can suggest items based on a user's history and profile to determine if the user prefers a particular item (Patel et al., 2017).

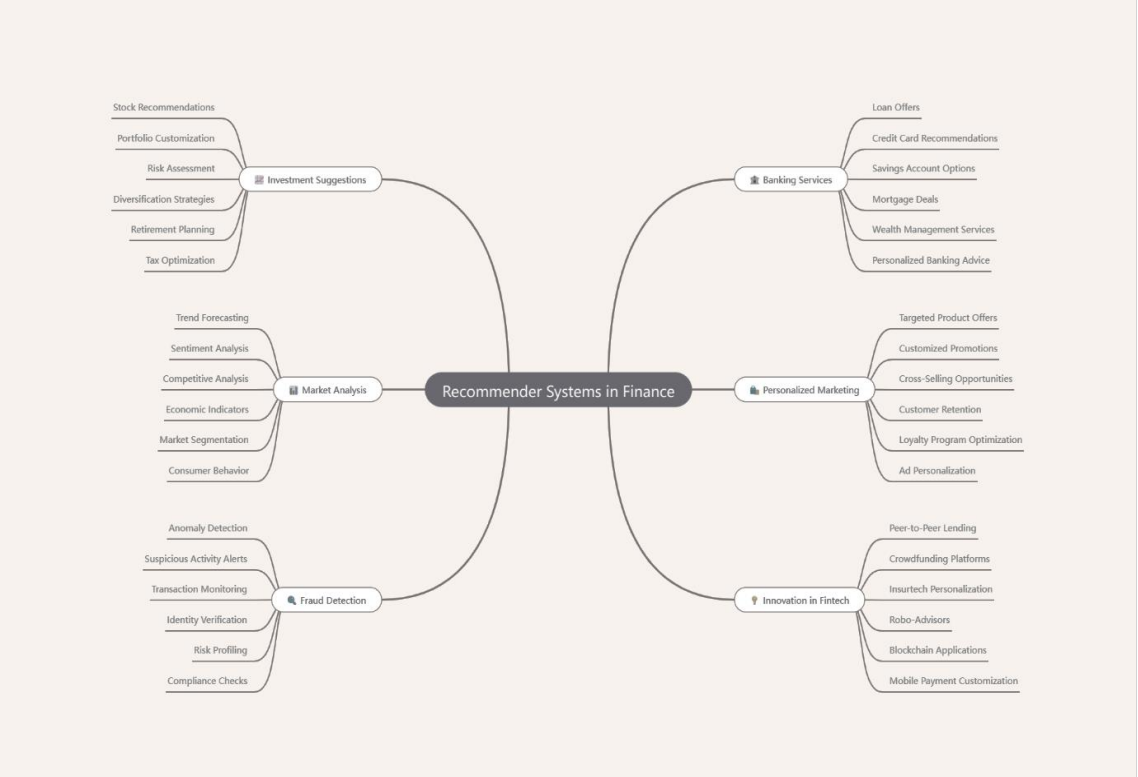
Recommendation systems generally produce two key outcomes:

- Assisting users in making decisions (for instance, by offering several suitable options).
- Enhancing users' awareness of their areas of interest by introducing them to new items and objects they may not have been aware of before.

It's important to note that in this context, an "item" refers to something the system recommends users to use, and the "user" is the recipient of these recommendations and the source of the data needed to generate them.

Among the various applications of recommender systems, one notable domain is finance. The following diagram illustrates the applications of recommendation systems across different fields:

Figure 1.
Application of Recommender Systems in Finance



(Source: Researcher's Findings)

Financial services institutions, including banks, brokerages, family offices, life insurance companies, and trusts, offer investment solutions to help clients achieve their financial goals. These services typically include advice on investment strategies and optional portfolio management, enabling clients to depend on financial market experts to manage their portfolios.

Recommending financial investment strategies is a complex and expertise-driven task. Financial advisors must engage in detailed discussions with their affluent clients to understand their needs and constraints. They then evaluate multiple options to find the most appropriate investment solution that aligns with their clients' goals.

Today, a crucial aspect of effective financial consulting is getting to know clients and providing personalized investment offers. Information technology (IT) investments aim to enhance transparency and provide better and timely reporting to customers. However, these IT advancements have not significantly impacted the investment decision-making process.

The objective of this study is to explore the applications of recommender systems in finance. To achieve this goal, we will delve into the definition of recommender systems, examine various types of recommendation methods, and analyze their advantages and disadvantages when applied to financial contexts.

Initial Questions

Publication Analysis:

- How many articles have been published on the application of recommender systems in financial institutions over different periods (e.g., years, decades)?
- Which scientific journals have published the highest number of articles in this field?
- What are the most frequently used keywords and phrases in the titles and abstracts of these articles?
- Has the publication trend in this area increased or decreased over time?

Geographical and Institutional Analysis:

- Which countries and institutions have published the highest number of articles in this field?

Methodological Analysis:

- Have articles been emphasizing specific methods for evaluating and managing market risk in financial institutions?

Objectives

- *Investigating Research Trends*: Examining the trends in research on the application of recommender systems in finance and identifying whether the interest and volume of publications in this area are increasing or decreasing.
- *Identifying Hot Topics*: Highlighting the key themes and hot topics currently explored in the intersection of recommender systems and finance.
- *Identifying Active Authors and Institutions*: Introducing the most prolific authors and leading institutions contributing to research in this field.
- *Highlighting Future Research Outlook*: Providing an outlook on potential future research directions and emerging trends in using recommender systems in finance.

Literature Review

In the following sections, we will delve into the theoretical literature relevant to the research. Before delving into the specific details, it is essential to establish a solid understanding of the fundamental concepts related to the topic. To that end, the table below presents the most critical definitions of recommendation systems:

Table 1.
An Overview of the Definitions of Recommending Systems in Different Theories

Definitions	Author(s)
Recommendation systems (RS) are software applications and methodologies designed to propose items that users can utilize.	(Ricci et al., 2011)

Definitions	Author(s)
These systems employ analytical technologies to assess the likelihood that a user will buy a product, ensuring that users receive tailored purchase recommendations.	(Park et al., 2012)
Recommender systems try to discover the user's preferences and get information about them to predict their needs. Widely, the recommendation system offers specific suggestions about items (products or actions) in an area that may interest the user.	(De Campos, 2010)
Recommender systems are services that analyze customer data, including user purchase data, to recommend the most appropriate product or service.	(Jooa et al., 2016)
The recommender system is an artificial intelligence algorithm that filters information about customer behavior and offers them products. This offer is based on various factors such as past purchases, demographic information, search history, and so on. Implementing a recommender system has three main approaches: collaborative filtering, content-based filtering, and a hybrid recommendation system.	(Tatiana & Mikhail, 2018)
Recommendation systems solve the problem of additional information that users commonly face with personalized recommendations.	(Isinkaye et al., 2015)
The recommendation process solves a large part of the additional information that customers encounter when ordering by providing personalized recommendations.	(Patel & Jain, 2018)
In recommender systems, trust or reliability is defined as: "How confident are you that the recommender systems provide the right advice?"	(Bobadilla et al., 2018)

(Source: Researcher's Findings)

The following table categorizes different methods of recommending systems:

Table 2.
Types of Recommender Systems Methods

Article(s)	Description	Methods
(Yu et al., 2008), (Qian et al., 2019), (Moreno et al., 2016)	Web data mining involves discovering patterns within vast datasets that can be applied in numerous areas such as interactive group recommendations, decision-making, group data mining, social data filtering, personalization, taxi route management, and selecting TV programs. Information synthesis is the process of combining data to generate new insights. This study concentrates on merging item clusters with social connections, decision-making groups, adaptive frameworks, knowledge sharing, and multivariate hybrid groups, among other aspects.	Data web mining & information fusion
(Salter & Antonopoulos, 2006), (Van Meteren & Van Someren, 2000), (Lops et al., 2011),(Blanco-Fernandez et al., 2008)	This method suggests items based on recommendations for similar products that the user has previously liked, including fostering group behavior, enhancing group learning, identifying topics, fostering trust within groups, and leveraging social networks.	content-based filtering
(Herlocker et al., 2004), (Schafer et al., 2007), (Ekstrand et al., 2011), (Luo et al., 2012)	This recommendation system offers suggestions based on shared preferences among users, incorporating aspects such as customer profile modeling, user engagement, social interactions, e-commerce platforms, TV and music content, group trust models, and group tagging.	Collaborative filtering
(Baltrunas & Ricci 2009), (Liu et al., 2015)	Content-based recommendation systems operate on contextual (textual) data, including factors like time of day, weather forecasts, and predictions of rain, among others. They also encompass group recommendations, targeted suggestions, e-commerce, social networks, and more.	Context-based filtering

Article(s)	Description	Methods
(Wang et al., 2014), (Fernández-Tobías et al., 2011)	These web recommender systems are classified as ontological. Group recommendation systems exhibit behavior aligned with semantic methods, including trust management, social interactions within groups, multidimensional groups, group decision-making, group goal recommendations, and hybrid groups.	Semantic-based
(Reddy et al., 2002), (Kamahara et al., 2005)	Recommendation systems utilizing this method offer suggestions to users as well as their close friends. It focuses on trust groups, travel groups, social networking groups, and collaborative groups.	Community filtering based
(Tso-Sutter et al., 2008), (Liang et al., 2008), (Kim et al., 2010), (Ji et al., 2007)	Group-based tag recommendation systems involve keywords related to activities or attributes associated with a photo, video, or article. This approach benefits users by enhancing the relevance of recommendations. This research emphasizes group segmentation, tagging behavior, trust in group tags, tagged images, and social networking groups.	Tagged Filtering
(Krishna et al., 2013), (Koukourikos et al., 2012), (Alahmadi et al., 2015)	Emotion analysis methods leverage social factors to evaluate recommendation systems, focusing on group patterns, social networks, and trust within groups.	Sentiment analysis
(Ghazanfar & Prugel-Bennett, 2010), (Bellogín et al., 2013)	Hybrid recommendation systems integrate the various approaches mentioned earlier. Group recommendation systems enhance suggestions by incorporating elements such as social networking within groups, content-based grouping, group learning, and techniques related to data mining, clustering, labeling, and group modeling.	Hybrid filtering
(Zhao et al., 2014), (Safoury & Salah, 2013).	Demographic characteristics, such as gender and age, play a crucial role in personal recommendations. In group recommendation systems, researchers have employed various methods, including travel groups, social networks, proposed objectives for groups, and collective decision-making.	Demographic-based
(Masthoff, 2011), (Kim & Kim, 2001), (Cantador & Castells, 2012), (McCarthy et al., 2006).	Group recommendation modeling seeks to forecast the ranking and behavior of particular groups using a structured approach. Several researchers have utilized this method in developing group recommendation systems (GRS), emphasizing group behavior, trust models, personalization, collective decision-making, mobile social networks, and influential groups.	Group models
(Ghazarian & Nematbakhsh, 2015), (Wang et al., 2016)	In this method, the recommendation system generates suggestions by analyzing a panel of individuals with similar or targeted interests. Group recommendation systems (GRS) provide guidance on various factors, including group behavior, collective memory, group interactions, content-based groups, social data, and recommendations for TV shows and music.	Group filtering

(Source: Researcher's Findings)

Methodology

In this study, we utilize the bibliometric method to investigate the research landscape on the use of recommendation systems in finance. The process of the bibliometric method is outlined by Börner, Chen, and Boyack (2003). According to Zupic and Čater (2015), the general science mapping workflow, introduced by Börner et al. (2003), includes five key stages:

1. Study Design

2. Data Collection
3. Data Analysis
4. Data Visualization
5. Interpretation

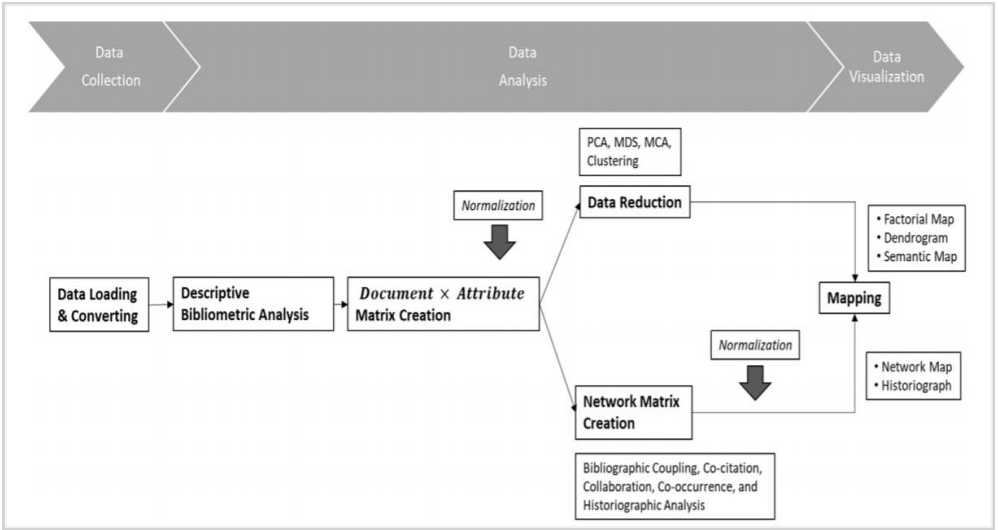
In the study design phase, researchers develop their research question(s) and select appropriate bibliographic methods to address these inquiries. Bibliometrics can be used to address three major concerns in mapping science:

1. Determining the foundational knowledge and intellectual framework of a specific subject or research area.
2. Investigating the breadth and conceptual framework of research related to a particular topic or field.
3. Constructing a social network structure within a specific scientific community.

The primary question guiding this research is twofold: What are the potential applications of recommender systems in finance, and what research has already been conducted in this domain? Additionally, the study seeks to identify the challenges faced when applying recommender systems in the finance sector.

The steps involved in using science mapping to explore the application of recommender systems in finance include:

Figure 2.
Bibliometrix and the Recommended Science Mapping Workflow



(Source: Researcher's Findings)

According to the above figure, the science mapping process involves the following three key stages: data collection, data analysis, and data visualization. These stages are further explained below:

Data collection comprises three steps. Firstly, data retrieval is conducted. Numerous online bibliographic databases serve as valuable resources for bibliographic data, such as (Cobo et al., 2011):

- Clarivate Analytics Web of Science (WoS) (http://www.webofknowledge.com)
- Scopus (http://www.scopus.com)
- Google Scholar (http://scholar.google.com)
- Science Direct (http://www.sciencedirect.com/)

Given the vast amount of research on recommendation systems, we focus on understand their application in finance. For this purpose, a search was performed using the keyword "recommendation system + finance" in the Scopus database on February 23, 2024. The bibliometrix package in R software was utilized to extract the following results.

Figure 3.
Map of Keywords Used in Articles

(Source: Researcher's Findings)

Findings

Table 3 shows the descriptive statistics of research conducted on financial recommendation systems.

Table 3.
Descriptive Statistics of Research Conducted on Financial Recommendation Systems

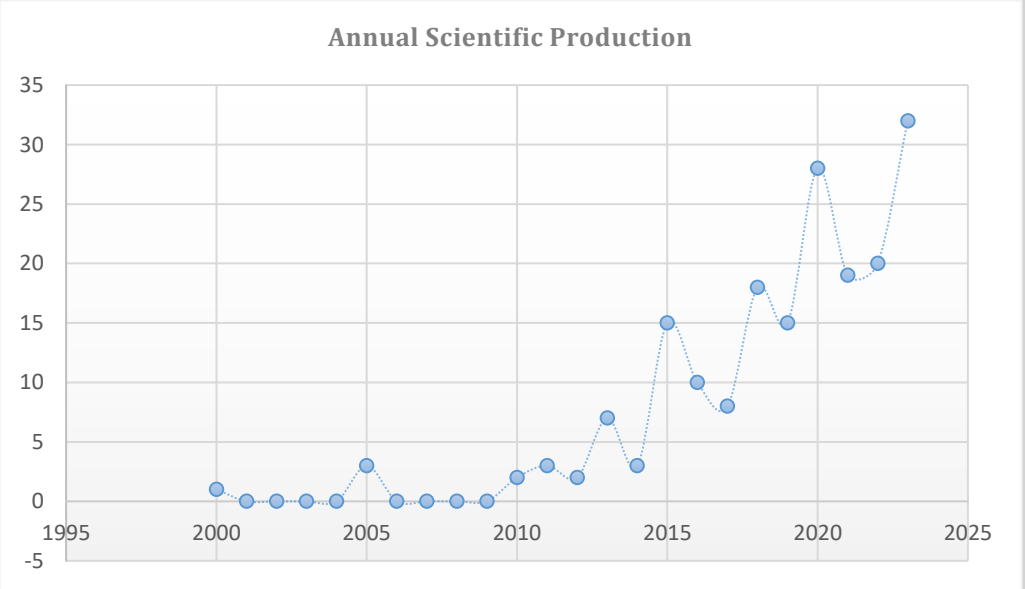
Description	Results
Main Information About Data	
Timespan	2000:2024
Sources (Journals, Books, etc)	132
Documents	190
Annual Growth Rate %	5.95
Document Average Age	5.13
Average citations per doc	21.63
References	0

Description	Results
Document Contents	
Keywords Plus (ID)	1415
Author's Keywords (DE)	630
Authors	
Authors	594
Authors of single-authored docs	15
Authors Collaboration	
Single-authored docs	15
Co-Authors per Doc	3.44
International co-authorships %	13.68
Document Types	
article	53
article conference paper	1
book	3
book chapter	5
conference paper	122
review	6

(Source: Researcher's Findings)

According to Table (3), 132 studies have been conducted by 594 authors on financial recommendation systems, of which 53 are articles.

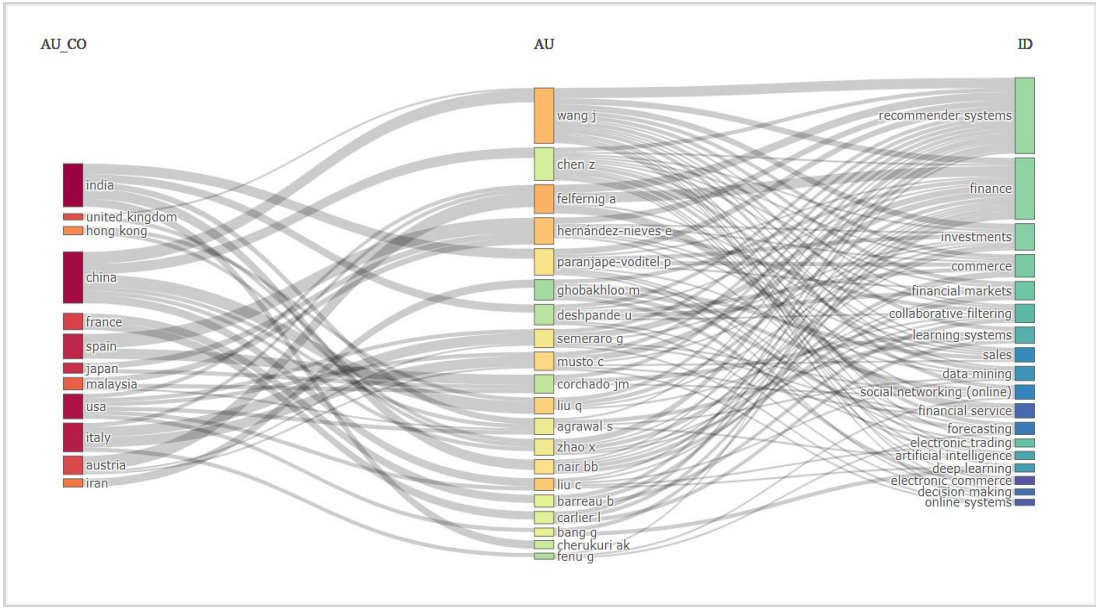
Figure 4.
Annual Scientific Production



(Source: Researcher's Findings)

According to the above figure, the research peak is observed from 2015 to 2023.

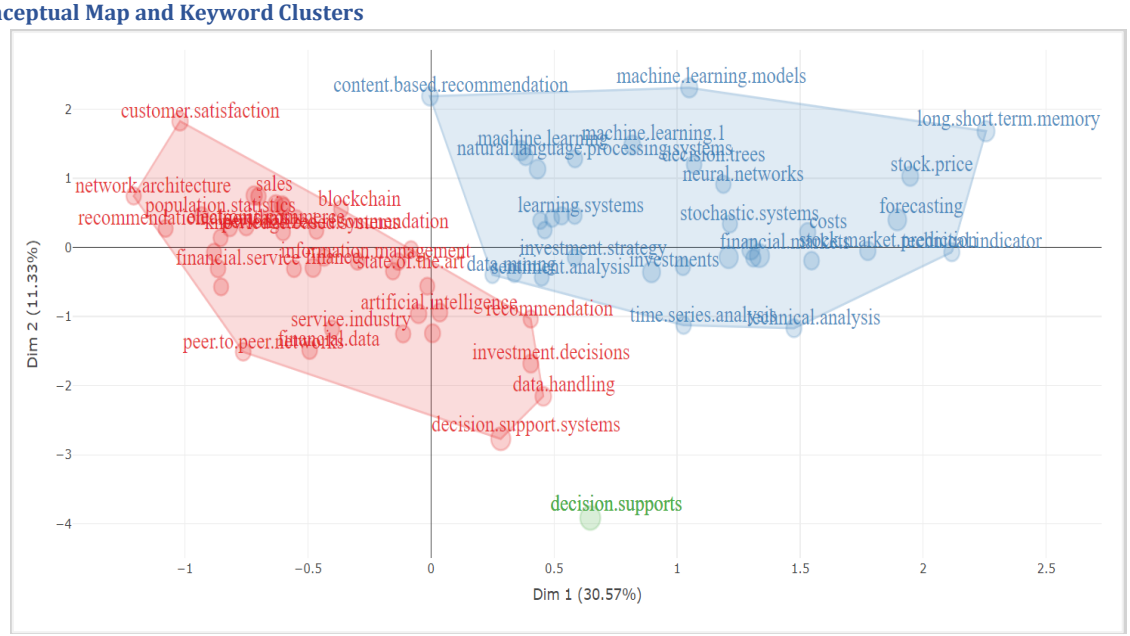
Figure 5.
Financial Network, Relationship between Countries, Keywords and Research Topics



(Source: Researcher's Findings)

In this network, the relationship between countries, keywords, and titles is presented with the keywords on the left side, titles in the middle, and the authors of the top studies on the right side.

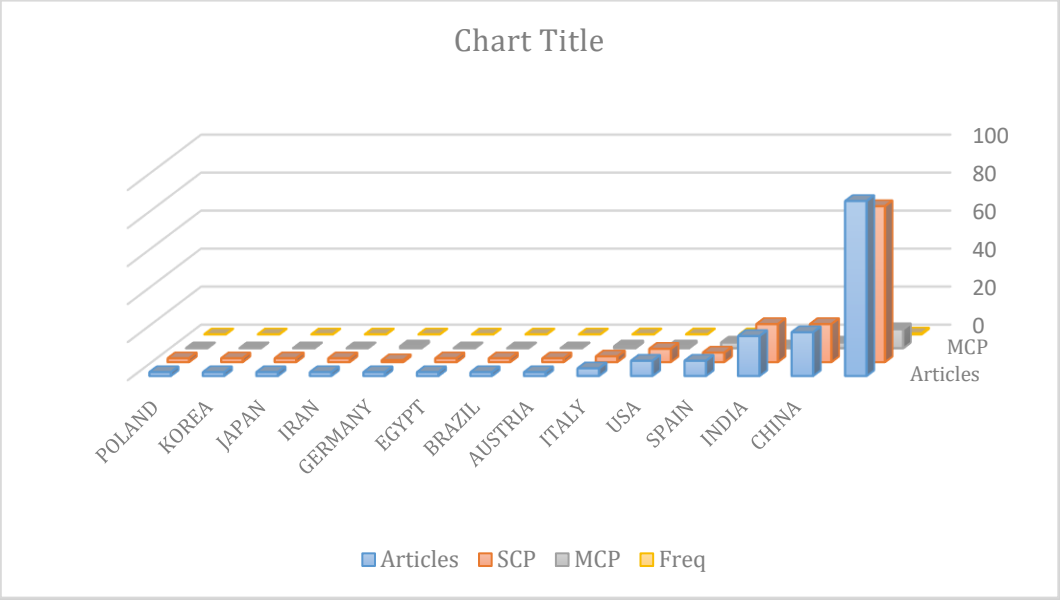
Figure 6.
Conceptual Map and Keyword Clusters



(Source: Researcher's Findings)

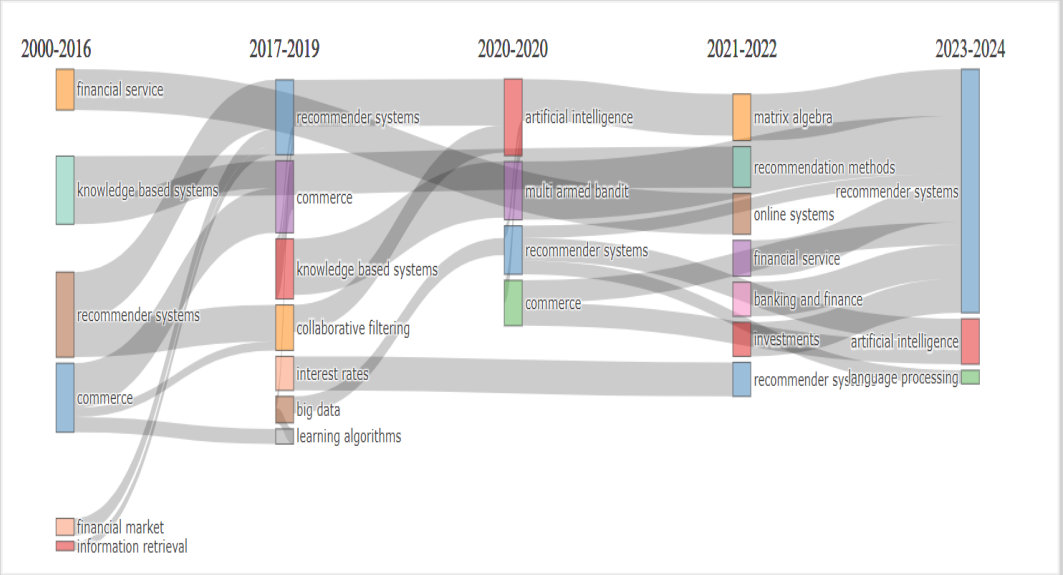
Based on Figure 7, China, India, and Spain have conducted the most research in this field.

Figure 7.
Corresponding Author's Countries



(Source: Researcher's Findings)

Figure 8.
Thematic Evolution



(Source: Researcher's Findings)

Figure 8 illustrates the thematic progression of financial services research from 2000 to 2024. The visualization shows a shift in focus from knowledge-based systems and conventional financial services to adopting AI, machine learning, and data-driven methodologies. The interconnection of these themes highlights the complex interaction between technological innovations and regulatory changes shaping the evolution of the field.

The following table provides an overview of the most important research conducted on financial recommender systems:

Table 4.
Review of Research

Results	Authors
This study aims to review and retest Swedish Robo counseling from 2010 to 2019. The collected data is examined through a correlation test to ensure that it accurately represents the robo Consulting's portfolio and performance.	(Mhanga & Berg, 2019)
This study seeks to introduce a stock trading recommendation system based on a classifier that uses historical stock price data and technical indicators as input.	(Vismayaa et al., 2019)
This study compares seven German Robo consultations with the top six consultants from the United Kingdom and the United States. First, various web-based risk assessment questionnaires are reviewed. The algorithm then automatically tests all or a range of possible responses and stores the risk profile. This allows for in-depth analysis of risk profiles and comparison of recommended profiles through Robo Consulting.	(Tertilt & Scholz, 2018)
Based on the assumptions of the effect of stock transfers on the China Stock Exchange, this study uses the collaborative filtering technique to build a stock forecasting algorithm, which is a new stock recommendation technique. This algorithm leads to high profitability with average annual returns.	(Zheng et al., 2019)
This research proposes a model that presents a stock recommendation model for making a profit through the analysis of electronic social networks.	(Patel, 2019)
This research focuses on the cold start, a situation in which no information is available from the user to recommend based on it. Cold start is one of the challenges of recommending systems.	(Gonard, 2018)
This research presents a trading system for a portfolio that creates both buying and selling signals and counters portfolio constraints.	(Almahdi & Yang, 2019)
The study aims to provide administrators with a new tool to help them limit the stock list so that they can accurately analyze it.	(De Rossi et al., 2019)
In this research, the intrinsic characteristics of stocks are extracted to predict the stock trend better.	(Chen et al., 2019)
This study presents a stock market portfolio recommendation system based on association rules, which examines stock data to generate a ranked list of stock portfolios.	(Paranjape-Voditel & Deshpande, 2013)
This article focuses on forecasting stock price trends using online text news. Textual features are extracted through news sites, and recommendations are generated based on interpretations.	(Bag & Kulkarni, 2017)
This article presents a new methodological framework for pair trading strategies, emphasizing exploration and monitoring, which identifies the optimal pairs for profit at the right time. The framework includes a system that alerts traders at appropriate moments based on the strategy. Business strategies can be employed to identify specific market patterns. The pair trading strategy focuses on selecting pairs of assets that exhibit co-movement to generate profits.	(Al-Naymat et al., 2018)
This paper presents a framework for recommending asset allocation strategies that integrate reasoning with innovative diversification techniques to assist financial advisors in creating diversified and personalized investment portfolios. The framework's performance was assessed based on the experiences of 1,172 actual users, revealing that the returns from the recommended portfolios generally surpassed those provided by human consultants across most experimental scenarios while also accounting for the preferred risk levels of the portfolios. Additionally, the diversification strategy demonstrated encouraging results in terms of diversity and average performance.	(Musto et al., 2015)

Results	Authors
This article examines the use of recommendation systems across various financial domains, aiming to enhance the development of such systems in different sectors.	(Zibriczky, 2016)
This paper presents a group recommendation model that utilizes financial social networks and collaborative filtering techniques. Unlike recent personalized advisory systems, this model considers not only individual investors' assets and risk preferences but also the social connections and collective risk profiles within groups. Experimental results from benchmark datasets and real-world scenarios show that the proposed algorithm surpasses existing methods in both tasks.	(Xue et al., 2018)
This research uses a bibliometric approach to examines the application of recommendation systems in the evolution of Robo Advisors. It systematically reviews empirical studies in this field, underscores the importance of Robo Advisors in finance, and proposes a framework tailored for Iran.	(Zarei et al., 2023)

(Source: Researcher's Findings)

Application of Recommender Systems in Finance

Table 5.
Application of Recommender Systems in Finance

Research	Application
(Zhang et al., 2019), (Rakesh et al., 2016), (Li et al., 2020), (An et al., 2014), (Li et al., 2020), (Gera & Kaur, 2018), (Benin, 2018)	Recommended system in crowdfunding
(Bhaskar & Subramanian, 2011), (Zhao et al., 2014), (Ren & Malik, 2019), (Zhao et al., 2016), (Babaei & Bamdad, 2020), (Zhang et al., 2019), (Chai et al., 2019)	Recommended system in p2p lending
(Saladin et al., 1993), (Wang et al., 2018)	Recommendation system for credit
(Paranjape-Voditel & Deshpande, 2013), (Hegde et al., 2018), (Nair & Mohandas, 2015), (Paranjape-Voditel & Deshpande, 2011), (Vismayaa et al., 2020), (Sayyed et al., (n.d.)), (Sun et al., 2018), (De Rossi et al., 2019), (Nourahmadi et al., 2024)	Stock portfolio recommender system
(Nair et al., 2017), (Hegde et al., 2018)	Recommendation system in stock clustering
(Hernández-Nieves et al., 2020), (Gallego & Huecas, 2012), (Asosheha et al., 2008), (Gigli et al., 2017), (Oyebode & Orji, 2020), (Tangphoklang et al., 2010), (Abdollahpouri & Abdollahpouri, 2013)	Bank recommendation system
(Alrawhani et al., 2016), (Yuan et al., 2013), (Ginevičius et al., 2011), (Rehman et al., 2019), (Zhang et al., 2019), (Daly et al., 2014)	Real Estate recommendation system
(Musto et al., 2015)	recommendation system in wealth management
(Frey et al., 2016), (Wang et al., 2019), (Arora et al., 2020), (Porkodi & Kesavaraja, 2020), (Bosri et al., 2020), (Bhardwaj & Datta, 2020)	Blockchain
(Abbas et al., 2015), (Hinduja & Pandey, 2017), (Qazi et al., 2017), (Mitra et al., 2014), (Lesage et al., 2020), (Qazi et al., 2020), (Bi et al., 2020), (Kanchinadam et al., 2018), (Atauchi et al., 2019), (Rokach et al., 2013)	Insurance recommendation system
(Hernández et al., 2018), (Nieves, 2020)	Fintech and recommendation system

(Source: Researcher's Findings)

Challenges of Recommender Systems

The following table examines the challenges of recommending systems:

Table 6.
Challenges of Recommender Systems

Problem	Definition	Author(s)
Change user preference	The recommendation system primarily relies on users' interests and profiles. Over time, users' preferences and settings evolve, and adapting to these changes is one of the key challenges of recommendation systems.	(Rashid et al., 2002)
Sparsity	With a vast number of users and items available, users generally only rate a small subset of items. Recommendation system techniques strive to develop profiles that reflect user preferences. However, when a user has rated only a few items, it becomes difficult to accurately assess their preferences resulting in suboptimal recommendations. This challenge, known as dispersion, stems from insufficient data.	(Chen et al., 2011), (Sarwar, 2001), (Jain et al., 2015)
Scalability	As the number of users and items increases, the system needs more resources to process the data and provide accurate recommendations efficiently.	(Sarwar, 2001), (Sarwar et al., 2000), (Ghazanfar & Prugel-Bennett, 2010), (Jain et al., 2015)
Synonymy	Since closely related items have similar names and descriptions, many recommendation systems struggle to differentiate between them for example, differentiating "baby clothes" from "children's clothes."	(Sarwar et al., 2000)
Privacy	To provide the most accurate and reliable recommendations, systems need to gather extensive information from the user, including demographic data and other relevant details.	(Ramakrishnan et al., 2001), (Jeckmans et al., 2013), (Jain et al., 2015)
Cold start	Cold start, a prevalent issue in many recommendation system applications, refers to having limited information about a user's preferences for generating recommendations. Item cold start refers to the introduction of a new item (e.g., an article) that users have not yet reviewed. This challenge is often associated with data sparsity, which primarily affects participatory filtering approaches.	(Karimi et al., 2018), (Lika et al., 2014), (Jain et al., 2015)

(Source: Researcher's Findings)

Discussion and Conclusion

With the rapid pace of technological advancements, the daily generation of large volumes of structured, semi-structured, and unstructured data from various sources has become commonplace. Hidden within this data are shared patterns that, when properly analyzed, can produce highly personalized recommendations. Recommender systems, pivotal in industries ranging from entertainment to retail, are increasingly relevant in the financial domain, where they provide tailored insights and solutions for both investors and service providers.

This study leveraged bibliometric analysis to explore the landscape of recommender systems within finance systematically. By examining the key research contributions in this field, we highlighted the evolution, methodologies, and applications of these systems.

Our findings reveal the transformative potential of recommender systems to optimize decision-making processes, enhance client engagement, and drive more informed financial strategies.

We have also outlined the challenges in implementing these systems, particularly within the financial sector's complex and regulated environment. Nonetheless, the potential for recommender systems to innovate and bring efficiency to financial services remains vast.

Future research should concentrate on enhancing the practical use of these systems by applying advanced data analytics, machine learning, and AI techniques. This will enable recommender systems to better adapt to the ever-changing financial markets, delivering more precise and actionable recommendations. Ongoing innovation in this field has the potential to transform the operations of financial institutions, offering significant advantages to both users and providers.

In conclusion, recommender systems in finance are not just tools but strategic assets capable of transforming user experiences and decision-making processes. With sustained research and development, their role will only grow, offering richer insights and more personalized financial solutions in the coming years.

Drawing on the findings of this study and the analysis of recommender systems in the financial sector, we put forward several suggestions for future research and practical application:

- Development of Smarter Models Using Deep Learning and AI: Given the complexity and vast amount of financial data, the integration of deep learning and AI algorithms can enhance the accuracy and efficiency of recommender systems. Future studies should focus on exploring these advanced techniques to build more intelligent and adaptive systems.
- Improvement of Data Quality and Preprocessing Techniques: High-quality data is crucial for the effectiveness of recommender systems. Researchers should develop more sophisticated data preprocessing methods to handle missing, noisy, and unstructured data in the financial sector, often presenting unique challenges.
- Applying Hybrid Recommender Systems: Combining different recommendation approaches, such as collaborative filtering, content-based filtering, and knowledge-based systems, can improve the robustness and flexibility of financial recommender systems. Future research should explore hybrid models to provide more accurate and diversified recommendations.
- Addressing Privacy and Ethical Concerns: As financial data is highly sensitive, ensuring user privacy and addressing ethical concerns in the development and application of recommender systems is vital. Future studies should investigate ways to protect data while maintaining the system’s performance, including using privacy-preserving algorithms.

- Applying Real-Time Recommendation Systems: Financial markets are dynamic and time-sensitive. Developing real-time recommender systems that can analyze streaming data and provide timely recommendations is crucial for applications such as stock trading and investment advice. This area requires further exploration and innovation.
- Customization and Personalization: As financial needs and goals vary greatly among individuals, future research should focus on enhancing the personalization of recommender systems. Developing more customized solutions that adapt to user preferences and risk profiles will increase the system's effectiveness and user satisfaction.
- Performing Cross-Disciplinary Research: Promoting collaboration between financial specialists, data scientists, and technology experts can drive the creation of more sophisticated and practical recommender systems. Future research should embrace a multidisciplinary approach to tackle the complexities of the financial sector effectively.

By implementing these recommendations, financial recommender systems can progress further, providing more innovative, dependable, and personalized solutions that cater to the needs of both users and financial institutions.

REFERENCES

Abdollahpouri, H., & Abdollahpouri, A. (2013). An Approach for Personalization of Banking Services in Multi-Channel Environment Using Memory-Based Collaborative Filtering. In *The 5th Conference on Information and Knowledge Technology (*pp. 208–13*)*. IEEE. Doi: 10.1109/IKT.2013.6620066.

Abdelkader,. (2020). Real Estate Loan Knowledge-Based Recommender System. *Journal of Digital Information Management, 18*(2), 65-77.

Al-Naymat, G., Al-Kasassbeh, M., & and Sober, Z. (2018). Pairs Trading Strategy: A Recommendation System. *International Journal of Computers and Applications, 42*(8), 787–797.

Alahmadi, D.H., & Zeng, X.J. (2015). Twitter-Based Recommender System to Address Cold-Start: A Genetic Algorithm Based Trust Modelling and Probabilistic Sentiment Analysis. In *2015 IEEE 27th International Conference on Tools with Artificial Intelligence (ICTAI)*. (pp. 1045–52). IEEE.

Almahdi, S., & Steve Y. Y. (2019). A Constrained Portfolio Trading System Using Particle Swarm Algorithm and Recurrent Reinforcement Learning. *Expert Systems with Applications* 130, 145–56.

Alrawhani, E. M., Halizah B., & Sa'ayaa, Z. (2016). Real Estate Recommender System Using Case-Based Reasoning Approach. *Journal of Telecommunication, Electronic and Computer Engineering (JTEC), 8*(2),177–82.

An, J., Quercia, D., & Crowcroft, J. (2014). Recommending Investors for Crowdfunding Projects. In: Choudhury, S., Mishra, R., Mishra, R., Kumar, A. (eds). *Intelligent Communication, Control and Devices. Advances in Intelligent Systems and Computing*, vol 989. Springer, Singapore. https://doi.org/10.1007/978-981-13-8618-3_51.

Argiddi, R. V., & Apte. S. S., (n.d). Collaborative Filtering Recommender System for Financial Market. *International Journal of Engineering and Advanced Technology (IJEAT) ISSN* 2249–8958.

Arora, M., Chopra, A.B., & Dixit, V.S. (2020). An Approach to Secure Collaborative Recommender System Using Artificial Intelligence, Deep Learning, and Blockchain. In *Intelligent Communication, Control and Devices*. (pp. 483–95).Springer.

Asosheha, A., Bagherpour, S., & Yahyapour, N. (2008). Extended Acceptance Models for Recommender System Adaption, Case of Retail and Banking Service in Iran. *WSEAS Transactions on Business and Economics, 5*(5),189–200.

Atauchi, P. D., Nedel, L., & Galante, R. (2019). Broker-Insights: An Interactive and Visual Recommendation System for Insurance Brokerage. In: Gavrilova, M., Chang, J., Thalmann, N., Hitzer, E., Ishikawa, H. (eds). *Advances in Computer Graphics. CGI 2019. Lecture Notes in Computer Science*,11542. Springer, Cham. https://doi.org/10.1007/978-3-030-22514-8_13

Babaei, G., & Bamdad, SH. (2020). A Multi-Objective Instance-Based Decision Support System for Investment Recommendation in Peer-to-Peer Lending. *Expert Systems with Applications,* 150,113278.

Bag, V., & Kulkarni, U.V. (2017). Stock Price Trend Prediction and Recommendation Using Cognitive Process. *International Journal of Rough Sets and Data Analysis (IJRSDA), 4*(2), 36–48.

Baltrunas, L., & Ricci, F. (2009). Context-Based Splitting of Item Ratings in Collaborative Filtering. In *Proceedings of the third ACM conference on Recommender systems* (pp. 245–48).

Bellogín, A., Cantador, I., Díez, F., Castells, P., & Chavarriaga, E. (2013). An Empirical Comparison of Social, Collaborative Filtering, and Hybrid Recommenders. *ACM Transactions on Intelligent Systems and Technology (TIST), 4*(1),1–29.

Benin, A.C. (2018). *A Comparison of Recommender Systems for Crowdfunding Projects*. Universidade Federal do Rio Grande do Sul, Brazil, Porto Alegre, Brazi

Bhardwaj, R., & Datta, D. (2020). *Development of a Recommender System HealthMudra Using Blockchain for Prevention of Diabetes* (pp. 313–327). Scrivener Publishing LLC: Hoboken, NJ, USA.

Bhaskar, T., & Subramanian, G. (2011). Loan Recommender System for Microfinance Loans: Increasing Efficiency to Assist Growth. *Journal of Financial Services Marketing, 15*(4), 334–45.

Bi, Y., Song, L., Yao, M., Wu, Z., Wang, J., & Xiao, J. (2020). A Heterogeneous Information Network Based Cross Domain Insurance Recommendation System for Cold Start Users. In *Proceedings of the 43rd International ACM SIGIR Conference on Research and Development in Information Retrieval*. (pp. 2211–20). IEEE.

Blanco-Fernandez, Y., Pazos-Arias, J.J., Gil-Solla, A., Ramos-Cabrer, M., & Lopez-Nores, M. (2008). Providing Entertainment by Content-Based Filtering and Semantic Reasoning in Intelligent Recommender Systems. *IEEE Transactions on Consumer Electronics*, *54*(2), 727–35.

Bobadilla, J., Gutiérrez, A. Ortega, F., and Zhu, B. (2018). Reliability Quality Measures for Recommender Systems. *Information Sciences,* 442,145–57.

Börner, K., Chen, CH., & Boyack, K.W. (2003). Visualizing Knowledge Domains. *Annual Review of Information Science and Technology, 37*(1), 179–255.

Bosri, R., Rahman, M. SH. & Bhuiyan, Z.D., & Al Omar, A. (2020). Integrating Blockchain with Artificial Intelligence for Privacy-Preserving in Recommender Systems. *IEEE Transactions on Network Science and Engineering*, *8*(2), 1009-1018

Luis M., de Campos, Fernández-Luna, J. M., Huete, J. F., Rueda-Morales, M. A. (2010). Combining Content-Based and Collaborative Recommendations: A Hybrid Approach Based on Bayesian Networks. *Intennational Journal of Approximate Reasoning,* 51,785–99.

Cantador, I., & Castells, P. (2012). Group Recommender Systems: New Perspectives in the Social Web. In *Recommender systems for the social web*. (pp. 139–57). Springer.

Chai, Y. B., Cong, Y. H., Bai, L. & Cui, L. X. (2019). Loan Recommendation in P2P Lending Investment Networks: A Hybrid Graph Convolution Approach. In *2019 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*. (pp. 945–49). IEEE.

Chen, Ch., Zhao, L., Bian, J., Xing, Ch., & Liu. T.Y. (2019). Investment Behaviors Can Tell What inside: Exploring Stock Intrinsic Properties for Stock Trend Prediction. In *Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining.* (pp. 2376–84).

Chen, Y., Wu, CH., Xie, M., & Guo, X. (2011). Solving the Sparsity Problem in Recommender Systems Using Association Retrieval. *Journal of Computers, 6*(9), 1896–1902.

Cobo, M.J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). Science Mapping Software Tools: Review, Analysis, and Cooperative Study among Tools. *Journal of the American Society for Information Science and Technology, 62*(7), 1382–1402.

Daly, E. M., Botea, A., Kishimoto A., & Marinescu, R. (2014). Multi-Criteria Journey Aware Housing Recommender System. In *Proceedings of the 8th ACM Conference on Recommender systems*. (pp. 325–28).

De Rossi, G., Kolodziej, J., & Brar, G. (2019). A Recommender System for Active Stock Selection. *Computational Management Science,* 1–31.

Ekstrand, M.D., Riedl, J.T., & Konstan, J.A. (2011). Collaborative Filtering Recommender Systems. *Foundations and Trends in Human–Computer Interaction,* 4(2), 81–173.

Fernández-Tobías, I., Cantador, I., Kaminskas, M., & Ricci, F. (2011). A Generic Semantic-Based Framework for Cross-Domain Recommendation. In *Proceedings of the 2nd International Workshop on Information Heterogeneity and Fusion in Recommender Systems*. (pp. 25–32).

Frey, R., Wörner, D., & Ilic, A. (2016). Collaborative Filtering on the Blockchain: A Secure Recommender System for e-Commerce. *AMCIS 2016 Proceedings*. 36. https://aisel.aisnet.org/amcis2016/ISSec/Presentations/36

Gallego, D., & Huecas, G. (2012). An Empirical Case of a Context-Aware Mobile Recommender System in a Banking Environment. In *2012 third FTRA international conference on mobile, ubiquitous, and intelligent computing*. (pp. 13–20). IEEE.

Gera, J., & Kaur, H. (2018). A Novel Framework to Improve the Performance of Crowdfunding Platforms. *ICT Express, 4*(2), 55–62.

Ghazanfar, M. A., & Prugel-Bennett, A. (2010). A Scalable, Accurate Hybrid Recommender System. In *2010 Third International Conference on Knowledge Discovery and Data Mining*. (pp. 94–98). IEEE.

Ghazarian, S., & Nematbakhsh, M.A. (2015). Enhancing Memory-Based Collaborative Filtering for Group Recommender Systems. *Expert Systems with Applications, 42*(7), 3801–3812.

Gigli, A., Lillo, F., & Regoli, D. (2017).Recommender Systems for Banking and Financial Services. In *RecSys Posters* Poster Proceedings, August 27-31, Como, Italy.

Ginevičius, T., Kaklauskas, A., Kazokaitis, P., & Alchimovienė, J. (2011). Recommender System for Real Estate Management. *Business: Theory and Practice, 12*(3), 258–267.

Gonard, F. (2018). Cold-Start Recommendation: From Algorithm Portfolios to Job Applicant Matching. Artificial Intelligence [cs.AI]. Université Paris-Saclay. English.

Hegde, M. S., Krishna, G., & Srinath, R. (2018). An Ensemble Stock Predictor and Recommender System. In *2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI)*. (pp. 1981–85). IEEE.

Herlocker, J.L., Konstan, J.A., Terveen, L.G., & Riedl, J.T. (2004). Evaluating Collaborative Filtering Recommender Systems. *ACM Transactions on Information Systems (TOIS), 22*(1), 5–53.

Hernández-Nieves, E., Hernández, G., Gil-González, A.B., Rodríguez-González, S., & Corchado, J.M. (2020). Fog Computing Architecture for Personalized Recommendation of Banking Products. *Expert Systems with Applications,* 140, 112900.

Hernández, E., Sittón, I., Rodríguez, S., Gil, A. B., and García, R.J. (2018). An Investment Recommender Multi-Agent System in Financial Technology. In *The 13th International Conference on Soft Computing Models in Industrial and Environmental Applications*. (pp. 3–10). Springer.

Hinduja, A., & Pandey, M. (2017). Multicriteria Recommender System for Life Insurance Plans Based on Utility Theory. *Indian Journal of Science and Technology, 10*(14),1–8.

Isinkaye, F. O., Y. O. Folajimi, & Ojokoh, B. A. (2015). Recommendation Systems: Principles, Methods and Evaluation. *Egyptian Informatics Journal 16*(3), 261–73.

Jain, S., Grover, A., Singh Thakur, P., & Kumar Choudhary, S. (2015). Trends, Problems and Solutions of Recommender System. In *International Conference on Computing, Communication & Automation*. (pp. 955–58). IEEE.

Jeckmans, J. P., Beye, M., Erkin, Z., Hartel, P., Lagendijk, R. L., & Tang, Q. (2013). Privacy in Recommender Systems. In *Social media retrieval*. (pp. 263–8). Springer.

Ji, A.T., Yeon, CH., Kim, H-N., & Jo, G. (2007). Collaborative Tagging in Recommender Systems. In *Australasian Joint Conference on Artificial Intelligence*. (pp. 377–86). Springer.

Jooa, J., Bangb, S., & Parka, G. (2016). Implementation of a Recommendation System Using Association Rules and Collaborative Filtering. *Procedia Computer Science,* 91, 944–52.

Kamahara, J., Asakawa, T., Shimojo, Sh., & Miyahara, H. (2005). A Community-Based Recommendation System to Reveal Unexpected Interests. In *11th international multimedia modelling conference*. (pp. 433–38). IEEE.

Kanchinadam, T., Qazi, M., Bockhorst, J., Morell, M. Y., Meissner, K., & Fung, G. (2018). Using Discriminative Graphical Models for Insurance Recommender Systems. In *2018 17th IEEE International Conference on Machine Learning and Applications (ICMLA)*. (pp. 421–28). IEEE.

Karimi, M., Jannach, D., & Jugovac, M. (2018). News Recommender Systems–Survey and Roads Ahead. *Information Processing & Management, 54(*6), 1203–1227.

Kim, D., & Kim, SW. (2001). Dynamic Expert Group Models for Recommender Systems. In *Asia-Pacific Conference on Web Intelligence*. (pp. 136–40). Springer.

Kim, H-N, Ji, A-T., Ha, I., & Jo, G-S. (2010). Collaborative Filtering Based on Collaborative Tagging for Enhancing the Quality of Recommendation. *Electronic Commerce Research and Applications, 9*(1),73–83.

Koukourikos, A., Stoitsis, G., & Karampiperis, P. (2012). Sentiment Analysis: A Tool for Rating Attribution to Content in Recommender Systems. In *RecSysTEL EC-TEL (*pp. 61–70).

Krishna, P.V., Misra, S., Joshi, D., & Obaidat, M.S. (2013). Learning Automata Based Sentiment Analysis for Recommender System on Cloud. In *2013 International Conference on Computer, Information and Telecommunication Systems (CITS)*. (pp. 1–5). IEEE.

Lesage, L., Deaconu, M., Lejay, A., Meira, J.A., & Nichil, G. (2020). A Recommendation System for Car Insurance. *European Actuarial Journal, 10*(2), 377–398.

Li, Y-M., Liou, J-H., & Li, Y.W. (2020). A Social Recommendation Approach for Reward-Based Crowdfunding Campaigns. *Information & Management*, *57*(7), 103246.

Li, Y-M., Wu, J.D., Hsieh, Ch-Y., & Liou, J-H. (2020). A Social Fundraising Mechanism for Charity Crowdfunding. *Decision Support Systems,* 129,113170.

Liang, H., Xu, Y., Li, Y., & Nayak, R. (2008). Collaborative Filtering Recommender Systems Using Tag Information. In *2008 IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology*. Vol. 3. (pp. 59–62). IEEE.

Lika, B., Kolomvatsos, K., & Hadjiefthymiades, S. (2014). Facing the Cold Start Problem in Recommender Systems. *Expert Systems with Applications, 41*(4), 2065–2073.

Liu, H., Kong, X., Bai, X., Wang, W., Bekele, T.M., & Xia, F. (2015). Context-Based Collaborative Filtering for Citation Recommendation. *IEEE Access,* 3, 1695–1703.

Lops, P., De Gemmis, M., & Semeraro, G. (2011). Content-Based Recommender Systems: State of the Art and Trends. In *Recommender systems handbook*. (pp. 73–105). Springer.

Luo, X., Xia, Y., & Zhu, Q. (2012). Incremental Collaborative Filtering Recommender Based on Regularized Matrix Factorization. *Knowledge-Based Systems,* 27, 271–80.

Masthoff, J. (2011). Group Recommender Systems: Combining Individual Models. In *Recommender systems handbook*. (pp. 677–702). Springer.

McCarthy, K., Salamó, M., Coyle, L., McGinty, L., Smyth, B., & Nixon, P. (2006). Group Recommender Systems: A Critiquing Based Approach. In *Proceedings of the 11th international conference on Intelligent user interfaces*. (pp. 267–69)

Van Meteren, R., & Van Someren, M. (2000). Using Content-Based Filtering for Recommendation. In *Proceedings of the Machine Learning in the New Information Age: MLnet/ECML2000 Workshop*. Vol. 30. (pp. 47–56).

Mhanga, S., & Berg, A. (2019). *Robo-Advisors on the Swedish Market: From a Portfolio Management Perspective* [PhD thesis, Yale University].

Mitra, S., Chaudhari, N., & Patwardhan, B. (2014). Leveraging Hybrid Recommendation System in Insurance Domain. *International Journal of Engineering and Computer Science,* 3(10), Retrieved from https://www.ijecs.in/index.php/ijecs/article/view/2028.

Moreno, M. N., Segrera, s., López, V.F., Muñoz, M. D., & Sánchez, A.L. (2016). Web Mining Based Framework for Solving Usual Problems in Recommender Systems. A Case Study for Movies′ Recommendation. *Neurocomputing,* 176, 72–80.

Musto, C., Semeraro, G., De Gemmis, M., & Lops, P. (2015). A Framework for Personalized Wealth Management Exploiting Case-Based Recommender Systems. *Intelligenza Artificiale, 9*(1), 89–103.

Musto, C., Semeraro, G., Lops, P., De Gemmis, M., & Lekkas, G. (2015). Personalized Finance Advisory through Case-Based Recommender Systems and Diversification Strategies. *Decision Support Systems*, 77, 100–111.

Nair, B. B., Kumar, P.K.S., Sakthivel, N.R., & Vipin, U. (2017). Clustering Stock Price Time Series Data to Generate Stock Trading Recommendations: An Empirical Study. *Expert Systems with Applications,* 70, 20–36.

Nair, B. B., & Mohandas, V. P. (2015). An Intelligent Recommender System for Stock Trading. *Intelligent Decision Technologies*, *9*(3), 243–269.

Nieves, E. H. 2020. New Approach to Recommend Banking Products Through a Hybrid Recommender System. In *International Symposium on Ambient Intelligence*. (pp. 262–66). Springer.

Oyebode, O., & Orji, R. (2020). A Hybrid Recommender System for Product Sales in a Banking Environment. *Journal of Banking and Financial Technology, 4(15),* 1–11. 10.1007/s42786-019-00014-w.

Paranjape-Voditel, P., & Deshpande, U. (2011). An Association Rule Mining Based Stock Market Recommender System. In *2011 Second International Conference on Emerging Applications of Information Technology*. (pp. 21–24). IEEE.

Paranjape-Voditel, P., & Deshpande, U. (2013). A Stock Market Portfolio Recommender System Based on Association Rule Mining. *Applied Soft Computing, 13*(2),1055–63.

Park, D. H., Kim, H. K., Choi, I.Y., & Kim, J.K. (2012). A Literature Review and Classification of Recommender Systems Research. *Expert Systems with Applications, 39*(11),10059–72.

Patel, B., Desai, P., & Panchal, U. (2017). Methods of Recommender System: A Review. In *2017 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)*. (pp. 1–4). IEEE.

Patel, H. R. (2019). Analytical Study for Hybrid Method Based Stock Recommendation. *Journal of the Gujarat Research Society, 21*(6), 227–234.

Patel, M. T.S.V., & Jain, P. (2018). Review of Prediction of Product Recommendation Using Clustring Technique and Voting Scheme. *International Journal of Scientific Research & Engineering Trends*, *4*(6), 1065-1079.

Porkodi, S., & Kesavaraja, D. (2020). A Trust-Based Recommender System Built on IoT Blockchain Network With Cognitive Framework. *Recommender System with Machine Learning and Artificial Intelligence: Practical Tools and Applications in Medical, Agricultural and Other Industries* 293.

Qazi, M., Fung, G.M., Meissner, K.J. & Fontes, E.R. (2017). An Insurance Recommendation System Using Bayesian Networks. In *Proceedings of the Eleventh ACM Conference on Recommender Systems*. (pp. 274–78).

Qazi, M., Tollas, K., Kanchinadam, T., Bockhorst, J., & Fung, G. (2020). Designing and Deploying Insurance Recommender Systems Using Machine Learning. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, 1363.

Qian, Y., Zhang, Y., Ma, X., Yu, H., & Peng, L. (2019). EARS: Emotion-Aware Recommender System Based on Hybrid Information Fusion. *Information Fusion,* 46, 141–146.

Rakesh, V., Lee, W.C., and Reddy, Ch.K. (2016). Probabilistic Group Recommendation Model for Crowdfunding Domains. In *Proceedings of the ninth ACM international conference on web search and data mining*. (pp. 257–66).

Ramakrishnan, N., Keller, B.J., Mirza, B.J., Grama, A.Y., & Karypis, G. (2001). When Being Weak Is Brave: Privacy in Recommender Systems. *ArXiv Preprint Cs/0105028*.

Rashid, A.M., Albert, I., Cosley, D., Lam, Sh. K., McNee, S.M., Konstan, J.M., & Riedl, J. (2002). Getting to Know You: Learning New User Preferences in Recommender Systems. In *Proceedings of the 7th international conference on Intelligent user interfaces*. (pp. 127–34).

Reddy, P. K., Kitsuregawa, M., Sreekanth, P., & Rao, S.S. (2002). A Graph Based Approach to Extract a Neighborhood Customer Community for Collaborative Filtering. In *International Workshop on Databases in Networked Information Systems*. (pp. 188–200). Springer.

Rehman, F., Masood, H., Ul-Hasan, A., Nawaz, R., & Shafait, F. (2019). An Intelligent Context Aware Recommender System for Real-Estate. In *Mediterranean Conference on Pattern Recognition and Artificial Intelligence*. (pp. 177–91). Springer.

Ren, K., & Malik, A. (2019). Investment Recommendation System for Low-Liquidity Online Peer to Peer Lending (P2PL) Marketplaces. In *Proceedings of the Twelfth ACM International Conference on Web Search and Data Mining*. (pp. 510–18).

Ricci, F., Rokach,L., & Shapira, B. (2011). Introduction to Recommender Systems Handbook. In *Recommender systems handbook*. (pp. 1–35). Springer.

Rokach, L., Shani, G., Shapira, B., Chapnik, E., & Siboni, G. (2013). Recommending Insurance Riders. In *Proceedings of the 28th Annual ACM Symposium on Applied Computing*. (pp. 253–60).

Safoury, L., & Salah, A. (2013). Exploiting User Demographic Attributes for Solving Cold-Start Problem in Recommender System. *Lecture Notes on Software Engineering, 1*(3), 303–7.

Saladin, E. F., Mate, K.V., Gers, H., & Ruhlin. K. A. (1993). Expert Credit Recommendation Method and System.

Salter, J., & Antonopoulos, N. (2006). CinemaScreen Recommender Agent: Combining Collaborative and Content-Based Filtering. *IEEE Intelligent Systems,* 21(1), 35–41.

Sarwar, B., Karypis, g., Konstan, J., & Riedl, J. (2000). *Application of Dimensionality Reduction in Recommender System-a Case Study*. Minnesota Univ Minneapolis Dept of Computer Science.

Sarwar, B. M. (2001). *Sparsity, Scalability, and Distribution in Recommender Systems* [PhD thesis, University of Minnesota].

Schafer, J. B., Frankowski, D., Herlocker, J., & Sen, Sh. (2007). Collaborative Filtering Recommender Systems. In *The adaptive web*. (pp. 291–324). Springer.

Sun, Y., Fang, M., & Wang, X. (2018). A Novel Stock Recommendation System Using Guba Sentiment Analysis. *Personal and Ubiquitous Computing, 22*(3), 575–87.

Tangphoklang, P., Tanchotsrinon, Ch., Maneeroj, S., & Sophatsathit, P. (2010). A Design of Multi-Criteria Recommender System Architecture for Mobile Banking Business in Thailand. In *Proceedings of the Second International Conference on Knowledge and Smart Technologies*. Vol. 2010.

Tatiana, K., & Mikhail, M. (2018). Market Basket Analysis of Heterogeneous Data Sources for Recommendation System Improvement. *Procedia Computer Science,* 136, 246–54.

Tertilt, Michael, and Peter Scholz. 2018. "To Advise, or Not to Advise—How Robo-Advisors

Evaluate the Risk Preferences of Private Investors." *The Journal of Wealth Management,* 21(2), 70–84.

Tso-Sutter, K.H. L., Marinho, L.B., & Schmidt-Thieme, L. (2008). Tag-Aware Recommender Systems by Fusion of Collaborative Filtering Algorithms. In *Proceedings of the 2008 ACM symposium on Applied computing*.(pp. 1995–99).

Vismayaa, V., K. R. P., Alekhya, A., C. N. Malavika, Binoy B. Nair, and P. N. Kumar. (2019). Classifier Based Stock Trading Recommender Systems for Indian Stocks: An Empirical Evaluation. *Computational Economics, 55,* 901–923, https://doi.org/10.1007/s10614-019-09922-x.

Vismayaa, V., K. R. Pooja, A. Alekhya, C. N. Malavika, Binoy B. Nair, and P. N. Kumar. 2020. Classifier Based Stock Trading Recommender Systems for Indian Stocks: An Empirical Evaluation. *Computational Economics,* 55(3), 901–23.

Wang, Ch., Han, D., Liu, Q., & Luo, S. (2018). A Deep Learning Approach for Credit Scoring of Peer-to-Peer Lending Using Attention Mechanism LSTM. *IEEE Access,* 7, 2161–2168.

Wang, Sh., Huang, Ch., Li, J., Yuan, Y., & Wang, F-Y. (2019). Decentralized Construction of Knowledge Graphs for Deep Recommender Systems Based on Blockchain-Powered Smart Contracts. *IEEE Access,* 7, 136951–61.

Wang, W., Zhang, G., & Lu, J. (2016). Member Contribution-Based Group Recommender System. *Decision Support Systems,* 87, 80–93.

Wang, X., Zhao, Y.L., Nie, L., Gao, Y., Nie, W., Zha, Z-J., & Chua, T-S. (2014). Semantic-Based Location Recommendation with Multimodal Venue Semantics. *IEEE Transactions on Multimedia,* 17(3), 409–19.

Wang, Z., Liao, J., Cao, Q., Qi, H., & Wang, Z. (2014). Friendbook: A Semantic-Based Friend Recommendation System for Social Networks. *IEEE Transactions on Mobile Computing, 14*(3), 538–51.

Xue, J., Zhu, E., Liu, Q., & Yin, J. (2018). Group Recommendation Based on Financial Social Network for Robo-Advisor. *IEEE Access,* 6, 54527–35.

Yu, L., Huang, W., Wang, Sh., & Lai, K.K. (2008). Web Warehouse–a New Web Information Fusion Tool for Web Mining. *Information Fusion, 9*(4),501–11.

Yuan, X., Lee, J-H., Kim, S-H., & Kim, Y.H. (2013). Toward a User-Oriented Recommendation System for Real Estate Websites. *Information Systems, 38*(2), 231–43.

Zhang, L., Wu, X., Zhao, H., Cheng, F., & Liu, Q. (2020). Personalized Recommendation in P2P Lending Based on Risk-Return Management: A Multi-Objective Perspective. *IEEE Transactions on Big Data*, *8*(4), 1141-1154, doi: 10.1109/TBDATA.2020.2993446.

Zhang, L., Zhang, X., Cheng, F., Sun, X., & Zhao, H. (2019). Personalized Recommendation for Crowdfunding Platform: A Multi-Objective Approach. In *2019 IEEE Congress on Evolutionary Computation (CEC)*. (pp. 3316–3324). IEEE.

Zhang, Q., Zhang, D., Lu, J., Zhang, G., Qu, W., & Cohen, M. (2019). A Recommender System for Cold-Start Items: A Case Study in the Real Estate Industry. In *2019 IEEE 14th International Conference on Intelligent Systems and Knowledge Engineering (ISKE)*. (pp. 1185–92). IEEE.

Zhao, H., Liu, Q., Wang, G., Ge, Y., & Chen, E. (2016). Portfolio Selections in P2P Lending: A Multi-Objective Perspective. In *Proceedings of the 22nd ACM SIGKDD international conference on knowledge discovery and data mining*.(pp. 2075–84).

Zhao, H., Wu, L., Liu, Q., Ge, Y., & Chen, E. (2014). Investment Recommendation in P2p Lending: A Portfolio Perspective with Risk Management. Pp. 1109–14 in *2014 IEEE international conference on data mining*. IEEE.

Zhao, X. W., Guo, Y., He, Y., Jiang, H., Wu, Y., & Li, X. (2014). We Know What You Want to Buy: A Demographic-Based System for Product Recommendation on Microblogs. In *Proceedings of the 20th ACM SIGKDD international conference on Knowledge discovery and data mining*.(pp. 1935–44).

Zheng, Z., Gao, Y., Yin, L., & Rabarison, M.K. (2019). Modeling and Analysis of a Stock-Based Collaborative Filtering Algorithm for the Chinese Stock Market. *Expert Systems with Applications, 162,* 113006.

Zibriczky, D. (2016). Recommender Systems Meet Finance: A Literature Review. 10.13140/RG.2.1.1249.2405.

Zupic, I., & Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods, 18*(3), 429–72.

Nourahmadi, M., Rahimi, A., & Sadeqi, H. (2024). Designing a Stock Recommender System Using the Collaborative Filtering Algorithm for the Tehran Stock Exchange. *Financial Research Journal*, *26*(2), 302-330. doi: 10.22059/frj.2023.360955.1007479

Zarei, F., Nourahmadi, M., & Sadeqi, H. (2023). Application of recommendation systems in the development of Robo Advisors: A Bibliometrics Method. *Journal of Asset Management and Financing*, *11*(3), 69-94. doi: 10.22108/amf.2023.138681.1812.

From Click to Trust: The Role of Website Quality and Brand Awareness in Customer Trust in Tourism

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ABSTRACT

The rapid advancement of technology and the growing demand for efficient communication and trade have significantly enhanced the relevance of e-commerce. Trust is a critical factor in ensuring customer retention, particularly in the competitive digital marketplace. Despite its importance, limited research has examined the impact of website quality on customer trust, especially with brand awareness as a mediating factor. This study addresses this gap by investigating the relationship between website quality, brand awareness, and customer trust in the tourism industry. The research focuses on prominent Iranian tourism websites, including AliBaba, Eligasht, Flightio, Zoraq, Samtik, Safarestan, DoroNazdik, SafarMe, SafarNik, and Airplane Ticket. Using a descriptive-survey and applied methodology, a sample of 385 online customers was selected based on Cochran's formula. Data were gathered through questionnaires, with construct validity and reliability confirmed through factor analysis. The data analysis was conducted using SPSS and PLS software. The findings demonstrate that website quality significantly influences customer trust, with brand awareness playing a mediating role. All primary and secondary hypotheses were confirmed. These results highlight the importance of investing in website quality to enhance customer trust and foster stronger brand perceptions. Managers in the tourism sector are advised to recognize the dynamic nature of e-commerce and prioritize factors influencing customer trust. By doing so, they can capitalize on new opportunities, improve customer retention, and maintain a competitive edge. This study underscores the strategic importance of aligning website quality with brand awareness to build lasting customer relationships in the rapidly evolving e-commerce landscape.

KEYWORDS

Brand Awareness, Customer Trust, Tourism Industry, Website Quality.

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Introduction

In today's digital era, information technology plays a pivotal role in helping organizations maximize their profitability, offering significant advantages for business operations (Sutrisno et al., 2023). The rapid growth of online stores in C2C and B2C business models has intensified the competition, particularly as businesses expand their reach through social media platforms like Instagram and Facebook. In this increasingly comptative landscape, businesses must prioritize building customer trust and satisfaction, which can be achieved by improving website quality (Wijaya et al., 2021).

Website quality, a concept introduced by Barnes and Vidgen (2002), is crucial in e-commerce and government websites. It encompasses three components: usability, information quality, and interaction quality (Lisnawati et al., 2019). Usability includes user-friendly design elements such as easy navigation and attractive interface. Information quality ensures that content is reliable, accurate, and easily understood. Interaction quality focuses on factors such as secure transactions, brand reputation, and customer privacy (Sastika et al., 2016). Together, these elements help build customer trust, which is essential for long-term loyalty and success in e-commerce.

Brand image, a critical aspect of business strategy, plays a significant role in shaping customer perceptions. A strong brand image influences customer attitudes and decisions, making it a key factor in competition. Brand image, encompassing customer beliefs and associations, has become central to branding and contributes to loyalty and increased profitability (Tahir et al., 2024). The cost of retaining loyal customers is much lower than acquiring new ones, making brand image a powerful tool for reducing marketing and customer service expenses (Monzo et al., 2015). Therefore, website design is crucial for spreading the organization's brand, and websites must be considered from both technical and theoretical perspectives. In other words, the knowledge of librarians and information specialists who are aware of website design principles and criteria should be utilized alongside computer specialists (Rusdi et al., 2016). Therefore, owners of companies that have chosen many strategies for transitioning to online transactions and marketing must consider solutions to reduce concerns and increase customer trust (Aydinli & Senyurek, 2016). Despite the growing importance of e-commerce, many businesses still fail to fully grasp the strategic impact of website quality and brand image on customer trust. Companies often lack a clear understanding of how to align their website design with their branding goals.

Furthermore, the increasing risk of online transactions—such as fraud and privacy concerns—adds another layer of complexity. These risks discourage customers from engaging in online purchases, highlighting the need for businesses to foster trust and mitigate perceived risks (Saw & Inthiran, 2022). Online consumers lack the experience of physical interaction with sellers. This makes it difficult to evaluate orders and verify seller identity effectively. Therefore, trust is a crucial factor in online buyer loyalty.

Additionally, when purchasing from websites, payment is typically made using credit cards. Thus, the possibility of fraud is very high, and the received product may not match

the order. Online shopping brings its own uncertainties and risks for customers compared to shopping from physical stores (Sastika et al., 2016).

The tourism industry is particularly impacted by these issues, as many Iranian tourism websites struggle to establish trust with online customers. While the Internet has become a significant transaction platform, concerns over security and the inability to physically verify products or services contribute to consumer hesitation. Trust, therefore, plays a critical role in fostering online loyalty and reducing perceived risks. Websites with high-quality design, clear communication, and strong security measures can help to build customer confidence and facilitate smoother transactions.

Despite numerous studies on website quality and customer trust, research has yet to simultaneously examine these variables, particularly in the context of the tourism sector. By exploring this relationship, the study aims to provide valuable insights into how tourism businesses can enhance customer trust and loyalty by improving their website design and brand image. The findings of this research will help managers and organizations in the tourism industry understand the critical role of website quality and brand image in creating lasting customer relationships. As online shopping grows, particularly in sectors like tourism, ensuring a trustworthy, user-friendly website will be essential for maintaining a competitive edge and driving business success. Hence, this research aims to address the gap in the existing literature by investigating how website quality affects customer trust in the Iranian tourism industry, with brand awareness acting as a mediating factor.

The remaining parts of the paper is organized as follows: Section 2 reviews the theoretical background of the study. Research methodology is discussed in Section 3. Research findings are reported in Section 4. Discussions and conclusion are presented in Section 5. Section 6 deals with managerial implications. Limitations and future studies are introduced in Section 7.

Literature Review

Website Quality

A website is an information and communication technology medium used to display informational content in a fast, scalable, cost-effective, and diverse manner. Additionally, a website serves as the virtual face of an institution, reflecting its presence in the digital space. The role of a website has become a crucial part of an organization, offering competitive advantages to entities capable of delivering services or products to users or customers online. Through a website, companies can access broader markets or even global audiences (Napitupulu, 2017).

Website quality is a pivotal concept in e-commerce, as customers' perceptions of a site's quality significantly influence their intention to use it and shape their purchasing decisions (Hsu et al., 2018). When a website meets consumer expectations, users are more likely to maintain their engagement with the company. Unsurpisingly, some websites excel in attracting and retaining customers due to their ability to meet higher standards

in satisfying consumer expectations (Suryani et al., 2024). Customers' perception of website quality can be described as "users' evaluation of a website's features based on their needs." Consequently, identifying the website attributes that users prioritize becomes essential for companies seeking to implement a successful e-commerce strategy. Online retailers must clearly understand website quality to attract and retain customers (Hsu et al., 2018).

In online shopping, websites play a fundamental role in enabling transactions between buyers and sellers. Certain websites achieve greater success in attracting and retaining buyers, thanks to features such as user-friendly interfaces and positive user experiences. As a result, website quality emerges as a crucial determinant of an online business's success (Gao & Li, 2019). Website quality is a multifaceted concept encompassing three key dimensions: information quality, system quality, and service quality (Gao & Li, 2019; Hsu et al., 2018). These dimensions collectively assess the core factors shaping users' expectations and perceptions of website quality. The quality of information, systems, and services provided through a company's website forms the cornerstone of effective business website design.

- *Information Quality* is assessed from a technical perspective and refers to the perceived value of the output generated by a website.
- *System Quality* relates to the overall performance of the website system and can be measured by the degree of user-friendliness perceived by customers during online shopping.
- *Service Quality* is evaluated from a customer-centric perspective and refers to customers' overall assessment and judgment of the quality of online service delivery.

These three factors play a critical role in enhancing online customer satisfaction, ultimately improving their purchase intentions (Hsu et al., 2018).

Customer Trust

Trust is a vital element in building strong, long-term relationships. It plays a crucial role in enhancing interactions and fostering enduring connections between customers and companies. Trust can be described as an individual's willingness to rely on another party. Thus, *customer trust* can be defined as the customer's readiness to depend on a company, with the expectation that the company will honor its commitments (Honora et al., 2023). Trust reflects customers' confidence in their exchange partner's ability to meet their expectations. It entails a willingness to engage in specific actions based on the belief that the other party will deliver on their promises. Trust encompasses three key components: credibility, reliability, and intimacy**.** Credibility reflects honesty and dependability in employees. Reliability pertains to fulfilling promises, including timely delivery of services or products. Intimacy relates to ethical integrity, showcasing employees' honesty and moral values. Collectively, these elements underscore the importance of trust in sustaining long-term relationships between companies and their partners (Dimyati & Subagio, 2018). According to Rousseau et al. (1998), trust is the willingness to rely on an

exchange partner in whom one has confidence and involves accepting vulnerability based on positive expectations of the other party's actions.

The above definitions highlight that customers prefer relationships with trustworthy partners, as trust minimizes transaction risks. As customer trust grows, uncertainty and anxiety about interactions decrease (Issock et al., 2020). In marketing, customer trust is commonly described as a customer's willingness to engage with a brand repeatedly. Trust operates in two dimensions: belief and intention. It reflects a customer's positive expectation and readiness to make a purchase (Manzoor et al., 2020). Trust is regarded as one of the most crucial foundations for building and sustaining corporate and cooperative relationships in business. Studies have consistently highlighted its importance in establishing and maintaining long-term connections. Customer trust represents consumers' confidence in a specific store or brand to meet their needs and achieve their goals.

Additionally, trust includes expecting the other party to contribute to a favorable outcome (Alharthey, 2020). Over time, this concept has evolved to encompass trust in institutional frameworks, trust in outcomes, trust in sellers, and trust in platforms. This evolution illustrates how the definition of "trust" has expanded alongside advancements in e-commerce (Saw & Inthiran, 2022). Ha and Stoel (2009) highlight that trust and pleasure are critical factors influencing perceptions of online shopping quality. Establishing and sustaining customer trust is a key responsibility for e-commerce platforms, as customers need to feel secure to engage in online shopping. Trust in e-commerce websites grows when customers perceive the technology as reliable.

The importance of trust in online shopping surpasses that in physical retail settings due to the inherent uncertainties and higher risks associated with the online environment. Trust plays a vital role in mitigating these uncertainties and reducing perceived risks (Haque & Mazumder, 2020). When customers trust an online store, they feel more comfortable and confident during their shopping experience. This trust encourages repeated purchases, ultimately fostering customer loyalty (Juwaini et al., 2022).

Brand Awareness

Brand awareness refers to the extent to which consumers recognize, accept, and recall a brand. Aaker (2012) defines it as "a potential buyer's ability to identify or remember that a brand belongs to a specific product category." Similarly, Keller (1993) emphasizes that brand awareness involves tracking the brand in consumers' memory, representing their ability to recognize or recall a brand name across various situations. By reducing the time and effort required to search for a desired product, brand awareness helps minimize the perceived risk for consumers. Consequently, consumers are more likely to choose a brand they are familiar with. Aaker identifies four levels of brand awareness: brand recognition, brand recall, top-of-mind awareness, and dominant brand status (Bilgin, 2018).

According to Hong et al. (2022), research suggests that even a single exposure to a brand in a consumer's environment can evoke the thought, "I know this brand," when

encountered again. This principle forms the basis of many advertising strategies, which aim to embed the brand name in the minds of current and potential customers. In brand management literature, brand awareness is vital in strengthening a brand and achieving a competitive edge (Świtała et al., 2018). It is also one of the core dimensions of brand equity (Amelia, 2018; Doddy et al., 2020; Alexandra & Cerchia, 2018). Without brand awareness, consumers have limited knowledge of a brand, leading to a decline in its perceived value. Aaker further defines brand awareness as the strength of a consumer's connection to the brand, reflected in their ability to recall and retain it in memory (Doddy et al., 2020). Brand awareness is critical in consumer decision-making, offering three primary advantages: learning, consideration, and choice. Customer-based brand equity arises when consumers' exhibit high brand recognition and familiarity alongside strong, favorable, and distinctive brand associations embedded in their memory. This awareness stems from consumers' exposure to the brand (Amelia, 2018). Brand awareness heavily influences consumer decisions, with even minimal recognition sometimes being sufficient for a purchase. Consumers often prefer well-known and familiar brands, which are perceived as more reliable due to their established presence in the market and consistent quality (Alexandra & Cerchia, 2018). Brand awareness is foundational in developing a product's brand identity. Companies seeking to expand their market share must prioritize increasing their brand visibility.

Brand awareness can be categorized into several levels: 1) Unaware of Brand, 2) Brand Recognition, 3) Brand Recall, and 4) Top of Mind (Apriyani et al., 2018). Research shows that while consumers may recognize several brands, they typically recall only a few or even just one. Effective brand awareness is cultivated through advertising, media exposure, social networks, and user-generated content. Studies confirm its substantial positive impact on purchase decisions and overall brand equity (Appiadu et al., 2023).

Research Background

Qatawneh et al. (2023) explored how website quality influences citizens' e-loyalty in Jordan's domestic tourism sector, with e-satisfaction and e-trust serving as mediating factors. Their findings reveal that citizens' e-loyalty toward Jordan's tourism-related government websites is moderate, with users expressing general comfort with the electronic services provided. Additionally, the study highlights that e-satisfaction and e-trust mediate the relationship between website quality dimensions—particularly information quality and personalization—and e-loyalty. Wijaya et al. (2021) analyzed the effect of website quality on customer loyalty, considering customer satisfaction as a moderating variable. Their research indicates that website quality has a significant positive impact on customer satisfaction with e-commerce websites. However, customer satisfaction does not have a significant direct effect on customer loyalty. The study also finds that website service quality directly influences customer loyalty in the e-commerce context.

Hansopaheluwakan (2020) examined the interplay between e-service quality, website quality, and e-customer loyalty, with e-customer satisfaction acting as a mediator. The

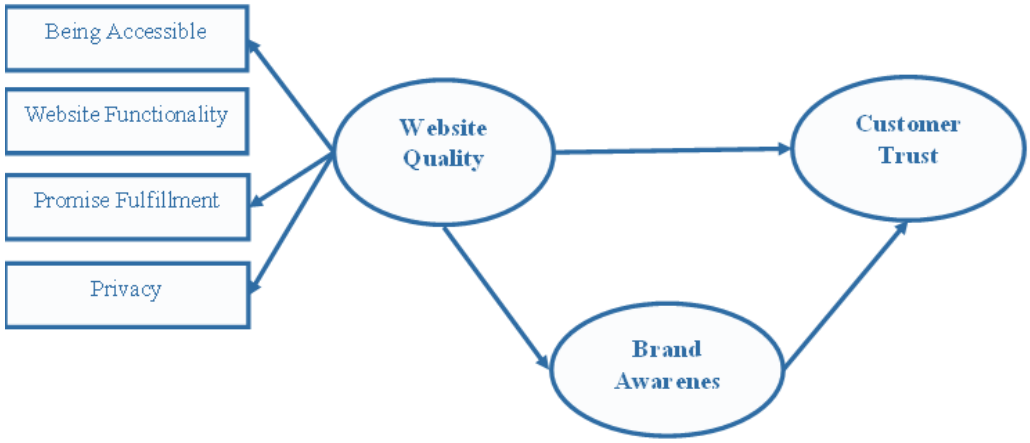
results demonstrate that both e-service quality and website quality significantly contribute to e-customer loyalty via the mediating effect of e-customer satisfaction. Aydinli and Senyurek (2017) confirmed in their research the positive impact of service quality dimensions on customer satisfaction.

Ha and Lennon (2010) investigated how various website elements influence shoppers' emotions, specifically pleasure and arousal, during browsing and purchasing activities. Their findings reveal that these emotional responses, triggered by website features, positively impact consumer satisfaction, purchase intentions, and approach behaviors. Notably, the study found that online shoppers with a clear intent to purchase experienced higher levels of pleasure and arousal when initially interacting with websites rich in task-relevant cues, such as detailed product information. Conversely, shoppers without a specific purchase intention were more likely to feel pleasure and arousal when browsing websites featuring low task-relevant cues, like patterns and background colors.

Research Conceptual Model

This research includes three variables: website quality, brand awareness, and customer trust. Therefore, the independent variable is website quality, the dependent variable is customer trust, and the mediating variable is brand awareness. The research model (Figure 1) has been developed based on studies by Pramudya et al. (2018), Qatawneh et al. (2023), and Sastika et al. (2016).

Figure 1.
Research Conceptual Model



(Source: Researcher's Findings)

According to research conceptual model (Figure 1), research hypotheses are presented here:

Main Hypotheses

1. Website quality significantly impacts customer trust.
2. Brand awareness significantly impacts customer trust.
3. Website quality significantly impacts customer trust through brand awareness.

Secondary Hypotheses

1. Accessibility significantly impacts customer trust through brand awareness.
2. Website functionality significantly impacts customer trust through brand awareness.
3. Promise fulfillment significantly impacts customer trust through brand awareness.
4. Privacy significantly impacts customer trust through brand awareness.

Methodology

This study aims to investigate the effect of website quality on customer trust, with brand awareness acting as a mediating variable in the tourism industry. The research is applied in its purpose, adopts a quantitative approach, and employs a descriptive-survey method for data collection. The statistical population includes online customers of Iranian tourism websites, assumed to be unlimited. Using Cochran's formula, the required sample size was calculated as 385. A total of 400 questionnaires were distributed, and responses were collected to match the calculated sample size.

The questionnaire consists of two sections. The first section includes demographic information, such as participants' gender, job title, workplace, or educational level.

The second section utilizes a five-point Likert scale to measure website quality, brand awareness, and customer trust. Responses range from *strongly disagree* to *strongly agree*, scored from one to five, respectively. The questionnaire includes 29 items designed to evaluate the study variables: website quality design (items 1–5) across four components—accessibility (items 6–8), website functionality (items 9–12), promise fulfillment (items 13–15), and privacy (items 16–19). Additionally, brand awareness is measured with four items (items 20–23), and customer trust is assessed with six items (items 24–29).

Table 1.
Research Constructs Measurements and Their Sources

Component	Questions	Source
Website Quality	Questions 1-5	Hsu et al. (2018)
Accessibility	Questions 6-8	Sastika et al. (2016)
Website Functionality	Questions 9-12	Sastika et al. (2016)
Promise Fulfillment	Questions 13-15	Sastika et al. (2016)
Privacy	Questions 16-19	Sastika et al. (2016)
Brand Awareness	Questions 20-23	Bilgin (2018)
Customer Trust	Questions 24-29	Manzoor et al. (2020)

(Source: Researcher's Findings)

In this research, the initial questionnaire was provided to several professors and experts with relevant research backgrounds to assess content validity and face validity. After collecting and implementing experts' corrective feedback, the initial questionnaire was given to a number of employees, and necessary corrections were made to its writing style to ensure accuracy and complete understanding by respondents.

In this research, Cronbach's alpha coefficient method was used to estimate the reliability of the questionnaires. Cronbach's alpha coefficient was calculated using SPSS software, and its reliability is presented below. In this research, due to the multiplicity of independent variables and indicators, the Partial Least Squares (PLS) method using Smartpls software was used to confirm the model's validity.

Table 2.
Reliability Coefficient and Composite Reliability of Factors

Variable	Cronbach's Alpha	Composite Reliability
Website Quality	0.720	0.804
Accessibility	0.836	0.901
Website Functionality	0.723	0.782
Promise Fulfillment	0.756	0.821
Privacy	0.852	0.922
Brand Awareness	0.763	0.845
Customer Trust	0.889	0.924

(Source: Researcher's Findings)

Convergent Validity: The acceptable threshold for Average Variance Extracted (AVE) is 0.4, as suggested by Gebremedhin et al. (2022). The AVE values for each construct are presented in Table 3. As indicated in the table, all AVE values exceed 0.4, confirming that the model demonstrates adequate convergent validity.

Table 3.
Results of Average Variance Extracted (AVE) for Variables to Examine Convergent Validity

Variable	Website Quality	Accessibility	Website Functionality	Promise Fulfillment	Privacy	Brand Awareness	Customer Trust
AVE	0.85	0.86	0.83	0.82	0.88	0.87	0.85

(Source: Researcher's Findings)

Discriminant Validity: shows the correlation level between a construct and its indicators. Discriminant validity is acceptable when the square root of AVE for each construct is greater than the shared variance between that construct and other constructs in the model.

Table 4.
Matrix Comparing Square Root of AVE and Construct Correlation Coefficients

	1	2	3	4	5	6	7
1. Website Quality	0.91						
2. Accessibility	0.84	0.92					
3. Website Functionality	0.59	0.61	0.92				
4. Promise Fulfillment	0.62	0.85	0.86	0.94			
5. Privacy	0.59	0.70	0.59	0.69	0.85		
6. Brand Awareness	0.59	0.70	0.59	0.69	0.85	0.88	
7. Customer Trust	0.61	0.86	0.59	0.83	0.70	0.88	0.86

(Source: Researcher's Findings)

As demonstrated in the matrix above (Table 4), the AVE values for each construct (located on the main diagonal) are higher than the correlation coefficients between that

construct and the other constructs (found in the respective rows and columns). This indicates that the constructs exhibit acceptable discriminant validity.

Goodness of Fit (GOF) criterion is used to evaluate the overall model, which was proposed by Tenenhaus et al. (2004). This criterion is calculated as follows:

$$GOF = \sqrt{0.5 * 0.23} = 0.33$$

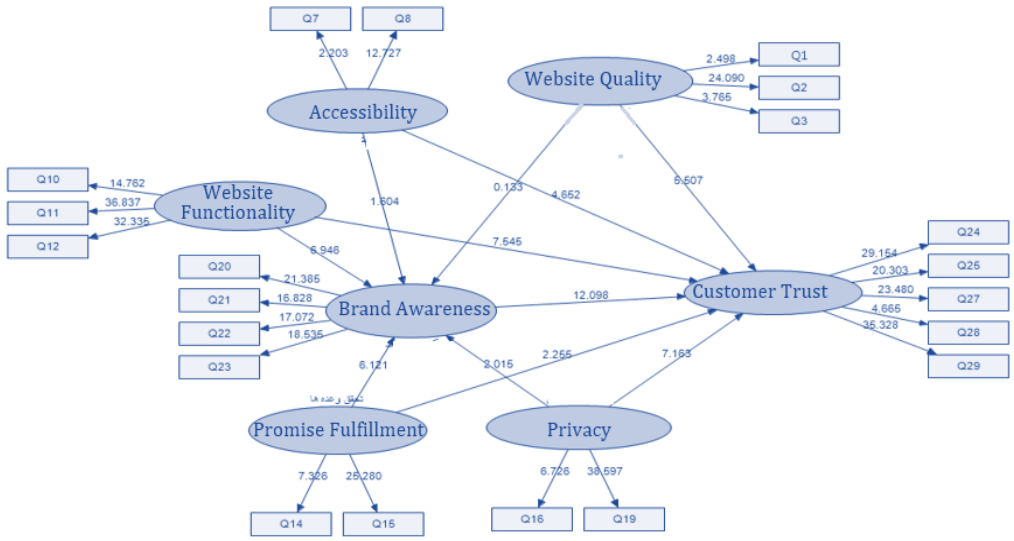
$$GOF = \sqrt{0.5 * 0.30} = 0.38 \qquad GOF = \sqrt{\overline{Communalties}\,\overline{R^2}}$$

Values of 0.01, 0.25, and 0.36 are considered weak, moderate, and strong, respectively, in terms of the goodness of fit for the overall model. The calculated GOF value for the research model was 0.33 and 0.38, which indicates a strong overall fit. Therefore, the structural model's overall fit is confirmed as strong.

Findings

Two methods are used to examine the fit of the structural model: determining the t-value and the R^2. In examining hypothesis testing, if the t-value is greater than 1.96, the path and path coefficient are significant, and the hypothesis is confirmed; otherwise, the path coefficient is not significant, and the related hypothesis is rejected (See Figure 2).

Figure 2.
T-Test of Hypotheses



(Source: Researcher's Findings)

The Sobel test was utilized in this model to assess the third main hypothesis and all secondary hypotheses. The Sobel test, also known as the coefficient product approach, delta method, or normal theory approach, is used to make inferences about the indirect effect coefficient (ab). This test is based on the same inference theory as direct effects. The indirect effect (ab) is an estimate of the population's indirect effect, which is subject to

sampling variance. By estimating the standard error of ab and assuming a normal distribution for the sampling distribution of ab, a p-value for ab can be calculated.

In the Sobel test, normal estimation is generally applied to examine the significance of the relationship. Using the standard error estimate of the indirect effect, the null hypothesis can be tested against the alternative hypothesis. The Z statistic is calculated by dividing ab by its standard error, resulting in the Z-value expressed by the following formula:

$$z - value = \frac{a \times b}{\sqrt{(b^2 \times sa^2) + (a^2 \times sb^2) + (sa^2 \times sb}}$$

In this formula, the letters represent:

a: Path coefficient value between independent and mediating variable

b: Path coefficient value between mediating and dependent variable

sa: Standard error for the path between independent and mediating variable

sb: Standard error for the path between mediating and dependent variable

In the research model below, all hypotheses were confirmed. A summary of the hypothesis results is presented in Table 5.

Table 5.
Summary of Research Hypothesis Results

Hypothesis	t-statistic	Path Coefficient	Test Result
Website quality has a significant effect on customer trust.	5.507	+	Confirmed
Brand awareness has a significant effect on customer trust.	12.098	+	Confirmed
Website quality has a significant effect on customer trust through brand awareness.	7.921	+	Confirmed
Accessibility has a significant effect on customer trust through brand awareness.	3.721	+	Confirmed
Website functionality has a significant effect on customer trust through brand awareness.	7.789	+	Confirmed
Promise fulfillment has a significant effect on customer trust through brand awareness.	6.154	+	Confirmed
Privacy has a significant effect on customer trust through brand awareness.	5.083	+	Confirmed

(Source: Researcher's Findings)

R^2 Criterion: The second criterion used to assess the fit of the research's structural model is the R^2 criterion, which reflects the extent to which an independent (exogenous) variable influences a dependent (endogenous) variable. A higher R^2 value indicates a better model fit. Fauzi (2022) defines benchmark values of 0.19, 0.33, and 0.67 as representing weak, moderate, and strong R^2 values, respectively. The R^2 values for the main endogenous variables in this model are 0.23 and 0.30, suggesting that the structural model provides an appropriate fit for the data.

Discussion and Conclusion

The analysis of Main Hypothesis 1 demonstrates that website quality significantly affects customer trust. This hypothesis was confirmed with a t-value of 5.507, which exceeds the critical threshold of 1.96, validating the researcher's proposition. The characteristics of a website play a pivotal role in shaping customer behavior and trust, especially in the tourism sector, where these factors are particularly influential. As a result, tourism companies have increasingly focused on enhancing website quality to deliver greater value to customers. This includes strategies to retain existing customers, attract new ones, and foster robust customer relationship management. Companies aiming to achieve these goals must understand the dimensions of customer value. The confirmation of this hypothesis can be attributed to the quality of website content and the provision of accurate, reliable, and engaging information. These elements significantly contribute to customer trust and satisfaction. Therefore, tourism companies must prioritize improving website quality, as customer trust is integral to achieving organizational goals.

These findings align with prior research conducted by Aydinli and Senyurek (2017) and Qatawneh et al. (2023), further emphasizing the importance of website quality as a driver of customer trust. By implementing measures to enhance website design and functionality, companies can establish stronger relationships with their customers and improve their competitive positioning in the tourism industry.

The analysis of Main Hypothesis 2 reveals that brand awareness significantly affects customer trust. This hypothesis was confirmed with a t-value of 12.098, well above the critical threshold of 1.96, validating the researcher's claim. Brand awareness is a fundamental prerequisite for building trust, significantly influencing customers' purchase decisions. This awareness plays a key role in embedding a brand in customers’ minds, facilitating familiarity with its characteristics, and reducing perceived risks of purchasing decisions. As a result, customers are more likely to evaluate a brand positively and demonstrate a higher willingness to engage with it. Brand awareness also serves as a critical driver for acquiring brand equity and represents one of the foundational steps in brand-building efforts. Companies with strong brand awareness often enjoy a competitive edge, as heightened awareness is associated with increased sales, greater market share, and enhanced customer loyalty. In the context of tourism, the findings suggest that a positive brand image fosters customers’ trust, which is essential for decision-making and loyalty. This connection underscores the importance of creating and maintaining a favorable brand image in customers’ minds, particularly in a highly competitive industry like tourism. The results further emphasize the need for tourism companies to invest in strategies that enhance brand awareness, as it directly contributes to trust-building and long-term customer engagement. By doing so, companies can achieve stronger market positioning and sustained success.

The analysis of Hypothesis 3 indicates that website quality significantly impacts customer trust through the mediating role of brand awareness. This hypothesis was validated with a t-value of 7.921, exceeding the critical value of 1.96, and confirming the

researcher's proposition. The findings highlight the role of websites and internet branding in shaping brand image and serving as communication channels with potential and existing customers. A high-quality website not only enhances brand awareness but also facilitates the establishment of trust, which is crucial for the success of any business. Customer trust, in turn, positively influences customer behavior, improving company and website performance. Increased customer interaction driven by trust further contributes to website refinement, which subsequently attracts a larger customer base. In the tourism sector, factors such as the availability of diverse services, comprehensive information presented in accessible formats, user-friendly search functionalities, and rich, relevant content on websites appear to play a significant role in reinforcing this relationship. These attributes enhance customer experiences, foster trust, and elevate brand perception, confirming the hypothesis. The results underscore the importance of investing in website quality as a strategic asset. By creating well-designed, informative, and user-centric websites, tourism companies can strengthen brand awareness and trust, leading to improved customer engagement and sustained competitive advantage.

The analysis of the secondary hypotheses highlights the significant impact of various factors on customer trust through the mediating role of brand awareness. According to Secondary Hypothesis 1, the findings indicate that accessibility plays a crucial role in enhancing trust by improving brand awareness. With a t-value of 3.721, the ease of accessing and navigating site content emerges as a key factor. User-friendly website features ensure seamless interaction, foster a sense of trust among users, and strengthen their connection to the brand.

Similarly, based on Secondary Hypothesis 2, website functionality significantly affects customer trust through brand awareness, with a t-value of 7.789. Effective website elements, such as intuitive navigation, quick loading times, and search engine efficiency, contribute to a better user experience. These features enhance customer satisfaction and elevate the brand's perceived value, thereby building trust.

According to the analysis of Secondary Hypothesis 3, promise fulfillment is another critical factor, as demonstrated by a t-value of 6.154. Meeting customer expectations through consistent service quality and variety significantly reinforces trust. When companies deliver on their promises, they create a reliable brand image, which further solidifies customer loyalty.

Lastly, based on the analysis of Secondary Hypothesis 4, privacy was found to have a substantial effect on customer trust through brand awareness, with a t-value of 5.083. Ensuring the security of website content and respecting user privacy are essential for gaining customer confidence. Websites prioritizing data protection and confidentiality create a trustworthy environment for their users. These results are consistent with the findings of Aydinli and Senyurek (2017) and Qatawneh et al. (2023), emphasizing the critical role of website quality, privacy, and service delivery in strengthening customer trust through enhanced brand awareness.

Practical Implications

The findings from Main Hypothesis 1 suggest that tourism companies should prioritize the development of well-designed websites, considering the criteria identified in this research. A well-crafted website serves as a key organizational asset and can significantly enhance a company's ability to attract, retain, and build customer trust. This, in turn, leads to increased profitability and provides a sustainable competitive advantage over other companies in the industry. Therefore, organizations need to focus on both the technical and user-centered aspects of website design. Websites should be designed in a way that meets customer expectations and preferences. To achieve this, tourism companies should gather feedback from their target audience through surveys focused on the specific indicators outlined in the analytical model. Additionally, including a "suggestions and complaints" section on the website can improve customer engagement and satisfaction.

According to the findings of Main Hypothesis 2, forming a positive initial experience for customers is crucial, especially for those purchasing tourism services for the first time. Companies should give special attention to first-time customers to ensure their first interaction is positive. Companies should create a strong brand experience in customers' minds from the outset. A customer’s first encounter with a tourism company may involve both the website and the brand, so having a well-designed website with desirable features is essential. Given the complexity of website design and brand development, companies need to combine customer feedback with insights from experienced website designers and brand experts. This collaborative approach will help ensure that the website is functional and effectively conveys the company’s brand image and values.

The findings of Main Hypothesis 3 highlight the importance of website quality as a critical factor in fostering positive customer attitudes and trust. Tourism company managers are advised to invest strategically in enhancing website quality, adapting to rapid changes in the business environment, and capitalizing on the growing shift toward e-commerce. By doing so, companies can differentiate their brand and maintain a competitive edge. Additionally, innovation in service delivery should be prioritized, incorporating customer feedback to refine service methods and improve overall satisfaction.

Regarding Secondary Hypothesis 1, the website environment is increasingly recognized as a vital communication tool with customers and is poised to become one of the most significant channels in the future. To maximize its impact, companies are advised to: 1) Create a visually appealing website environment. 2) Develop an appropriate brand image supported by effective advertising. 3) Ensure quick and seamless accessibility. These elements collectively contribute to a positive and memorable experience for customers, reinforcing brand loyalty.

The findings of Secondary Hypothesis 2 suggest that tourism companies must allocate sufficient budgets to website design. Investments should focus on prioritizing key features and indicators to optimize the website as a strategic tool for customer engagement.

According to Secondary Hypothesis 3, tourism companies can foster repeated purchases by enhancing their internet brand image. This involves fulfilling promises to customers, maintaining website features, and making targeted investments in website design. A consistent and reliable online presence helps to build customer trust and encourages long-term loyalty.

Finally, the results of Secondary Hypothesis 4 underline the importance of addressing customer priorities, particularly website security. Tourism companies should emphasize protecting customer information, incorporating trust seals, and ensuring error-free operation. These elements are especially significant given Iranian customer preferences and cultural considerations. By prioritizing these aspects, companies can strengthen trust and confidence among their online clientele.

Limitation and suggestions for future studies

Like other studies, this research has its limitations, which pave the way for future qualitative and quantitative studies. First, the data for this study were collected from Iranian users of tourism websites, and the model testing was limited to the Iranian user community. It is recommended that the model be re-evaluated in other countries with different socio-cultural and technological contexts. Second, the moderating effects of variables such as gender, age, and education were not assessed in this model. Future research should include these variables in the model to provide a more comprehensive insight. Third, this study examined the tourism industry as a whole and did not focus on specific sectors such as hospitality, ticket booking, and others. Future studies are encouraged to address these specific domains for a more detailed understanding.

REFERENCES

Alexandra, Z. & Alina Elena, C. (2018). The Influence of Brand Awareness and Other Dimensions of Brand Equity in Consumers Behaviour: The "Affordable Luxury" Strategy". *Ovidius University Annals: Economic Science Series, 18*(1), 222-427.

Alharthey, B. (2020). The role of online trust in forming online shopping intentions. *International Journal of Online Marketing, 10*(1), 32-57.

Amelia, Sh. (2018), The Effect of perceived quality, brand awareness, and brand loyalty toward brand equity of Beer Bintang in Surabaya. *Calyptra, 7*(1), 899-918.

Appiadu, D. Senayah, W. K. & Gadegbeku, C. (2023). The role of advertising and positive word-of-mouth in fabric brand equity: The mediating effect of brand awareness and brand image. *Ghana Social Science Journal, 20*(1), 39-57.

Apriyani, H., Isdayanti, I., & Usman, O. (2018), Influence of promotion through social media instagram, brand awareness, brand equity, brand loyalty to purchasing decisions. SSRN Electronic Journal. 10.2139/ssrn.3310670.

Aydinli, C., Senyurek, E. (2017), measuring impact of service quality dimensions on customers' satisfaction: Case of GSM Users in Poland. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 6* (1), 127–133.

Bilgin, Y. (2018). The Effect of Social Media Marketing Activities on Brand Awareness, Brand Image and Brand Loyalty. *Buisness and Management: an Iinternational Journal, 6*(1), 128-148.

Dimyati, M., & Subagio, N., Ari (2018). Customer trust as mediator in the creation of customer relationship intention. *Management & Marketing, 13*(1), 710-729.

Doddy, M., Ali, J., Hindardjo, A., & Ratnasih, C. (2020, December). The influence of brand awareness, perceived quality, brand association, brand loyalty on brand equity of zakat institutions, In *Proceedings of The International Conference on Environmental and Technology of Law, Business and Education on Post Covid 19, ICETLAWB*E. Bandar Lampung, Indonesia.

Gao, W., & Li, X. (2019). Building presence in an online shopping website: the role of website quality. *Behaviour & information technology, 38*(1), 28-41.

Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of business research*, *62*(5), 565-571.

Ha, Y., & Lennon, S. J. (2010). Online visual merchandising (VMD) cues and consumer pleasure and arousal: Purchasing versus browsing situation. *Psychology Marketing, 27*(2), 141-165.

Hansopaheluwakan, S. (2021). Analysis of e-service quality and website quality effect on e-customer loyalty through e-customer satisfaction (case study: Tokopedia), In *IOP Conference Series: Earth and Environmental Science,* 794(1). IOP Publishing.

Haque, U. N., & Mazumder, R. (2020). A study on the relationship between customer loyalty and customer trust in online shopping. *International Journal of Online Marketing*, *10*(2), 1-16.

Honora, A., Chih, W., & Ortiz, J. (2023). What drives customer engagement after a service failure? The moderating role of customer trust. *International Journal of Consumer Studies, 47*(5), 1714-1732.

Hsu, C-L., Chen, M-C., & Kumar, V. (2018). How social shopping retains customers? Capturingthe essence of website quality and relationship quality. *Total quality management & business excellence, 29*(1-2), 161-184.

Issock, P.B.I, Roberts-Lombard, M, & Mpinganjira, M. (2020). The importance of customer trust for social marketing interventions: a case of energy-efficiency consumption. *Journal of Social Marketing, 10*(2), 265-286.

Juwaini, A., Chidir, G., Novitasari, D., Iskandar, J., Hutagalung, D., Pramono, T., & Purwanto, A. (2022). The role of customer e-trust, customer e-service quality and customer e-

satisfaction on customer e-loyalty. *International journal of data and network science, 6*(2), 477-486.

Lisnawati, L., Hurriyati, R., & Al Qorni, A. W. (2019). Website Quality and Risk Perception as the Influence of Purchase Intention in E-Commerce Website in Indonesia. *Strategic Jurnal Pendidikan Manajemen Bisnis, 19*(2), 90-99.

Manzoor, U., Baig, S.A., Hashim, ., & Sami, A. (2020). Impact of social media marketing on consumer's purchase intentions: the mediating role of customer trust. *International Journal of Entrepreneurial Research, 3*(2), 41-48.

Monzo, V. R., Sanchez, M. M., Garcia, M. G. (2015). Using online consumer loyalty to gain competitive advantage in travel agencies. *Journal of Business Research, 68*, 1638–1640.

Napitupulu, D. (2017). Analysis of factors affecting the website quality based on WebQual approach (study case: XYZ University). *International Journal on Advanced Science, Engineering and Information Technology, 7*(3), 792-798.

Pramudya, A. K., Sudiro, A., & Sunaryo, S. (2018). The role of customer trust in mediating influence of brand image and brand awareness of the purchase intention in airline tickets online. *Jurnal Aplikasi Manajemen, 16*(2), 224-233.

Qatawneh, N., Alkhasawneh, R., Althonayan, A., & Altarawneh, A. (2023). Examining the Influence of Website Quality on Citizen's E-Loyalty in Domestic Tourism in Jordan: The Role of E-Trust and E-Satisfaction. *Human Behavior and Emerging Technologies, 2023*(1), 2614673.

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of management review*, *23*(3), 393-404.

Rusdi, S. D., Achim, N., Edura Wan Rashid, W., Hayat, N. (2016). Employee relationship quality and customer satisfaction: the case of Halal Products Supplier at Elhajj Products SdnBhd. *Applied Environmental and Biological Sciences, 6*(6), 35-39.

Sastika, W., Suryawardani, B., & Hanifa, F. H. (2016). Analysis of website quality, brand awareness on trust and its impact on customer loyalty. In *2016 Global Conference on Business, Management and Entrepreneurship* (pp. 472-478), Atlantis Press.

Saw, Ch. Ch., & Inthiran, A. (2022). Designing for trust on E-commerce websites using two of the big five personality traits. *Journal of Theoretical and Applied Electronic Commerce Research, 17*(2), 375-393.

Suryani, T., Fauzi, A. A., Sheng, Margaret. L., & Nurhadi, M. (2024). Developing and testing a measurement scale for SMEs' website quality (SMEs-WebQ): Evidence from Indonesia. *Electronic Commerce Research, 24*(3), 1763-1794.

Sutrisno, S., Ausat, A. M. A., Permana, B., & Harahap, M. (2023). Do Information Technology and Human Resources Create Business Performance: A Review. *International Journal of Professional Business Review, 8*(8), 14-29.

Świtała, M., Gamrot, W., Reformat, B., & Bilińska-Reformat, K. (2018). The influence of brand awareness and brand image on brand equity–an empirical study of logistics service providers. *Journal of Economics and Management*, 33, 96-119.

Tahir, A. H., Adnan, M., & Saeed, Z. (2024). The impact of brand image on customer satisfaction and brand loyalty: A systematic literature review, *Heliyon, 10 (16), 1-10*.

Wijaya, S., Triandini, E., Kabnani, G., & Arifin, S. (2021). E-commerce website service quality and customer loyalty using WebQual 4.0 with importance performances analysis, and structural equation model: An empirical study in shopee. *Register, 7*(2), 107-124.

Coopetition Strategy for Business Sustainability: A State-of-the-Art Review

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ABSTRACT

In today's competitive business environment and the rapidly evolving digital age, businesses move toward simultaneous competition and collaboration to achieve their goals. Coopetition, a term blending cooperation and competition, is rooted in the principles of game theory. This strategic approach has the potential to significantly enhance business sustainability. As a relatively new and evolving paradigm in business management, sustainability emphasizes the integration of environmental, social, and economic factors into organizational practices. This emerging concept reflects a growing commitment to balancing these dimensions in pursuit of long-term success. This study investigates the consequences of coopetition for business sustainability using a systematic review methodology. After reviewing relevant articles in Scopus and web of science databases, 51 articles were selected for coding. The consequences of using coopetition as a strategy for sustainability were extracted and classified into three categories: environment, social, and economic dimensions.

KEYWORDS

Business Model, Competition, Cooperation, Coopetition, Sustainability.

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Introduction

Sustainable development represents one of the most pressing challenges of contemporary society, requiring the responsible and efficient management of limited resources. Firms play a pivotal role in this domain as they directly influence how resources are utilized. Efficient resource management is crucial to ensuring their sustainability. The push for sustainable development has broadened the scope of resource efficiency to include environmental and social resources. One strategy for achieving more sustainable resource utilization involves adopting a circular approach, where firms share resources and facilitate exchanges among various stakeholders. This approach often requires competing firms to engage in coopetition—a dynamic strategy that blends competition and cooperation. Extensively explored in management literature, coopetition offers several advantages, including fostering innovation in business models, improving market positioning, enhancing production efficiency, and accelerating new product development (Manzhynski & Figge, 2020).

Corporate management is vital in moving towards sustainability. Achieving sustainable development relies significantly on businesses actively addressing and contributing solutions to sustainability challenges. The emphasis is placed on coopetition strategy that enables businesses to enhance their economic, social, and environmental performance while contributing positively to society by addressing issues such as cleaner air, water scarcity, and improved environmental management. Coopetition is a strategic approach where competing organizations actively collaborate while maintaining competition, aiming to achieve shared benefits and mutual growth (Christ et al., 2017). Coopetition strategy is based on the concept that competitors can collectively generate and share value, thereby expanding market opportunities and finding new ways to mitigate threats facing all firms involved. In today's world, strategic alliances, collaborations, networks, and the exchange of relevant information between firms are all recognized as ways in which businesses work together and can improve overall performance through partnership (Munten et al., 2021).

Coopetition can occur among various types of organizations, such as those in the manufacturing, service, government, and non-governmental sectors. From the point of view of sustainability, coopetition helps sustainability when it has a positive contribution at the social level. The positive results of companies' coopetition are mainly assessed at the individual level of firms. Cooperating while competing for sustainability can lead to beneficial outcomes, not only for the businesses engaged but also for society as a whole. Integrating cooperation and competition creates synergistic advantages for participating firms, often resulting in improved performance. Research indicates that these benefits extend to sustainability outcomes as well. Manzhynski and Figge (2020) explored the limited research available on the intersection of coopetition and sustainability, examining the underlying reasons for this gap in the literature. They found two reasons: Firstly, there is a possible conflict between economic outcomes and environmental or social impacts. Coopetition may positively influence one dimension while simultaneously negatively

impacting another. To gain deeper insights into how coopetition affects sustainability, comprehensive research is needed to distinguish its various consequences on sustainability. Secondly, current coopetition research primarily emphasizes the benefits it provides to firms. However, when considering sustainability in a broader social context, these outcomes need to be assessed at the macro level.

This paper aims to propose a framework addressing the implications of coopetition for sustainability. The structure of the paper is as follows: Section 2 provides a review of the key concepts and an overview of previous studies on coopetition for sustainability. Section 3 outlines the research methodology. Section 4 presents the research findings, and Section 5 concludes the paper with reflections on future research directions.

Literature Review

In this section, we begin by introducing the key research concepts and then provide an overview of the relevant literature on coopetition for sustainability.

Coopetition

Coopetition, a neologism that combined cooperation and competition, was coined by Novell founder Ray Noorda in 1980_s. Then, Brandenburger and Nalebuff (1996) published a book entitled "Coopetition," which led to popularize the concept of coopetition. They defined Coopetition as a relationship where firms actively participate in cooperation and competition. Coopetition can be described as a process in which players gradually adopt clear and significant cooperative behaviors (Frisio et al., 2012). Hannah and Eisenhardt (2018) defined coopetition as cooperation and competition at the same time within the same industry. Research on coopetition has increased significantly in recent years. In other words, research on the concept that firms simultaneously cooperate and compete to create value has gained momentum recently.

Coopetition, the simultaneous cooperation and competition among competing firms to create value, has become a compelling strategy for the more effective use of complementary resources (Meena et al., 2023). This strategy primarily aims to foster mutually advantageous collaborations, enhancing value for both of the involved parties. However, this concept is not recognized as a new concept. For decades, businesses across various industries have employed this strategy to pursue various strategic objectives. Research on this concept can be classified depending on three flows: why (antecedents, motives, likelihood), how (interaction, process, tension, managing and shaping), and what (consequences, outcome, cause-and-effect) (Peng et al., 2018).

Clarke-Hill and Davies (2003) maintained that game theory and the resource-based view are two prominent theories associated with competition. However, it is important to note that these are not the only theoretical frameworks relevant to competition. Other perspectives, such as paradox theory, network theory, and transaction cost economics, also provide valuable insights (Charleton et al., 2018). Coopetition operates on three distinct levels: the intra-firm level, the inter-firm level, and the network level (Dorn et al., 2016). At the inter-organizational level, coopetition emerges when firms engage with one

another in a way that synthesizes their respective interests. By collaborating, they create value that would be unattainable individually. Moreover, coopetition can occur horizontally and vertically, involving competitors across different value chain stages (Dagnino, 2009).

Four main research streams have been identified regarding the concept of coopetition. The first approach views coopetition as a process or a series of deliberate actions undertaken by competitors to establish rules for balancing competition and cooperation, aiming to reach mutually beneficial agreements. The second approach regards coopetition as a phenomenon or event that emerges independently of societal or economic norms. The third approach conceptualizes coopetition as a behavioral response to the pressures of global hyper-competition. Finally, the fourth approach defines coopetition as a paradox—a set of interdependent relationships characterized by inherent logical contradictions (Shvindina, 2019).

Despite its advantages, coopetition poses significant challenges due to its paradoxical and risky dynamics. Companies often face cognitive and behavioral dilemmas, including tensions, opportunistic behavior, and the risk of knowledge leakage, which can undermine the relationship (Le Roy & Fernandez, 2015; Raza-Ullah, 2020). Because of its complexity, coopetition is considered one of the most intricate and demanding organizational phenomena (Gernsheimer et al., 2021). Nevertheless, firms across various industries are increasingly adopting coopetition as a strategic practice, seeking to leverage its synergistic benefits for competitive advantage.

Coopetition relationships are evident across various industries, offering compelling examples of collaborative strategies between competitors. For instance, the American automaker Ford and Germany's Volkswagen Group recently announced a renewed partnership to develop and distribute electric and autonomous vehicles, reviving a collaboration that had previously ended unsuccessfully (Rauwald & Naughton, 2020). Similarly, the COVID-19 pandemic prompted several multinational pharmaceutical companies to partner with smaller firms to accelerate the development and production of coronavirus vaccines. The collaboration between Pfizer and BioNTech in creating a COVID-19 vaccine is a notable example of a coopetition strategy (Crick & Crick, 2020).

In higher education, the edX platform demonstrates coopetition through innovation. In 2012, two historic rivals, Harvard and MIT, joined forces to launch one of the first virtual learning platforms, providing seamless online access to their courses (Garrett, 2016). Another prominent example is the partnership between Apple and Google, which collaborated to develop contact-tracing technology aimed at mitigating the spread of COVID-19 (Brandenburger & Nalebuff, 2021). These cases underscore the diverse applications of coopetition strategies in addressing complex challenges and fostering innovation.

Innovation is a central topic within the study of coopetition, often serving as one of the most examined outcome variables in this context (Bengtsson & Raza-Ullah, 2016). Recognized as a primary driver of competitive advantage, innovation relies on the

development and integration of new knowledge. However, many firms face challenges in fostering innovation due to limited resources or inadequate internal capabilities. To address these limitations, companies often turn to external sources of knowledge through inter-organizational agreements and partnerships.

These collaborations frequently occur between competitors and involve either standardizing existing solutions or co-developing new ones, with both parties sharing the associated risks and costs of research and development. Such partnerships are defined by cooperative and competitive dynamics, shaped by trade-offs involving fairness versus opportunism, sharing versus control, and engagement versus rivalry. This duality, where competition and cooperation coexist, is referred to as *coopetition* (Ricciardi et al., 2022).

Cooptative relationships balance these opposing forces and are generally more conducive to innovation than strategies based solely on cooperation or competition. By enabling knowledge exchange, joint technology development, and shared risk-taking, coopetition provides a strategic advantage in driving innovation. However, the competitive aspects of these arrangements can sometimes lead to opportunistic behaviors, such as knowledge leakage, which may limit the innovation potential of the partners involved. Additionally, research suggests that coopetition is particularly suited to incremental innovation rather than radical innovation (Corbo et al., 2022).

Digital Coopetition

Digital coopetition provides new insight into the cooperative–competitive dynamics, especially significant in industries that take advantage of digital technology as the cornerstone of their value creation and capture strategies. Although traditional coopetition was prevalent in areas where digital systems were of limited use, such as tourism or food industries (Gernsheimer et al., 2021; Gnyawali & Charleton, 2018), the rapid expansion of digital ecosystems in recent years has made the emergence of a new perspective urgent. Digital Coopetition is applied to a relationship based on simultaneous cooperation and competition, while both are founded on technology and digital systems. In other words, in digital coopetition, competition utilizes digital tools to collect and process data and shape a relationship based on mutual benefit with their customers.

Digital coopetition averages specific technologies that help firms engage in simultaneous cooperation and competition. These innovative technologies include a wide array of digital systems and services such as platform systems, data analysis tools, cloud competing, and the internet of things (IOT). Platform technologies, such as those used by Uber and Airbnb, provide an interaction between firms and companies in a digital platform. Mobil technologies use GPS to enhance location-based services, while analysis tools provide companies with help in other for them to improve their operations. Cloud and IOT technologies provide networks that enables devices to connect and share data more conveniently. Together, all these digital tools help companies to improve their services, engage directly and more easily with customers, and establish a better competitive relationship (Reischauer & Hoffmann, 2023).

Digital coopetition has different stages, namely Initiation, Execution, and Termination.

In each of these stages, digital coopetition is different from traditional coopetition, because it allows for a fast and easy entry thanks to its transparent platforms and law-switching expenses. In addition, in its Execution stage, digital coopetition uses real-time digital metrics, while in traditional cooption, evaluation is much longer. In addition, in the ending phase, the functions of traditional and digital coopetition are also different. Traditional coopetition comes to an end basically as a result of issues like knowledge leakages (Raza-Ullah, 2020), while digital coopetition comes to an end when the planned advantages are achieved. This flexibility enabled by technology has reshaped the complex relationship between cooperation and competition (Reischauer & Hoffmann, 2023).

Sustainability

As Kidd (1992) highlighted, the concept of sustainability is not new but has a long history, evolving over time under the influence of various streams of thought and political ideologies. Notably, in academic and scientific circles, the terms "sustainability" and "sustainable development" are often used interchangeably, as observed in the literature. The Brundtland Report, *Our Common Future* (1987), published by the World Commission on Environment and Development, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.). Sustainable development generally has three main dimensions: environmental, social, and economic (UN.ESCAP, 2015).

Although many researchers use the terms “sustainable development” and “sustainability” interchangeably, some make a clear distinction between them. Simply put, sustainability is a long-term goal, whereas sustainable development refers to the processes and paths that lead to achieving that goal. Sustainability, therefore, is a broader term than sustainable development. Additionally, some scholars argue that sustainable development is a macro-level concept aligned with economic development, whereas sustainability is often discussed at the individual or organizational level (Mahajan, 2022).

Regarding the concept of sustainability, three pillars have been proposed: environmental, social, and economic dimensions.

1. *Environmental Pillar*: A key discourse in sustainability is the *environmental discourse*, which connects sustainability to the relationship between humans and nature, emphasizing the preservation of natural resources (Hanss & Böhm, 2012). Growing concerns about global environmental challenges, coupled with skepticism about the ability to significantly reduce industrial pollution, led the United Nations to recognize these issues as barriers to sustainable development. The Stockholm Conference played a pivotal role in establishing the United Nations Environment Program and numerous national environmental protection agencies.

2. *Social Pillar*: As highlighted by Dempsey et al. (2011), the World Commission on Environment and Development's (WCED) definition of sustainability underscores the importance of intergenerational equity, focusing on social factors such as social justice, distributive justice, and equality of conditions. Social discourse has also been shaped

within the corporate sphere, linking sustainability to the concept of corporate social responsibility (CSR). CSR is defined as a firm's commitment to pursue policies, make decisions, or engage in actions that align with societal goals and values (Farcane & Bureana, 2015). Additionally, employment issues—particularly the potential for creating new jobs in both the short and long term—are critical from the social dimension of sustainable development (Kasztelan, 2017).

3. *Economic Pillar*: The economic aspect of sustainability focuses on the relationship between businesses and the social and environmental challenges they face. From an economic perspective, sustainability pertains to a company's ability to thrive over time by maintaining profitability, productivity, and strong financial performance while effectively managing the environmental and social resources that form its capital.

Sustainable Business Model

Integrating sustainability into business operations remains a relatively new concept for startups, small and medium-sized enterprises (SMEs), and even large multinational corporations. Sustainable business models (SBM) have gained global attention, with design thinking increasingly employed to support this transition (Kurek et al., 2023). A sustainable business model can be defined as "a business model that creates, delivers, and captures value for all its stakeholders without depleting the natural, economic, and social capital it relies on" (Breuer & Lüdeke-Freund, 2014). This concept explains how an organization creates, delivers, and captures value economically, socially, culturally, or otherwise sustainably (Nosratabadi et al., 2019).

A sustainable business model offers competitive advantages by enabling conventional business models to achieve sustainable development goals while maintaining productivity and profitability (Broccardo et al., 2023). Building a sustainable business model is an innovative aspect of a business strategy, and various industries and organizations have adopted this approach to meet their economic, environmental, and social objectives concurrently. Sustainable business models promote social and environmental sustainability within industrial systems (Ludeke-Freund, 2010).

Historically, many business models did not prioritize sustainability, despite its significant social and environmental impacts on both humans and nature. However, business models aimed at achieving corporate sustainability goals gradually evolved to contribute to a more sustainable economic system (Geissdoerfer et al., 2018).

Sustainable business models leverage comprehensive management strategies, innovation, and a long-term perspective to fulfill sustainability objectives. As a result, these models have contributed to mitigating the negative impacts of business operations on the environment and society by offering solutions that enable companies to simultaneously meet their economic and sustainability targets (Nosratabadi et al., 2019). These models possess significant potential to embed sustainability principles and align sustainability objectives with value proposition, value creation, and value capture within businesses (Broccardo et al., 2023). In other words, Porter and Kramer (2011) suggest that sustainable business models provide a competitive edge by integrating sustainable

value propositions, value creation, and value capture mechanisms, which in turn deliver economic advantages to companies.

Sustainable business models consider a broad spectrum of stakeholder interests, encompassing environmental and societal concerns. Bocken et al. (2014) proposed a sustainable business model framework that included three main categories: technological, social, and organizational aspects. Each of these categories featured several archetypes, with examples provided for each. In a later work, Bocken et al. (2019) introduced an updated version of the sustainable business model, focusing on three key dimensions: environmental, social, and economic. The environmental dimension includes three archetypes: maximizing material and energy efficiency, closing resource loops, and substituting with renewable resources and natural processes. The social dimension encompasses three archetypes: delivering functionality rather than ownership, adopting a stewardship role, and encouraging sufficiency. Finally, the economic dimension consists of three archetypes: repurposing for societal or environmental benefits, creating inclusive value, and developing scalable, sustainable solutions.

In the following, we present a summary of previous research on coopetition for sustainability.

Table1.
Summary of Previous Studies

Authors	Title	Findings
Carfì & Schilirò (2012)	A Coopetitive Model for the Green Economy	The article introduces a cooperative-competitive model designed for the Green Economy—an economic framework focused on sustainable development. This approach aims to enhance human well-being, promote social equity, and substantially minimize environmental risks and ecological shortages.
Christ et al., (2017)	Coopetition as a Potential Strategy for Corporate Sustainability	This article explores a coopetitive agreement between two leading players in the Australian wine industry to establish a bottling plant in England. By collaborating despite being competitors, the two companies enhance resource efficiency, improve their environmental performance, and bolster their competitive standing within the industry.
Jafarnejad et al., (2020)	A Comprehensive Strategy for Collaboration and Coopetition Among Bio-Refineries, Taking into Account Sustainability Factors and Government Interventions	This study introduces a nonlinear model that seeks to determine the ideal quantity of biofuel production while considering the collaboration between bio-refineries and government financial interventions.
Planko et al., (2019)	Navigating Coopetition: Addressing Challenges in Collaborative Efforts for Sustainable Development - The Case of the Dutch Smart Grid Industry	This article contended that businesses aiming to adopt intricate innovative technologies that promote sustainable development must work with various participants in the innovation ecosystem, including their rivals. This paper is one of the first studies exploring the coopetition strategy for sustainable development at network level.
Sharma & Singh (2017)	Servitization, Coopetition, and Sustainability: An Operations Perspective in the Aviation Industry	This article investigated the cooperation of three airline companies in resource sharing to provide services. Shared use of resources and equipment, cooperation in supplying aircraft spare parts, resource pooling, centralization of locations, and lateral shipments create collaborative consumption that reduces the amount of equipment needed and dematerialization. As a result, coopetition reduces negative environmental effects and decreases energy consumption.
Manzhynski & Figge (2020)	Coopetition for Sustainability: Balancing Organizational Benefits and Societal Good	In this case study, the researchers showed that coopetition affects resource efficiency. The researchers expressed the value created through coopetition in monetary terms as the additional profit created compared to the situation without cooperation between competitors. They found that firms engaged in coopetitive relationships in two economic and environmental dimensions contributed positively to sustainability.

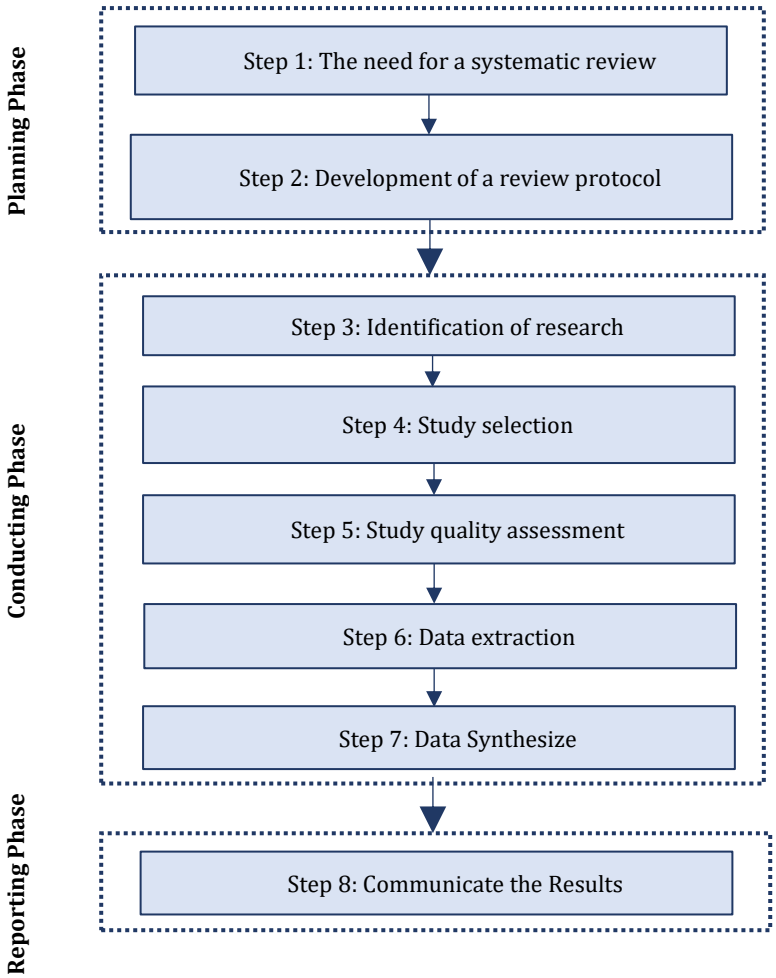
(Source: Researcher's Findings)

Previous studies have explored individual or multiple consequences of coopetition for sustainability. This study aims to address the research gap by presenting a comprehensive framework of the consequences of coopetition for sustainability, utilizing a systematic review method to synthesize and organize existing findings.

Methodology

This article's research methodology is a systematic review of published studies on coopetition for sustainability. Sustainability is viewed here as one of the outcomes of adopting a coopetition strategy. A systematic review involves a thorough search and assessment of existing research and documents related to the research question to obtain a comprehensive understanding of the topic (Grant & Booth, 2009). It is a structured and exhaustive literature review focusing on a clearly-defined research question, following a precise and well-established protocol. Kitchenham (2004) outlined guidelines for conducting a systematic review, which include three main phases- planning, conducting, and reporting- along with eight specific steps to follow during the review process.

Figure 1.
Steps Followed for a Systematic Review of Literature



(Source: Researcher's Findings)

Planning Phase

Step 1: The Need for a Systematic Review

The need for a systematic review arises from the necessity for researchers to consolidate and summarize all existing knowledge on specific topics. This research was motivated by the existing gap in coopetition for sustainability. Specifically, there is a significant lack of studies that explore sustainability as an outcome of coopetitive strategies.

Step 2: Development of a Review Protocol

Experts widely regard the development of a research protocol as the most critical step in systematic review research. The protocol serves as a crucial document that guides researchers through the review process by providing a detailed action plan. It ensures the research is conducted systematically and minimizes potential bias.

A key activity in this step is formulating a clear and precise research question. A well-defined question sets the course for the study and helps maintain focus, ensuring the researcher stays on the intended path. The research question for this study is: What are the consequences of coopetition strategy for sustainability?

Conducting Phase

Step 3: Research Identification

The concept of coopetition has seen significant growth in recent years. The chart below illustrates the increasing number of publications in the field of coopetition. This data is sourced from the Scopus database.

Figure 2.
The Number of Documents Published in Coopetition

(Source: Researcher's Findings)

The goal of a systematic review is to find a large number of primary studies relevant to the research question. It is necessary to assign and follow a search strategy. To perform this step, the words related to the research question were searched in the scientific databases of Web of Science and Scopus.

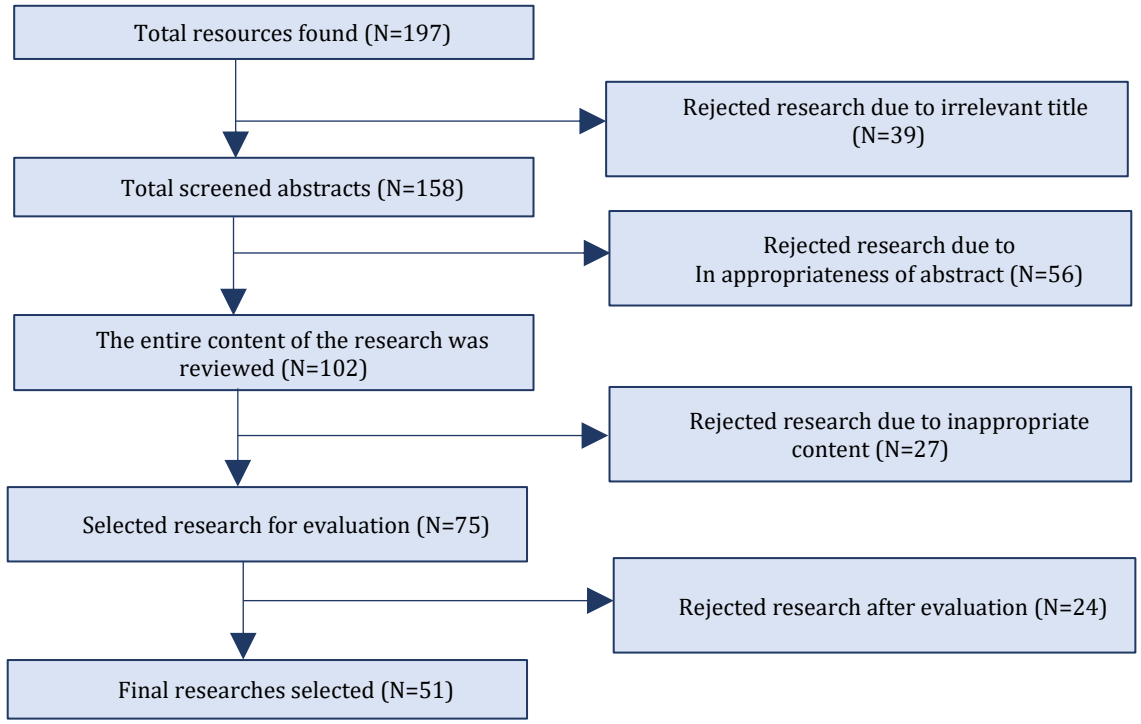
The search formula is as follows:

> "Coopetition" and "sustainability" OR "co-opetition" and "sustainability" OR "coopetition and sustainable development" OR coopetition consequences OR "coopetition" and "green energy" OR "coopetition" and "green product"

Step 4: Study Selection

Study selection is a multi-step process. The first step involves establishing selection criteria, including language, publication year, and type of sources. Keywords related to the research question were searched in two academic databases, Scopus and Web of Science, from 1996 to 2024. 1996 was chosen as the starting point because articles on coopetition in the Web of Science database began to be published from that year. All selected articles were in English.

Figure 3.
Algorithm for Selecting the Final Articles



(Source: Researcher's Findings)

In this section, the Inclusion and exclusion criteria of the articles were specified. In the end, 51 articles were selected to extract the consequences of coopetition for sustainability.

Step 5: Study Quality Assessment

There is no agreement among experts on the definition of quality. Some consider the

internal and external validity of articles as quality. To evaluate the quality of the articles, the relevance of the content of the articles to the research question and their internal and external validity were considered.

Step 6: Data Extraction

In this phase, a total of 38 consequences of coopetition for sustainability were identified from 51 selected articles. This identification process was carried out manually.

Step 7: Data Synthesize

These 38 identified codes were classified into 3 categories of environmental, social, and economic.

Table 2.
The Framework of Coopetition Consequences for Sustainability

Code	Authors	Category
Generating less waste	Carf et al., (2020); Volschenk (2018)	Environmental
Recycling waste	Carf et al., (2020); Filimonau (2021)	
Decreasing emissions	Christ et al., (2017); Trapp et al., (2020); Fallahi et al., (2022); Kavirathna et al., (2020); Tokunaga et al., (2019)	
Pollution Reduction	Carf et al., (2020); Carfi & Donato (2022); Filimonau, (2021); Xin et al., (2022)	
Preserving Bio-Resources	Carfi & Donato (2022)	
Using Green-Packagin	Carfi & Donato (2022); Ohtonen (2019)	
Renewable energy	Gao et al., (2023); Paravantis & Kontoulis (2020); Herbst (2019)	
Obtaining the optimum amount of biofuel production	Jafarnejad et al., (2020)	
Resource loops and use resources in more circularly	Manzhynski & figge (2020); Herbst (2019)	
Producing and selling green technological goods	Carfı et al., (2021); Xu et al., (2022); Shi et al., (2022); Xin et al., (2022); Felzensztein et al., (2018)	
Green energy production	Carfı et al., (2021); Doren (2020)	
Green supply chain (green logistics)	Limoubpratum et al., (2015)	
Declining energy consumption	Sharma & Singh (2017); Hafezalkotob (2017)	
Dematerialize	Sharma & Singh (2017)	
Natural environment protection	Nguyen et al., (2022)	
Social welfare	Hafezalkotob (2017); Carfi & Schilirò (2012); Huang et al., (2020)	Social
Social equity	Carfi & Schilirò (2012)	
Greater consumer surplus	Huang et al., (2020)	
Heritage preservation	Nguyen et al., (2022)	
Community involvement	Nguyen et al., (2022)	
Infrastructure voids and protection/promotion of industry legitimacy	Peloza & Falkenberg (2009)	
Delivery ownership (use resources without owning)	Sharma & Singh (2017)	
Health	Crick & Crick (2020)	

Code	Authors	Category
Improving Educational system	Stadtler & Van Wassenhove (2016); Dal-Soto & Monticelli (2017)	
Change in society's attitude	Kaempf (2022)	
Corporate social responsibility	Kumar et al., (2021)	
Resource and capacity sharing	Gnyawali & Park (2011); Trapp et al., (2020); Herbst (2019); Planko et al., (2019)	Economic
Create value	Ritala & Tidstr¨om (2014); Ko et al., (2020); Volschenk et al., (2016);Rodríguez et al., (2024)	
Shared value	Berti et al., (2017); Herbst (2019)	
Reduce Cost	Volschenk et al. (2016); Trapp et al., (2020); Kaempf (2022)	
knowledge sharing	Abubakar (2024)	
Open Innovation	Mention (2011); Hameed & Naveed (2019); Corbo et al., (2022); Abubakar (2024); Lee & Roh (2023a, 2023b)	
Cheaper services	Mirzabeiki et al., (2021)	
Energy-saving	Hafezalkotob (2017); Jafarnejad et al., (2020); Liu & Pan (2022); Carfı et al., (2020); Hafezalkotob (2018)	
Energy efficiency	Adhikary et al., (2019); Kim (2014)	
Increase or optimization of economic performance	Kaempf (2022)	
Reduction of business risk	Kaempf (2022)	
Digitalization capability	Lee & Roh (2023a, 2023b)	

(Source: Researcher's Findings)

Cohen's kappa coefficient can be used to measure the reliability of qualitative studies. For this purpose, three articles out of 51 articles were randomly given to a strategic management PhD expert. The expert coded the articles without knowing the researcher's codes. The expert extracted 10 codes from the three articles, while the researcher extracted 12 codes from them, 10 of which were the same as the expert's codes.

Table 3.
Coding Agreements

		Author		
		yes	NO	total
Expert	YES	A=10	B=1	11
	NO	C=2	D=0	2
	total	12	1	N=13

(Source: Researcher's Findings)

$$pr(a) = \frac{A + D}{N} = 0.769$$

$$pr(e) = \frac{A+D}{N} \times \frac{A+C}{N} \times \frac{C+D}{N} \times \frac{B+D}{N} = 0.00841$$

$$\text{Kappa} = \frac{pr(a) - pr(e)}{1 - pr(e)} = 0.77$$

Table 4.
Interpretation of the Kappa Coefficient

K	degree of agreement
k≤0	Strong disagreement
0.00-0. 2	Very poor agreement
0. 21-0.4	Low agreement
0.41-0.6	Average agreement
0.61-0.8	Satisfactory agreement
0.81-1.00	Excellent agreement

(Source: Researcher's Findings)

In this study, the kappa coefficient is 0.77, so there is satisfactory agreement.

Reporting Phase

The reporting phase involves a single step: communicating the results, which has been presented in the research findings section of this paper.

Finding

Coopetition strategy helps the environmental dimension of sustainability by generating less waste, recycling waste, decreasing emissions and pollution, declining energy consumption, preserving bio-resources, using green packaging, and obtaining the optimum amount of biofuel production. One of the important ways to increase the efficiency of resource consumption is to close resource loops and use resources in a more circular way; this requires the cooperation of competing resource users. Dematerializing, protecting natural environment, and using and producing renewable energy are other consequences of coopetition for environmental dimension of sustainability. Also, coopetition strategy contributes to green logistics and sustainable distribution.

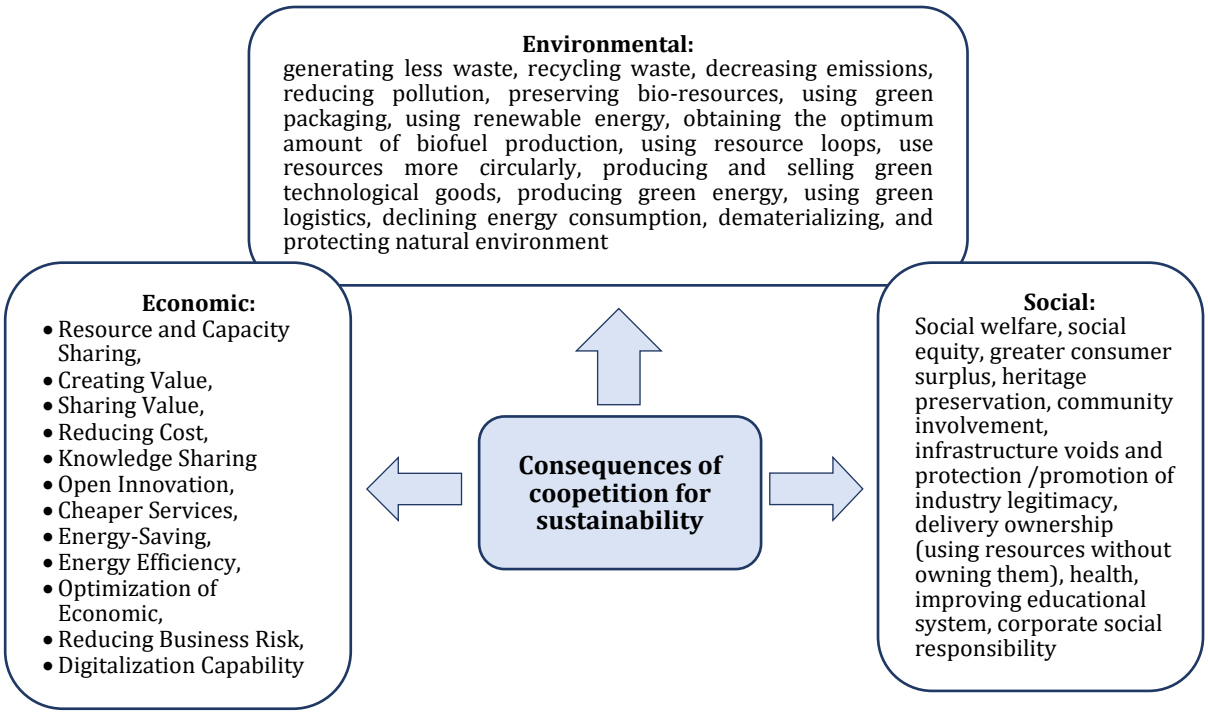
For social aspects of sustainability, coopetition can lead to social welfare, social equity, community involvement, and greater consumer surplus. Also, coopetition helps healthcare providers (doctors, nurse practitioners, radiologists, labs, hospitals, urgent care clinics, medical supply companies, and other professionals, facilities, and businesses that provide such services) to provide better and faster services. One of the best examples of coopetition was the collaboration between two companies BioNTech and Pfizer, to make a corona vaccine. Additionally, establishing well-conceived and well-managed cooperation networks of educational institutions (preschools, childcare, primary-elementary schools, secondary-high schools, and universities) can facilitate upgrading the education system. Moreover, coopetition allows companies to use resources without owning them by providing the possibility of sharing resources. It refers to the archetype “Deliver functionality, not ownership” in the sustainable business model. Furthermore, companies in an industry achieve corporate social responsibility through cooperation to address infrastructure voids and protection/promotion of industry legitimacy. Preserving heritage is the other consequence of coopetition strategy for the social dimension of sustainability.

For the economic dimension of sustainability, coopetition strategy provides the basis for sharing resources and capacities. Sharing resources, knowledge, ownership, and

wealth is the advantage of coopetition for the economic part of sustainability. In addition, coopetition helps to create and share value for all companies involved in this relationship and create positive value for all stakeholders. Coopetition strategy also reduces costs. Innovation is one of the most frequently studied dependent outcome variables in coopetition. In the economic dimension of sustainability, we see *open innovation*, so to achieve this, we definitely need to apply coopetition. Cheaper services, energy saving, energy efficiency, and optimization of economic performance are other consequences of coopetition strategy for the economic dimension of sustainability. Also, coopetition helps the sustainable performance of businesses through digitalization capability.

Notably, most of the extracted codes regarding the consequences of coopetition strategy for sustainability are consistent with the archetypes of Bocken's (2019) sustainable business model. It was mentioned in the background section that Bocken et al. (2019) presented a new version of the sustainable business model with three environmental, social, and economic dimensions. The environmental dimension includes three archetypes: maximizing material and energy efficiency, closing resource loops, and substituting with renewables and natural processes. The social dimension includes three archetypes: deliver functionality not ownership, adopt a steward-ship role, and encourage sufficiency. The economic dimension includes three archetypes: repurpose for society/ environment, create inclusive value, and develop sustainable scale up solutions.

Figure 4.
A Framework of Consequences of Coopetition Strategy for Sustainability



(Source: Researcher's Findings)

Discussion and Conclusion

Our review has provided a comprehensive overview of coopetition for sustainability. This

study collected and analyzed the literature and theoretical perspectives on the topic of coopetition for sustainability using a systematic review approach. Coopetition is a developing concept that can be introduced as a paradigm replacing the attitude of mere competition between competitors with cooperation. On the other hand, the concept of sustainability has become so important in today's era that any new discussion about environment and development is considered incomplete without considering this concept.

Like other conducted researches, the analyses and results of this research are subject to some limitations that are discussed as follows: despite all the efforts to ensure that the statistical population of this research included all related studies, some constraints were unavoidable. First, the scientific databases only included registered studies. Second, limited access to some articles and the non-English language of some articles registered in the scientific databases posed additional challenges. Consequently, the findings of unregistered, inaccessible, and non-English articles are not included in this study.

In summary, this study, using a systematic review of published articles on coopetition for sustainability, showed that coopetition strategy is a very important approach for businesses to achieve sustainability and, on a broader scale, affects the sustainability of societies. Additionally, coopetition consequences affect all dimensions of sustainability: environmental, social, and economic. It is expected that this research contributes to future research and the firms engaged in coopetitive relationship for sustainability. Given the importance of coopetition for sustainability, future researchers should investigate its various dimensions and aspects, exploring its consequences in diverse context to develope a comprehensive model in this field.

Since digital technology plays an important role in improving the efficiency of businesses, reducing the production of waste, and losing resources, paying close attention to this issue is very important. Also, relationship between companies in the evolving digital ecosystems are fluid and dynamic. As traditional industries undergo digital transformation, coopetition become a central issue. In addition, the application of a coopetition strategy leads to the achievement of digital capabilities, ultimately contributing to the sustainability of businesses.

This research aimed to provide a comprehensive framework outlining the consequences of coopetition for sustainability. The findings are not only valuable and essential for future researchers exploring this field but also offer practical insights for industry professionals. From an industrial perspective, the results provide valuable guidance for those focusing on sustainability, enhancing their understanding of how adopting a coopetitive strategy can contribute to business sustainability.

Finally, coopetition is a business strategy rooted in game theory helping businesses determine the optimal moment for rivals to work together. Cooperative games, as mathematical models, provide insights into how cooperation between competitors can increase benefits for all players and stimulate market growth. Coopetition is a strategy that brings considerable benefits to businesses in the current era. This research points out the benefits of using coopetition for sustainability.

REFERENCE

Abubakar, A. (2024). Competition and cooperation: a coopetition strategy for sustainable performance through serial mediation of knowledge sharing and open innovation. *Global Knowledge, Memory and Communication. https://doi.org/10.1108/gkmc-10-2023-0398*

Adhikary, D., Bayev, N. S. N., Hossain, M. F., Munasinghe, K. S., & Jamalipour, A. (2019, December). Coopetition based inter-operator traffic sharing for energy efficient cellular networks. In 2019 *13th International Conference on Signal Processing and Communication Systems (ICSPCS) (*pp. 1-7). IEEE.

Bengtsson, M., & Raza-Ullah, T. (2016). A systematic review of research on coopetition: Toward a multilevel understanding. *Industrial Marketing Management*, 57, 23-39.

Berti, G., Mulligan, C., & Yap, H. (2017). diGital food hubs as disruptive business models based on Coopetition and "shared value" for sustainability in the agri-food sector. In *Global Opportunities for Entrepreneurial Growth: Coopetition and Knowledge Dynamics within and across Firms* (pp. 415-438). Emerald Publishing Limited.

Bocken, N. M., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of cleaner production*, 65, 42-56.

Bocken, N., Boons, F., & Baldassarre, B. (2019). Sustainable business model experimentation by understanding ecologies of business models. *Journal of Cleaner Production*, 208, 1498-1512.

Brandenburger, A., & Nalebuff, B. (2021). The rules of co-opetition. *Harvard Business Review, 99*(1), 48-57.

Brandenburger, A., Nalebuff, B. (1996) *Co-opetition*. Doubleday Publishing, New York.

Breuer, H. & Lüdeke-Freund, F. (2014): Normative Innovation for Sustainable Business Models in Value Networks, in: Huizingh, K.; Conn, S.; Torkkeli, M. & Bitran, I. (Eds.): *The Proceedings of XXV ISPIM Conference – Innovation for Sustainable Economy and Society,* 8-11 June 2014, Dublin, Ireland.

Broccardo, L., Zicari, A., Jabeen, F., & Bhatti, Z. A. (2023). How digitalization supports a sustainable business model: A literature review. *Technological Forecasting and Social Change*, 187, 122146.

Carfí, D., & Donato, A. (2022). Plastic-Pollution Reduction and Bio-Resources Preservation Using Green-Packaging Game Coopetition. *Mathematics*, *10*(23), 4553.

Carfì, D., & Schilirò, D. (2012). A coopetitive model for the green economy. *Economic Modelling*, 29(4), 1215-1219.

Carfı, D., Donato, A., Fredella, M. I., & Squillante, M. (2020). Logistic coopetition in EIP by green food packaging.

Carfí, D., Donato, A., Fredella, M. I., & Squillante, M. (2021). Coopetitive games for environmental sustainability: Climate change and decision global policies. *Socio-Economic Planning Sciences*, *75*, 100807.

Charleton, T. R., Gnyawali, D. R., & Galavan, R. J. (2018). Theoretical perspectives of coopetition: Review and integration. *The Routledge Companion to Coopetition Strategies*, 23-35.

Christ, K. L., Burritt, R. L., & Varsei, M. (2017). Coopetition as a potential strategy for corporate sustainability. *Business strategy and the environment*, 26(7), 1029-1040.

Clarke-Hill, C., Li, H., & Davies, B. (2003). The paradox of co-operation and competition in strategic alliances: towards a multi-paradigm approach. *Management Research News*, *26*(1), 1-20.

Corbo, L., Kraus, S., Vlačić, B., Dabić, M., Caputo, A., & Pellegrini, M. M. (2022). Coopetition and innovation: A review and research agenda. *Technovation*, 122, 102624.

Crick, J. M., & Crick, D. (2020). Coopetition and COVID-19: Collaborative business-to-business marketing strategies in a pandemic crisis. *Industrial Marketing Management*, *88*, 206-213.

Dagnino, G. B. (2009). Coopetition strategy: a new kind of interfirm dynamics for value creation. In *Coopetition strategy* (pp. 45-63). Routledge.

Dal-Soto, F., & Monticelli, J. (2017). Coopetition strategies in the Brazilian higher education. *Revista de Administração de Empresas*, *57*, 65-78.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable development*, *19*(5), 289-300.

Doren, J. V. (2020). *The influence of technology development stages on the drivers of coopetition in the Dutch Green Hydrogen sector* (Master's thesis).

Dorn, S., Schweiger, B., & Albers, S. (2016). Levels, phases and themes of coopetition: A systematic literature review and research agenda. *European Management Journal*, *34*(5), 484-500.

ESCAP, U., & Scientific, C. (2015). Integrating the three dimensions of sustainable development: A framework and tools.

Fallahi, N., Hafezalkotob, A., Raissi, S., & Ghezavati, V. (2022). Cooperation and coopetition among retailers-third party logistics providers alliances under different risk behaviors, uncertainty demand and environmental considerations. *Environment, Development and Sustainability*, 25, 5597-5633.

Farcane, N., & Bureana, E. (2015). History of "Corporate social responsibility" concept. *Annales Universitatis Apulensis: Series Oeconomica*, *17*(2), 31.

Felzensztein, C., Gimmon, E., & Deans, K. R. (2018). Coopetition in regional clusters: Keep calm and expect unexpected changes. *Industrial Marketing Management*, *69*, 116-124.

Filimonau, V. (2021). The prospects of waste management in the hospitality sector post COVID-19. *Resources, Conservation and Recycling*, *168*, 105272.

Frisio, D. G., Ferrazzi, G., & Tesser, F. (2011, October). Coopetition: A strategic model for horticultural sector? The case of Lombardy region. In *V Balkan Symposium on Vegetables and Potatoes* 960 (pp. 247-254).

Gao, C., Tao, S., Su, B., Mensah, I. A., & Sun, M. (2023). Exploring renewable energy trade coopetition relationships: Evidence from belt and road countries, 1996-2018. *Renewable Energy*, *202*, 196-209.

Garrett, R. (2016). *The state of open universities in the Commonwealth: A perspective on performance, competition and innovation*. Commonwealth of Learning, Canada.

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of cleaner production, 198*, 401-416.

Gernsheimer, O., Kanbach, D. K., & Gast, J. (2021). Coopetition research-A systematic literature review on recent accomplishments and trajectories. *Industrial Marketing Management*, *96*, 113-134.

Gnyawali, D. R., & Park, B. J. R. (2011). Co-opetition between giants: Collaboration with competitors for technological innovation. *Research policy*, *40*(5), 650-663.

Gnyawali, D.R., & Charleton, T.R. (2018). Nuances in the interplay of competition and cooperation: Towards a theory of coopetition. *Journal of Management, 44*(7), 2511–34.

Grant, M. J., & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Health information & libraries journal*, *26*(2), 91-108.

Hafezalkotob, A. (2017). Competition, cooperation, and coopetition of green supply chains under regulations on energy saving levels. *Transportation Research Part E: Logistics and Transportation Review*, *97*, 228-250.

Hafezalkotob, A. (2018). Modelling intervention policies of government in price-energy saving competition of green supply chains. *Computers & Industrial Engineering*, *119*, 247-261.

Hameed, W. U., & Naveed, F. (2019). Coopetition-based open-innovation and innovation performance: Role of trust and dependency evidence from Malaysian high-tech SMEs. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *13*(1), 209-230.

Hannah, D. P., & Eisenhardt, K. M. (2018). How firms navigate cooperation and competition in nascent ecosystems. *Strategic Management Journal*, 39(12), 3163-3192.

Hanss, D., & Böhm, G. (2012). Sustainability seen from the perspective of consumers. *International Journal of Consumer Studies*, *36*(6), 678-687.

Herbst, J. M. (2019). Harnessing sustainable development from niche marketing and coopetition in social enterprises. *Business Strategy & Development*, *2*(3), 152-165.

Huang, W., Zhou, W., & Luo, F. (2020). Coopetition between B2C E-commerce companies: price competition and logistics service cooperation. *Journal of Systems Science and Systems Engineering*, *29*, 730-749.

Jafarnejad, E., Makui, A., Hafezalkotob, A., & Mohammaditabar, D. (2020). A robust approach for cooperation and coopetition of bio-refineries under government interventions by considering sustainability factors. *IEEE Access, 8,* 155873-155890.

Kaempf, D. (2022). Coopetition in the Context of the Sustainability Goals: A Systematic Overview. *Regional and Business Studies*, *14*(2), 47-61.

Kasztelan, A. (2017). Green growth, green economy and sustainable development: terminological and relational discourse. *Prague Economic Papers*, *26*(4), 487-499.

Kavirathna, C. A., Kawasaki, T., Hanaoka, S., & Bandara, Y. M. (2020). Cooperation with a vessel transfer policy for coopetition among container terminals in a single port. *Transport Policy*, *89*, 1-12.

Kim, S. (2014). An adaptive smart grid management scheme based on the coopetition game model. *ETRI journal*, *36*(1), 80-88.

Kitchenham, B. (2004). Procedures for performing systematic reviews. *Keele, UK, Keele University*, *33*(2004), 1-26.

Ko, Y., Chung, Y., & Seo, H. (2020). Coopetition for sustainable competitiveness: R&D collaboration in perspective of productivity. *Sustainability*, *12*(19), 7993.

Kumar, A., Connell, J., & Bhattacharyya, A. (2021). Co-opetition for corporate social responsibility and sustainability: drivers and success factors. *Sustainability Accounting, Management and Policy Journal*, *12*(6), 1208-1238.

Kurek, J., Brandli, L. L., Leite Frandoloso, M. A., Lange Salvia, A., & Mazutti, J. (2023). Sustainable Business Models Innovation and Design Thinking: A Bibliometric Analysis and Systematic Review of Literature. *Sustainability*, *15*(2), 988.

Le Roy, F., & Fernandez, A.-S. (2015). managing coopetitive tensions at the working-group level: The rise of the coopetitive project team. *British Journal of Management*, 26(4), 671.

Lee, M. J., & Roh, T. (2023a). Unpacking the sustainable performance in the business ecosystem: Coopetition strategy, open innovation, and digitalization capability. *Journal of Cleaner Production*, *412*, 137433.

Lee, M. J., & Roh, T. (2023b). Digitalization capability and sustainable performance in emerging markets: mediating roles of in/out-bound open innovation and coopetition strategy. *Management Decision*, (ahead-of-print).

Limoubpratum, C., Shee, H., & Ahsan, K. (2015). Sustainable distribution through coopetition strategy. *International Journal of Logistics Research and Applications*, *18*(5), 424-441.

Liu, B., & Pan, S. (2022). Adaptive Finite-Time Consensus Tracking Control for Coopetition Flexible Joint Multi-Manipulators with Full-State Constraints. *IEEE Access*, *10*, 32324-32336.

Lüdeke-Freund, F. (2010). Towards a conceptual framework of'business models for sustainability'. *Knowledge collaboration & learning for sustainable innovation, R. Wever, J. Quist, A. Tukker, J. Woudstra, F. Boons, N. Beute, eds., Delft*, 25-29.

Mahajan,R. (2022). Sustainability & Sustainable Development: Are they Different? https://crispglobal.org/sustainability-sustainable-development/

Manzhynski, S., & Figge, F. (2020). Coopetition for sustainability: Between organizational benefit and societal good. *Business Strategy and the Environment*, 29(3), 827-837.

Meena, A., Dhir, S., & Sushil, S. (2023). A review of coopetition and future research agenda. *Journal of Business & Industrial Marketing*, 38(1), 118-136.

Mention, A. L. (2011). Co-operation and co-opetition as open innovation practices in the service sector: Which influence on innovation novelty? *Technovation*, *31*(1), 44-53.

Mirzabeiki, V., He, Q., & Sarpong, D. (2021). Sustainability-driven co-opetition in supply chains as strategic capabilities: drivers, facilitators, and barriers. *International Journal of Production Research*, 61 (14), 1-27.

Munten, P., Vanhamme, J., Maon, F., Swaen, V., & Lindgreen, A. (2021). Addressing tensions in coopetition for sustainable innovation: Insights from the automotive industry. *Journal of Business Research*, 136, 10-20.

Nguyen, T. Q. T., Johnson, P., & Young, T. (2022). Networking, coopetition and sustainability of tourism destinations. *Journal of Hospitality and Tourism Management*, *50*, 400-411.

Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E. K., Rakotonirainy, A., & Chau, K. W. (2019). Sustainable business models: A review. *Sustainability*, *11*(6), 1663.

Ohtonen, S. (2019). Enhancing the Development of Green Product Innovations Through Collaboration among Startups and Large Firms.

Paravantis, J. A., & Kontoulis, N. (2020). Energy security and renewable energy: a geopolitical perspective. In *Renewable Energy-Resources, Challenges and Applications*. IntechOpen.

Peloza, J., & Falkenberg, L. (2009). The role of collaboration in achieving corporate social responsibility objectives. *California Management Review*, *51*(3), 95-113.

Peng, T. J. A., Yen, M. H., & Bourne, M. (2018). How rival partners compete based on cooperation? *Long Range Planning*, 51(2), 351-383.

Planko, J., Chappin, M. M., Cramer, J., & Hekkert, M. P. (2019). Coping with coopetition—Facing dilemmas in cooperation for sustainable development: The case of the Dutch smart grid industry. *Business strategy and the environment*, *28(*5), 665-674.

Porter, M. E., & Kramer, M. R. (2011). The big idea: Creating shared value. *Harvard business review*, 89(1), 62-77.

Rauwald, C., & Naughton, K. (2020). VW, Ford forge ahead with technology sharing to save costs. Retrieved October 28, 2020, from https://www.bloomberg.com/news/articles/2020-05-14/vw-ford-forge-ahead-with-ev-technology-sharing-to-cut-costs.

Raza-Ullah, T. (2020). Experiencing the paradox of coopetition: A moderated mediation framework explaining the paradoxical tension–performance relationship. *Long Range Planning*, 53(1), 101863

Reischauer, G., & Hoffmann, W. H. (2023). Digital coopetition: creating and capturing value with rivals in the age of algorithms, big data, and platforms. In *Research Handbook on Digital Strategy* (pp. 360-375). Edward Elgar Publishing.

Ricciardi, F., Zardini, A., Czakon, W., Rossignoli, C., & Kraus, S. (2022). Revisiting the cooperation–competition paradox: A configurational approach to short-and long-term coopetition performance in business networks. *European Management Journal, 40*(3), 320-331.

Ritala, P., & Tidström, A. (2014). Untangling the value-creation and value-appropriation elements of coopetition strategy: A longitudinal analysis on the firm and relational levels. *Scandinavian Journal of Management*, *30*(4), 498-515.

Rodríguez, A., Alcalde-Heras, H., & Iñigo, E. A. (2024). Exploring coopetition and value-based networks in business models for sustainability—A case study of the specialty coffee industry in Colombia. *Business Strategy and the Environment, 33* (7), 7305-7320.

Sharma, M. G., & Singh, K. N. (2017). Servitization, coopetition, and sustainability: An operations perspective in aviation industry. *Vikalpa, 42*(3), 145-152.

Shi, L., Cakanyıldırım, M., & Sethi, S. (2022). Pricing and Producing Green Products under Subsidy Termination and Coopetition. *Available at SSRN 4266514*.

Shvindina, H. (2019). Coopetition as an emerging trend in research: perspectives for safety & security. *Safety*, 5(3), 61.

Stadtler, L., & Van Wassenhove, L. N. (2016). Coopetition as a paradox: Integrative approaches in a multi-company, cross-sector partnership. *Organization Studies*, 37(5), 655-685.

Tokunaga, S., Martínez, M., & Crusat, X. (2019, April). Coopetition: Industrial Interplay to Foster Innovative Entrepreneurship in Energy Engineering Education. In *2019 IEEE Global Engineering Education Conference (EDUCON)* (pp. 1063-1068). IEEE.

Trapp, A. C., Harris, I., Rodrigues, V. S., & Sarkis, J. (2020). Maritime container shipping: Does coopetition improve cost and environmental efficiencies? *Transportation Research Part D: Transport and Environment*, *87*, 102507.

Volschenk, J. (2018). The value implications of coopetition. In *The Routledge Companion to Coopetition Strategies*. Routledge.

Volschenk, J., Ungerer, M., & Smit, E. (2016). Creation and appropriation of socio-environmental value in coopetition. *Industrial Marketing Management, 57*, 109-118.

Xin, X., Miao, X., & Cui, R. (2022). Enhancing sustainable development: Innovation ecosystem coopetition, environmental resource orchestration, and disruptive green innovation. *Business Strategy and the Environment*, *32* (4), 1388-1402.

Xu, Y., Chin, W., Liu, Y., & He, K. (2022). Do institutional pressures promote green innovation? The effects of cross-functional coopetition in green supply chain management. *International Journal of Physical Distribution & Logistics Management*, 53, 10.1108/IJPDLM-03-2022-0104.

Exploring the Implementation of Codes of Ethics in the Iranian ICT Sector: A Grounded Theory Approach

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ABSTRACT

Without effective mechanisms for implementation, a code of ethics would not impact employees' behavior. This study aims to inductively investigate implementing a code of ethics to improve the current understanding of this subject and make implementing a code of ethics in organizations more effective. To this end, the Grounded Theory (GT) approach is used. The research sample comprises managers and employees from 12 ICT companies in the Tehran Stock Exchange. Data were collected by conducting interviews and using the theoretical sampling method. On this basis, 23 HR managers/experts were interviewed. The collected data were analyzed using the approach proposed by Strauss and Corbin (1998). The findings indicate that organizations are driven to implement a code of ethics due to two main reasons: external pressure and internal needs. In implementing a code of ethics, they face challenges such as low top management support, improper financial situation, and unsupportive employee perceptions and attitudes. To implement a code of ethics, surveyed organizations take initiatives such as code of ethics definition and redefinition, communication, code of ethics training, punishing violations, and awarding obligations and social methods. Such initiatives can improve an organization's ethical climate and create a distinguished identity, whereas they can yield undesired consequences if proven unsuccessful.

KEYWORDS

Code of Ethics, Grounded Theory Approach, ICT Companies, Implementation of Codes of Ethics.

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Introduction

Codes of ethics are essential organizational instruments that impact employees' ethical behaviors (Wood et al., 2004). Companies have been concerned about the ethical behavior of their employees for more than 100 years (Loughran et al., 2022). Potentially, codes of ethics can have multiple functions. Zolingen and Honders (2010) identified eight distinct functions of codes of ethics within the literature. Five of these functions are internal: the orientation function (raising awareness of workplace norms and values), the explanatory function (clarifying employee responsibilities), the steering function (defining expectations to guide employee actions), the corrective function (enabling mutual accountability regarding compliance with the code), and the enthusiasm function (fostering commitment and loyalty to the organization). The remaining three functions are external: the distinguishing function (enhancing organizational recognition and image), the legitimizing function (building public trust in the organization), and the external corrective function (allowing external parties, such as citizens, to address compliance with the code).

Over the past decade, implementing codes of ethics in Iran has become increasingly crucial due to significant socio-economic and cultural changes. The rapid development of the ICT industry and the evolving regulatory landscape have heightened the need for robust ethical frameworks to guide organizational behavior. In Iran, the unique cultural and religious context necessitates that codes of ethics be comprehensive and culturally sensitive to be effective. This period has seen a growing recognition of the importance of ethical conduct in fostering trust and integrity within organizations, particularly in sectors like healthcare and technology, where ethical lapses can have profound consequences (Sharifikia et al., 2024). The emphasis on ethical guidelines has been driven by both internal needs, such as improving organizational performance and employee morale, and external pressures, including regulatory requirements and public expectations. As a result, Iranian organizations have increasingly adopted and refined their codes of ethics to address these challenges, ensuring they are well-equipped to navigate the complexities of modern business practices while maintaining cultural relevance (Simbar et al., 2023).

Considering the many functions of codes of ethics, the increase in using them in organizations is comprehensible. According to a KPMG Report, among Fortune 200 Top Ranking companies, 86% have codes of ethics (KPMG, 2008). Based on official reports, over 60% of organizations considered top companies by the Iranian Industrial Management Organization have a code of ethics (Hedayati, 2011). Companies surveyed in this study have formulated a code of ethics to foster their ethical climate and their employees' ethical decision-making.

Despite keen interest in using a code of ethics in Iranian organizations, administrative corruption is too high. Iran ranked 136th out of 175 countries in the 2014 Administrative Corruption Report by Transparency International Organization (Transparency International, 2014).

Many ethics scholars have mentioned that although a code of ethics is necessary for today's organizations, which confront many complicated ethical problems, the mere formulation of a code of ethics without implementing it would not help to improve ethics in organizations (Nijhof et al., 2003; O'Dwyer & Madden, 2006; Webley & Werner, 2008). Some authors have even refused a positive relationship between a code of ethics and employee ethical behaviors (Farrell et al., 2002). The code of ethics has become a window-dressing method, showing managers that they are committed to ethical values and social capital development (Mostafazadeh & Sadeghi, 2014).

Hence, to realize the primary function of the code of ethics, which is influencing employees' behavior, it is necessary to implement it. Professional ethical standards would be meaningless if a code is prepared regardless of whether it is followed or not, (Svara, 2007). In the case of not transferring ethical values to employees and lacking mechanisms to foster and implement them, the code of ethics is ineffective document and would not affect employees' behavior. Many companies, such as Enron, introduced as unethical organizations in media had a code of ethics (Webley & Werner, 2008).

Notably, implementing a code of ethics is too complicated (Frostenson et al., 2012). Hence, to understand the process of implementing a code of ethics in a country where only a few studies are conducted in this regard, it is necessary to explore this issue inductively. To achieve this goal, we utilize the Grounded Theory approach. After a short review of the literature on implementing a code of ethics and research methodology, the results of this research are provided in four sectors by using Strauss and Corbin's paradigm (1998) as a heuristic tool:

- What factors drive organizations to look for a code of ethics implementation?
- Which challenges do organizations face in implementing a code of ethics?
- What initiatives are taken by organizations to implement a code of ethics?
- What are the consequences of such initiatives?

Literature review

Implementing code of ethics means internalizing current values among employees and making them part of the work culture, procedures, and activities (Nijhof et al., 2003). Studies conducted on the code of ethics can be divided broadly into descriptive and prescriptive groups. However, such categorization is more of an ideal type since most studies have both prescriptive and descriptive contents. In descriptive studies, organizations' code of ethics implementation is studied, described, and analyzed. In their research, Jose and Thibodeaux (1999) examined the perceptions of 86 marketing and HR managers from US firms operating outside the country on implementing the code of ethics. They concluded that managers believe in the positive impact of ethical values on profitability. For implementing a code of ethics, they prefer implicit techniques such as leadership, organizational culture, and top management support over explicit ones such as ethics committees, ethics officers, and ethics newsletters.

By studying 812 US employees, Adam and Rachman-Moore (2004) analyzed different

ways of implementing a code of ethics and concluded that implicit methods, such as managers as ethical models and social ethics-supporting norms, create more ethical commitment among employees than explicit ones, like ethics official training courses.

Wood et al. (2004) surveyed the rate of using different tools to implement a code of ethics among organizations in Sweden, Australia, and Canada. An interesting finding of their study was that the rate of using such tools depends on the culture of the relevant country. In Sweden, for instance, where femininity culture dominates, lower official rules and regulations are used to implement a code of ethics, while in the same country, there are highly supportive initiatives for employees on issues related to the code of ethics.

O'Dwyer and Madden (2006) emphasized the necessity of implementing a code of ethics in Irish companies and concluded in their study that despite the increased use of codes of ethics in Irish organizations, they are not using explicit techniques well to transfer ethical values; therefore, they are not doing well in ethics implementation.

Svensson and Wood (2009) studied Swedish governmental organizations' use and implementation of a code of ethics. They concluded that these organizations do not use a code of ethics to solve ethical problems, which is a severe shortcoming in implementing a code of ethics. Another problem that hurts proper ethics implementation is the lack of employee contribution to the process of devising and implementing a code of ethics.

In their study on Sony Ericson, Zakaria, Garanca, and Sobeih (2012) investigated the cultural and legal challenges of implementing a code of ethics in Sony's supply chain. They concluded that behavioral codes are perceived differently in varied cultural and legal contexts. Hence, one should pay special attention to cultural and legal issues when devising and implementing a code of ethics.

Recommendations and guidelines are provided to implement a code of ethics in prescriptive studies. Some of these guidelines are the result of empirical and descriptive studies. For instance, Rezaee, Elmore, and Szendi (2001) surveyed 292 managers of US higher education centers and announced that adequate initiatives are not taken to implement a code of ethics in most centers. To improve the ethical environment and codes in such organizations, they recommended three actions:

- More emphasis on preventing financial, scientific, and academic cheating.
- More employee contribution to devising and implementing a code of ethics.
- Establishing a proper process for implementing a code of ethics.

In other research, the rate of prescriptive content is high. For instance, Stevens (2008) reviewed published studies on organizational code of ethics and concluded with five recommendations for implementing the code of ethics successfully:

- Make a code of ethics in a participative process.
- Discuss with employees the issues raised about the codes repeatedly.
- Use a code of ethics to resolve ethical problems.
- Inform all organizational members about ethical decisions and explain the logic of using the code of ethics in decision-making.
- Award rewards to those employees who act by the code of ethics.

By studying code of ethics implementation in universities, Remišová and Lašáková (2012) suggest that universities take the following steps to formulate and implement a code of ethics, especially in academic workplaces:

- Clarifying the aim planned to be met using a code of ethics.
- Analyzing organizational ethical environment.
- Determining a proper approach to formulating a code of ethics.
- Determining the method for implementing a code of ethics.
- Determining the required control mechanisms to guarantee the implementation of the code of ethics.

Webley and Werber (2008) believe that to implement a code of ethics, organizations should undertake two significant actions that each include several components:

1) Developing a well-designed business ethics policy that consists of five elements: a) agreeing on core ethical values, b) creating a stakeholder-based code, c) providing guidance for employees, d) establishing provisions for obtaining advice and speaking up, and e) raising awareness and offering training.

2) Promoting an ethical culture that consists of a) management behavior and communication and b) incorporating ethical considerations into corporate strategy.

In a country where we know little about the code of ethics implementation, we should initially conduct a study to explore, describe, and understand the current status of the code of ethics implementation.

Recent studies have continued to explore the complexities of implementing codes of ethics in various organizational contexts. For instance, Babri, Davidson, and Helin (2019) reviewed 100 empirical papers on corporate codes of ethics and found that while the content of these codes is predominantly self-defensive, they often encounter tensions when implemented across different national and organizational boundaries. This highlights the importance of considering cultural and contextual factors in the development and implementation of ethical guidelines. Similarly, Lartey (2021) emphasized the differences between integrity-based and compliance-based ethics programs, suggesting that a combination of both approaches might be necessary to promote ethical behavior in organizations effectively.

In the construction industry, a paradigm shift has been observed in implementing ethics codes. Ho and Oladinrin (2019) noted that ethics training programs significantly influence employees' ethical behavior, underscoring the need for continuous education and reinforcement of ethical standards. This aligns with the findings of Komić et al. (2015), who reported that adopting a code of ethics improves the integrity of financial reporting by reducing restatements, thereby enhancing overall organizational transparency and accountability.

Moreover, the role of research integrity and ethics in professional codes has been increasingly recognized. A study by Doung et al. (2020) examined the importance of ethical practices in business organizations and proposed mechanisms for their effective implementation. This includes establishing clear ethical guidelines, providing regular

training, and fostering an organizational culture that supports ethical decision-making. These recent insights contribute to a deeper understanding of the multifaceted nature of ethics implementation and highlight the ongoing need for adaptive and context-sensitive approaches in promoting ethical behavior within organizations.

Methodolothy

The method used in this paper is grounded theory (GT). In this methodology, the author begins with general observations and, through an ongoing analytical process, creates conceptual categories that explain the topic under study (Marvasti, 2004). GT involves the progressive identification and integration of categories of meaning from data. GT provides us with guidelines on identifying categories, making links between categories, and establishing relationships between them (Wilig, 2008).

We employed a qualitative research design due to the strength of in-depth qualitative data in providing new insights into emerging research topics (Leidner et al., 2018; Yin, 2017; Sadeghi et al., 2013a). Unstructured and semi-structured interviews were used to collect data. This method is chosen after considering the purpose of the research and its methodology (Danaeefard et al., 2015; Danaeefard et al., 2014). As the Grounded method is inductive, open questions on the general subject of the study are more suitable than closed questions. In the case of closed and detailed questions, the way toward different possibilities of exploring the phenomena is closed, and the inductive nature of the research is undermined.

A theoretical sampling method determines the number and type of samples. In this approach, sample size is not predetermined; samples are selected, and data is collected based on the emerging theory (Strauss, 1987). Sampling and data collection were continued to achieve a saturation point. Categories arrive at saturation point when no new information emerges during the coding process (Strauss & Corbin, 1998). On this basis, 23 HR managers/experts in 12 companies of the Tehran Stock Exchange were interviewed. These companies operate in the ICT industry. The reason for selecting HR employees was that in these companies, HR departments were more involved in implementing the code of ethics, and theoretical sampling led authors toward these samples. To ensure the proper transfer of concepts from the interviewers' minds to the researcher, the authors reformed and revised extracted concepts and meanings from interviews in an interactive process. Data collection from different companies made it possible to realize one critical aspect of GT: comparative analysis (Locke, 2001). The following results were achieved using the paradigm of Strauss and Corbin (1998) as a heuristic tool.

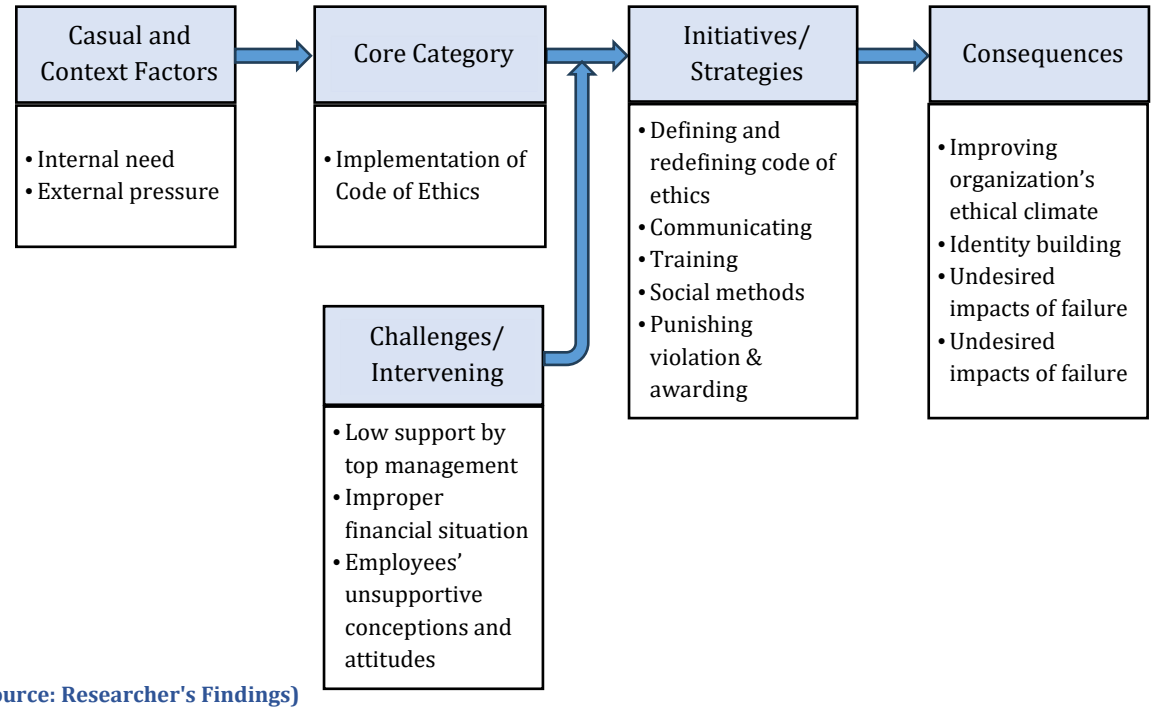
The validity and reliability of this article, which employs grounded theory (GT) methodology, are ensured through several rigorous processes. Using unstructured and semi-structured interviews allows for in-depth qualitative data collection, providing rich insights into the research topic. Theoretical sampling, where the sample size is not predetermined but based on emerging theory, ensures that data collection continues until

saturation is reached, enhancing the reliability of the findings. This approach, as outlined by Strauss and Corbin (1998), ensures that categories are well-developed and no new information emerges during the coding process. Additionally, the interactive process of reforming and revising extracted concepts from interviews helps maintain the accuracy and consistency of data interpretation. Comparative analysis across different companies further strengthens the validity by allowing for the identification of patterns and relationships within the data. These methodological rigor and systematic procedures contribute to the credibility and dependability of the research findings.

Findings

Data was analyzed using the principles of GT. First, open coding is used to identify words and ideas appearing in each interview transcript (Kountouridou & Domic, 2022). Second, during the selective coding process, the data was constantly re-evaluated, allowing the researchers to integrate the codes and categories into themes. At a subsequent stage, the theoretical codes are used to explain how the substantive codes relate to the later form of the theory (Glaser & Strauss, 1967).

Fig. 1.
Axial Coding



(Source: Researcher's Findings)

As shown in Figure 1, in this study, we did not distinguish between causal and contextual factors because such a division seems artificial and leads to unnecessary complexity of this model. In the rest of the article, the components of Figure 1 are discussed and presented along with the research questions.

What factors drive organizations to look for a code of ethics implementation?

Organizations implement ethics for different reasons. According to the present study's findings, ethics are implemented for two main reasons: internal need and external pressure.

1. Internal need: Some organizations implement ethics due to internal problems. After investigating their problems, such organizations conclude they can resolve them by implementing specific values. For instance, one surveyed organization had put "knowledge sharing" in its code of ethics and attempted to implement it since an essential problem in this organization was knowledge hiding and not sharing knowledge. Its HR manager asserts:

> "Our organization is individualistic, and there is no spirit of teamwork. Hence, there is too much knowledge hiding in our organization, and people do not even accept working as a team. When we ask them to share their knowledge, they object and say, 'Let us do our job.' They never make it possible to work as a team and to share knowledge. This culture of isolation hinders our progress and innovation. Employees focus solely on their tasks without considering the bigger picture or how their work impacts others. The lack of collaboration leads to repeated mistakes and missed opportunities for improvement."

Therefore, internal problems and the conceived capability of values to resolve them drive some organizations to implement such values. In such organizations, ethics implementation originates from the organization's needs; therefore, it is sought more rigorously, and managers usually show high commitment to ethics implementation.

2. External pressure: Sometimes, ethics implementation does not emanate from internal pressure; instead, factors aside from organizational problems drive an organization to implement ethics. For instance, some surveyed organizations formulated a code of ethics to acquire scores in excellence awards, or in some subsidiary organizations, the headquarters had forced them to implement a code of ethics. As a result of this coercive approach, these companies embarked on ethical implementation ceremonially. One of the interviewees contends:

> "Suddenly, the general manager of the holding company ordered all subsidiary firms to implement ethics in their organizations. They formulated the code of ethics and gave it to us, telling us that one of the tasks of HR managers in subsidiary organizations is implementing this code of ethics. In fact, implementing the code of ethics of the holding company was imposed on us, and as a subsidiary, we had to take measures in this regard. We were given strict deadlines to ensure that all employees were trained on the new code and that compliance was monitored rigorously. This sudden directive caused a stir among the staff, who were already resistant to change. The lack of initial involvement and consultation with our subsidiary teams resulted in skepticism and reluctance to embrace the new ethics code."

Ethical implementation is compulsory in such organizations, and they have no internal motivation. They have to accept external demands for ethics implementation to achieve their goals. When external pressure is removed, their motivation to implement ethics is

usually decreased, and consequently, ethics institutionalization does not usually happen in these organizations.

Which challenges do organizations face in implementing a code of ethics?

Implementing codes of ethics is not an easy task. Due to the complex nature of ethics implementation, surveyed organizations face many serious challenges in implementing codes of ethics:

1. Low support by top management: Like any other cases of major organizational change, ethics implementation needs management support. The HR department or any other department that attempts to implement ethics is successful only when it can initially achieve top management support. One of the biggest challenges of surveyed organizations was the low commitment of top managers to implementing ethics. While many top executives pay lip service to the importance of ethics, they often prioritize other initiatives when it comes to allocating resources, leaving ethics implementation as a low priority.

Additionally, in many organizations, due to the process of managers and different models of strategic HR planning (Seyed Javadein et al., 2013; Molavi et al., 2013), top managers are not highly committed to respecting ethical values, and one cannot see such values in their behaviors, which can discourage employees and result in not taking ethical values seriously because of the constant contradictory messages received from top managers. An HR deputy in a surveyed company asserts:

> "Some of our top managers have appeared as big supporters of ethics in their speeches, while the same ethical values are violated in their daily interactions. For instance, our general manager is too aggressive and treats his employees authoritatively. Sometimes, his voice echos throughout the organization, while mutual respect is an important principle in our code of ethics. This blatant hypocrisy has not gone unnoticed by the employees, leading to widespread frustration and cynicism. Many feel disillusioned and question the sincerity of the organization's commitment to ethical behavior. The inconsistency between what is preached and what is practiced undermines trust and morale. Employees often feel demoralized and powerless, unable to voice their concerns without fear of retribution."

2. Improper financial situation: Implementing the code of ethics is challenging and requires broad activities and financial resources. When the organization's profitability is low, implementing a code of ethics will face problems, and organizational decision-makers will allot resources to the operations that directly impact the company's profitability. Under the circumstances in which the organization is facing a financial crisis, this challenge gets more intensive (Mohammadi et al., 2019), and initiatives to implement ethics are seen as a candidate victim for cost reductions.

> "Since we are in financial difficulties, such issues have been marginalized. Although our general manager has a positive attitude toward these issues, he cannot invest in them due to financial concerns. We would take more initiative to implement a code of ethics if we had an adequate budget. The inconsistency between stated ethical commitments and actual practices undermines trust, morale, and

> productivity, exacerbating existing organizational challenges. Without addressing these financial and ethical issues, improving the organizational culture remains a significant challenge."

3. Employees' unsupportive conceptions and attitudes: A subjective image dominating an organization's code of ethics can either facilitate or impede its implementation. In some surveyed organizations, a code of ethics is seen as a symbolic document whose primary function is to promote the organization's image for external stakeholders. Naturally, the HR department faces a serious challenge when such a view about a code of ethics dominates among managers and employees.

Another attitude that is an essential challenge in ethics implementation in organizations is the short-term vision of its managers. Implementing codes of ethics and the emergence of its results is not possible in the short term, and such an attitude is seen as a radical barrier to ethics implementation:

> "One of our main difficulties in implementing a code of ethics was that everyone asked what the impact of such an initiative would be on our loss and benefit. In our organization, in fact, managers were looking for the immediate impact of ethics implementation on profitability, and did not welcome the idea that ethics can influence profitability indirectly in the future."

Employees' attitudes toward the organization' human aspect are also essential (Safari et al., 2013). In an organization where the core of organizational activities is seen as essential, and other staff functions like HR are marginal, ethics implementation will also face problems. In such organizations, it is believed that the task of staff units like HR is to pave the way for performing main activities more efficiently. Hence, developmental activities are not seen as serious and implementing code of ethics is limited to governmental laws and regulations. In this regard, an HR manager asserts:

> "In our organization, engineering culture dominates; that is, the human aspect of the organization is not remarkably concerned, and managers do not cooperate with us since they are more focused on technical and the 'hard' aspects of the business."

What initiatives are taken by organizations to implement a code of ethics?

1. Defining and redefining code of ethics: It is too common for organizations to revisit and revise their content or development process when implementing a code of ethics. Some of these reforms include lowering the number of ethical values and principles and simplifying the language. Some principles and values in the code of ethics may not be related to employees' tasks, making their implementation impractical. An interviewee asserts:

> "An important value in our code of ethics is respecting the customer. However, some white-collar staff questioned how they could practice customer orientation when they have no direct relationship with customers. This feedback prompted us to reassess and revise the content of the code of ethics, as well as its operational definitions. We recognized that customer orientation is a holistic approach that extends beyond direct interactions. It encompasses creating policies, processes,

and services that ultimately benefit the customer, even if the impact is indirect."

Therefore, organizations may have to revise values and principles in the code of ethics to implement them.

Sometimes, formulating a code of ethics may create problems in implementing it, making it necessary to revise the formulation process. In some surveyed organizations, an up-down and non-contributive process in formulating a code of ethics was employees' main reason for not utilizing them. One interviewee contends:

> "The implementation of some of these values initially faced resistance. For instance, some operational employees expressed disagreement with the health and safety values imposed on them. They felt that an administrative department should not make decisions about their specialized work without fully understanding its intricacies. To address these concerns, we recognized the importance of involving operational employees in the decision-making process. By incorporating their insights and expertise, we aimed to bridge the gap between administrative directives and on-the-ground realities. This collaborative approach enhances the relevance and effectiveness of our health and safety measures and fosters a sense of ownership and acceptance among employees."

2. Communicating: Familiarity with the codes of ethics in different organizations has various levels. Some employees are not even aware of the existence of a code of ethics in their organizations. Some other employees are aware of it, but do not know about its contents. Others are familiar with the outlines of the code of ethics but do not know their definitions and meanings correctly. Likewise, some employees are familiar with the contents and meanings of values and principles in the code of ethics but do not know how to employ them in their job activities.

One of the initiatives of the studied organizations for implementing the codes of ethics was to communicate them through different media. Employees' familiarity with codes is a function of the depth and scope of the used media. An administrative manager asserts:

> "If you ask anyone now, you'll find that they are well-versed in the ethical values outlined in our code of ethics. This is because we have strategically displayed our values throughout the organization—in corridors, restaurants, glass partitions, rooms, and other prominent places. We also reinforce these values in meetings and presentations, ensuring they are always present in our daily operations. As a result, almost everyone has memorized them."

An HR manager says:

> "We have uploaded our organization's code of ethics on our website. However, we found that most employees have neither read nor recalled its contents. Additionally, we have not yet utilized other available media to disseminate this important information. To address this, we recognize the need for a more comprehensive and engaging approach to ensure that all employees are aware of and understand our code of ethics. This includes leveraging various communication channels such as email newsletters, internal social media platforms, and interactive training sessions."

3. Code of ethics training: In addition to the mentioned activities and due to the

importance of training plans in organizations (Mostafazadeh et al., 2016), some studied organizations used official ethics training courses to improve their managers and employees' awareness of ethical values and principles. In some studied organizations, such training is provided at the outset of entering the organization through socialization processes, while in some of them, periodical trainings are held for employees. Basically, one of the indicators of organizational commitment to ethics implementation is the amount of resources dedicated to ethics training in official courses. Hence, in organizations where internal needs have driven the organization to ethics implementation, more detailed training courses are organized for employees. An interviewed manager emphasizes:

> "Recently, we identified a significant issue: our employees were consistently demonstrating ineffective customer service skills. To address this, we required all employees to attend a comprehensive training course and taught them how to interact with customers warmly and professionally. This course covered essential customer service principles, including active listening, empathy, and effective communication. Employees learned how to create positive customer experiences by addressing customers' concerns promptly and courteously. The feedback of this training was overwhelmingly positive, with employees feeling more confident and equipped to handle customer interactions."

4. Social methods: By social methods, we mean a set of initiatives based on interpersonal relationships that are considered voluntary and unofficial. Pressure from peer groups, unofficial relations, and, more importantly, considering top management as a role model are, among other things, the methods used by the surveyed organization at a very low level. Interviewees indicate that such kinds of unofficial methods are more effective than official and compulsory ones and are more admired by employees:

> "In our company, compulsory techniques have proven ineffective, often leading to negative reactions from employees. As a result, we have shifted our focus towards implementing social and informal methods, which have yielded much better results. By fostering a more relaxed and inclusive environment, we encourage voluntary participation and genuine engagement among our employees."

5. Punishing violation and awarding compliance: Another initiative observed in the studied organizations for implementing codes of ethics was to raise the salary of employees adhering to ethical values and decrease the salary of those who do not. Ethical values and principles can also be incorporated into performance appraisal criteria and organizational justice frameworks (Sadeghi et al., 2013b). Additionally, ethics-related criteria are used in selecting distinguished employees, which is considered as an award. Another initiative conducted limitedly is to admonish those employees who have not respected ethical values well. More intensive punishments include firing the violator, even though it is rarely conducted. In most of the studied organizations, efforts to punish violations and reward compliance remain limited.

> "One of our weaknesses in implementing a code of ethics is that it is not performed seriously. Those who breach the code of ethics are not much different from those

> who respect it. Consequently, employees lose their motivation. However, in my previous organization, outstanding awards were given to those who acted based on the code of ethics, and at the same time, the violators were treated seriously; some employees were even fired for breaching the code."

What are the consequences of such initiatives?

1. Improving organization's ethical climate: As expected, the most important outcome of implementing a code of ethics is the improved ethical climate of the organization. However, only a minority of the studied organizations reported achieving such results. Many surveyed organizations continue to encounter significant challenges in implementing their codes of ethics and their initiatives often fail to yield the desired results.

In organizations that have successfully implemented a code of ethics, the improvement in the organization's ethical climate can be observed. In such organizations, ethical violations are mitigated, and employees' behavior is integrated. It means that all employees have common conceptions of ethical values and principles and express similar behaviors in similar situations due to such common understanding. Likewise, the problems the organization had addressed in implementing a code of ethics would be resolved. At best, ethical values become a part of organizational life, and employees unconsciously behave based on ethical values.

2. Identity building: If organizational efforts to implement a code of ethics are successful, one of their fruits is achieving a distinguished identity that distinguishes the organization and its employees from other organizations. This is an interesting finding since it indicates that organizations can impact their employees' personalities and demeanor even outside the organization. One interviewee asserts:

> "A taxi driver shared with us that your employees are truly distinguished, and there is a noticeable difference between them and others. One can observe genuine humility in their behavior. For instance, they choose to sit in the front seat and converse with us, unlike others who often behave differently. This behavior reflects your organization's strong ethical culture and values."

As this evidence indicates, organizational members are recognized and distinguished by their institutionalized values from others. The organizational image of customers and other external stakeholders can be improved in this manner.

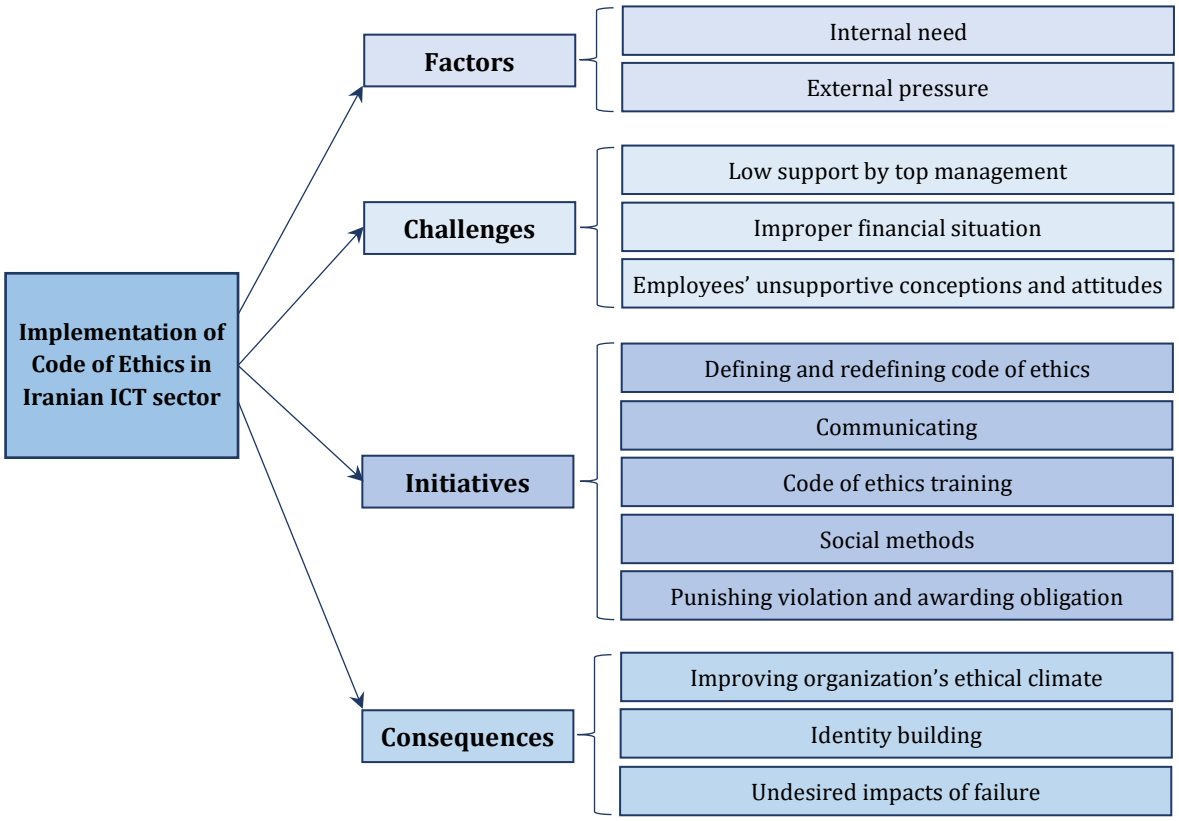
3. Undesired impacts of failure: The data also revealed that efforts to implement ethical values can sometimes result in negative outcomes. One of these outcomes is the loss of financial resources in the case of project failure. Implementing a code of ethics is costly and huge, and financial resources would be wasted if it fails.

As mentioned before, the employees' conceptions and attitudes toward the code of ethics are essential to implement it. If a company fails in the implementation of a code of ethics, a vicious cycle is created in which the negative attitude toward ethics implementation further impedes implementation efforts:

> "Our past experiences with implementing codes of ethics have led to a pervasive sense of pessimism about such initiatives. In the past, we invested significant

amounts of money without seeing any tangible results. This negative experience has become a significant barrier to implementing codes of ethics effectively. However, learning from these experiences can guide us in creating a more effective ethics program. By analyzing our mistakes, we can identify key areas for improvement and develop strategies that ensure better outcomes. This might include establishing clear goals, enhancing communication and training, and fostering a culture of accountability and transparency."

Fig. 2.
View of code of ethics Tree



(Source: Researcher's Findings)

Discussion and Conclusion

The present paper explores the implementation of the code of ethics in 12 ICT companies through GT. On this basis, it was clarified that organizations implement codes of ethics for two significant reasons: internal need and external pressure. Such organizations face many challenges, including low top management support, improper financial situations, and employees' unsupportive conceptions and attitudes. To implement a code of ethics, surveyed organizations take initiatives such as defining and redefining the code of ethics, communicating, training code of ethics, punishing violations, and awarding obligations and social methods. Also, the outcomes of implementing the code of ethics were identified in these 12 companies.

By improving the understanding of this phenomenon, one can implement codes of ethics more effectively. The findings of this paper are comparable with previous research

and theories in the field. On this basis, the role of external pressure in driving organizations to implement codes of ethics is consistent with Stohl, Stohl, and Popova (2009), who emphasized the marketing and legitimizing function of a code of ethics, as well as with the business ethics legitimacy theory which focuses on the legitimizing role of organizational ethical initiatives (Dominguez et al., 2009).

Likewise, the effects of internal needs and the capability of a code of ethics to resolve operational difficulties are consistent with the instrumental theory of business ethics (Dominguez et al., 2009), which emphasizes the impact of business ethics on organizational performance and profitability.

Other findings of this paper have also been addressed in the literature. Significant among these is the critical role of top management support (Rezaee et al., 2001), the influence of an organization's financial status on developmental activities (Cohen et al., 1992), and attitudes toward code of ethics (Schwartz, 2001). Other significant elements are the necessity of employee participation (Wood & Rimmer, 2009; Svensson & Wood, 2009), clearly defining expected behaviors (Trevino & Brown, 2004; Lere & Gaumnitz, 2007), and effectively communicating principles and values to stakeholders (Kaptein & Dalen, 2000; Chonko et al., 2003). Social methods and norms (Adam & Rachman-Moore, 2004; Zakaria et al., 2012), the impact of code of ethics on organizational ethical climate (Somers, 2001; McKinney et al., 2010) and their role in identity building and distinction (Zolingen & Honders, 2010) are also highlighted. The study emphasizes that implementing a code of ethics is complicated and challenging, influenced by numerous factors. This paper attempted to provide a better understanding of this phenomenon and serves as a guide to implementing codes of ethics.

Several practical measures can be taken to address the ethical challenges in implementing a code of ethics in ICT companies. First, enhancing top management support is crucial; this can be achieved through regular communication, involvement in ethics training, and leading by example. Improving financial stability is also essential, as financial constraints can hinder ethical practices; this involves better financial planning and integrating ethical considerations into financial decisions. Fostering positive employee attitudes towards the code of ethics is important and can be facilitated through workshops, feedback sessions, and creating a culture of openness and trust. Clearly defining and effectively communicating the code of ethics to all stakeholders, using various channels such as meetings, emails, and internal portals is necessary. Regular training and education on ethical standards should be implemented to keep employees informed and address emerging issues. Enforcing and rewarding ethical behavior through monitoring compliance, audits, and recognition programs can reinforce positive actions. Social methods and norms, such as peer influence and accountability, can promote ethical behavior. Finally, adapting to external pressures by staying responsive to regulatory requirements and market expectations and regularly updating the code of ethics ensures its relevance and effectiveness. By implementing these measures, ICT companies can create a more robust and effective ethical framework.

Future Research Direction and Limitations

Based on the insights from the study's findings, limitations, and methodological approach, here are some well-aligned suggestions for future research:

- In contrast to the hypothetic-deductive approach in which existing theories and hypotheses are tested, in GT, theories and hypotheses are generated. In other words, we focused on the context of discovery in this research. Hence, in future studies, researchers can test the findings of this study empirically. Conducting similar studies in different organizations in different sectors and industries can also improve current knowledge on implementing a code of ethics and can pave the way for developing a formal theory.

- Another recommendation is to study the effectiveness of various code implementation methods so that organizations can implement a code of ethics more effectively and rigorously. Studying more about the leading attitudes or obstacles to implementing a code of ethics and the methods of creating a positive attitude in managers and employees are also areas that need more research. The present paper indicates that attempts to implement a code of ethics may have negative outcomes for the organization. Future studies can investigate possible negative outcomes, their causes, and how to prevent them.

- Empirical Testing of Generated Hypotheses: Since this study used GT to generate new insights, future research could adopt a hypothetic-deductive approach to empirically test these findings. This could involve examining how the proposed drivers, challenges, and outcomes of implementing a code of ethics hold in various organizational contexts and through quantitative or mixed methods.

- Sectoral and Cross-Industry Comparisons: Expanding research beyond ICT companies in the Tehran Stock Exchange to other sectors (e.g., healthcare, finance, or manufacturing) could help explore how industry-specific factors impact the adoption and effectiveness of a code of ethics. Such comparative studies could reveal industry variations in ethical climate and the role of regulatory pressures.

- Evaluation of Code Implementation Methods: To enhance the rigor and effectiveness of ethical codes, future studies could compare various code implementation methods, such as mandatory training, ethical committees, digital monitoring tools, or reward and punishment systems. Examining the effectiveness of these approaches across different contexts could provide a more prescriptive understanding of best practices.

- Investigation of Attitudes and Obstacles: Given that management and employee attitudes can significantly influence ethical compliance, more research is needed to identify key obstacles to positive ethical attitudes and strategies to shift them. Studies could explore interventions like leadership modeling, change management programs, and communication techniques to foster supportive attitudes.

- In-depth Exploration of Negative Outcomes: Since unsuccessful code implementations may lead to negative consequences, future research could investigate specific adverse effects, such as employee distrust, demotivation, or ethical blind spots. These studies could identify common causes and strategies to mitigate these outcomes.

- Enhancing Access to Sensitive Data in Qualitative Research: The study highlights a major limitation in accessing sensitive organizational data. Research exploring methods to address these access challenges—such as building trust with participants, using anonymization techniques, or developing confidential data-sharing agreements—could benefit other GT and qualitative studies.

- Improving Familiarity with Qualitative Research: Given participants' unfamiliarity with qualitative methods, further research could focus on training programs or participatory research approaches to engage stakeholders in the qualitative research process. This could enhance data richness and improve understanding of qualitative findings among stakeholders.

- Developing Analytical Generalizability: Since GT emphasizes analytical rather than statistical generalizability, future studies could focus on transferring insights from this study to diverse organizational contexts through case studies or comparative qualitative analyses. This approach would refine the study's generated concepts and categories, broadening our understanding of ethical code implementation across various environments.

Qualitative research, despite its invaluable contribution to understanding the depth and richness of human experiences and social phenomena, has several limitations. One of the main drawbacks is its time-consuming nature; collecting and analyzing qualitative data often requires significant time and effort, making it less efficient than quantitative methods. Additionally, the researcher's subjectivity and interpretations can influence the data collection and analysis processes, leading to questions about the reliability and validity of the findings. Another limitation is the difficulty in generalizing results; qualitative research typically involves small, non-random samples that may not be representative of the larger population. Furthermore, the lack of statistical significance poses challenges in quantifying findings or establishing causality. Despite these limitations, qualitative research remains a powerful tool for exploring complex issues and generating rich, detailed insights that quantitative methods might overlook .We have also faced limitations in this study. According to Lock (2001), the most crucial limitation for organization and management scholars in using GT is to access data collection units. In GT, emerging concepts and categories should determine which data and where it should be gathered. Accessibility limitation means that researchers usually do not have free access to needed data. We faced the same limitation in this study. Some secondary data on the code of ethics were not provided to the author due to their sensitivity and confidentiality. Also, unlike many quantitative researches that have been conducted on Tehran Stock Exchange companies (Nourahmadi et al., 2023; Nourahmadi et al., 2022; Rasti & Sadeqi, 2021), this article has a qualitative approach that was somewhat strange to the participants. For this reason, although they have sufficient historical quantitative data in their companies, they were not familiar enough with qualitative research, and it was very difficult to conduct interviews.

Another point is the generalizability of the present findings. Since the present study is

conducted in ICT organizations, the generalizability of the achieved findings is limited. However, one should note that in GT, statistical generalization of findings is not so important, but a more important criterion is analytical generalizability (Lock, 2001). This means that in GT, it is not necessary to generalize findings to a greater population; instead, it should provide concepts, categories, and relations that help us better understand similar phenomena in different contexts.

REFERENCE

Adam, M. A, & Rachman-Moore, D. (2004). The Methods Used to Implement an Ethical Code of Conduct and Employee Attitudes. *Journal of Business Ethics, 54*(3), 225–244. https://doi.org/10.1007/s10551-004-1774-4.

Babri, M., Davidson, B., & Helin, S. (2021). An Updated Inquiry into the Study of Corporate Codes of Ethics: 2005–2016. *Journal of Business Ethics,* 168, 71–108. https://doi.org/10.1007/s10551-019-04192-x.

Chonko, L. B, Wotruba, T. R., & Loe, T. (2003). Ethics Codes Familiarity and Usefulness: Views on Idealist and Relativist Managers under Conditions of Turbulence, *Journal of Business Ethics 42*(3), 237–252. https://doi.org/10.1023/A:1022261006692.

Cohen, J. R., Pant, L. W., & Sharp, D. J. (1992). Cultural and Socioeconomic Constraints on International Codes of Ethics: Lessons from Accounting, *Journal of Business Ethics, 11*(9), 687-700. https://doi.org/10.1007/BF01686349.

Danaeefard, H., Mostafazadeh M., & Sadeghi, M. R. (2014). Exploring and Analyzing the Consequences of National Silence in Political Systems. *Journal of Public Administration Perspective, 5*(18), 15-45.

Danaeefard, H., Sadeghi, M. R., & Mostafazadeh, M. (2015). Exploring and Analyzing the Consequences of Politicization of the Bureaucracy in Political Systems. *Strategic Management Thought, 9*(2), 57-86. https://doi.org/10.30497/smt.2015.1863.

Dominguez, L.R, Alvarez, I.G, & Sanchez, I. M. G. (2009). Corporate Governance and Codes of Ethics. *Journal of Business Ethics, 90*(2), 187–202. http://dx.doi.org/10.1007/s10551-009-0035-y.

Duong, H. K., Fasan, M., & Gotti, G. (2022). Living up to your codes? Corporate codes of ethics and the cost of equity capital. *Management Decision, 60*(13), 1-24. https://doi.org/10.1108/MD-11-2020-1486.

Farrell, B. J., Cobbin, D. M., & Farrell, H. M. (2002). Can Codes of Ethics Really Produce Consistent Behaviors? *Journal of Managerial Psychology, 17*(6), 468–490. http://dx.doi.org/10.1108/02683940210439397.

Frostenson, M., Helin, S., & Sandström, J. (2012). The internal significance of codes of conduct in retail companies, *Business Ethics: A European Review, 21*(3), 263-275. https://doi.org/10.1111/j.1467-8608.2012.01657.x.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Routledge

Hedayati, A. M. (2011). *A comparative analysis of the contents of Codes of ethics in Iranian and Turkish top organizations,* Master's thesis, University of Tehran, Tehran, Iran.

Ho, C. MF., & Oladinrin, O. T. (2019). A paradigm shift in the implementation of ethics codes in construction organizations in Hong Kong: Towards an ethical behaviour. *Science and Engineering Ethics,* 25, 559-581. https://doi.org/10.1007/s11948-018-0026-4.

Jose, A., & Thibodeaux, M.S. (1999). Institutionalization of Ethics: The Perspective of Managers. *Journal of Business Ethics, 22*(2), 133–143. https://doi.org/10.1023/A:1006027423495.

Kaptein, M., & Dalen, J.V. (2000). The Empirical assessment of Corporate Ethics: A Case Study. *Journal of Business Ethics, 24*(2), 95-114. http://dx.doi.org/10.1023/A:1006360210646.

Komić. D., Marušić. S. L., & Marušić, A. (2015). Research Integrity and Research Ethics in Professional Codes of Ethics: Survey of Terminology Used by Professional Organizations across Research Disciplines. *PLOS one, 10*(7), e0133662. https://doi.org/10.1371/journal.pone.0133662.

Kountouridou, M., & Domic, D. (2022). The Impact of a Positive Visualisation Course in Brand Identity on Freshmen Students' Perceptions of University Brand Image. *Interdisciplinary Journal of Management Studies (Formerly known as Iranian*

Journal of Management Studies), 15(4), 945-962. https://doi.org/10.22059/ijms.2022.326021.674612.

KPMG (2008). Business Codes of the Global 200: Their Prevalence, Content and Embedding (KPMG, The Netherlands).

Lartey, F. M. (2021). Integrity-based and Compliance-based Ethics Programs: A Critical Analysis of Key Differences. Inte*rnational Journal of Economics, Business and Management Research, 5*(5), 43-53.

Leidner, D. E., Gonzalez, E., & Koch, H. (2018). An affordance perspective of enterprise social media and organizational socialization. *Journal of Strategic Information Systems, 27*(2), 117–138. https://doi.org/10.1016/j.jsis.2018.03.003.

Lere, J. C., & Gaumnitz, R. B. (2007). Changing Behavior by Improving Codes of Ethics, *American Journal of Business, 22*(2), 7-18. https://doi.org/10.1108/19355181200700006.

Lock, D. K. (2001). *Grounded Theory in Management Research*. London: Sage Publications.

Loughran, T., McDonald, B., & Otteson, J. R. (2022). How Have Corporate Codes of Ethics Responded to an Era of Increased Scrutiny? *Journal of Business Ethics*, *183*(4). https://doi.org/10.1007/s10551-022-05104-2.

Marvasti, A. B. (2004). *Qualitative Research in Sociology*. London: Sage Publications.

McKinney, J. A., Emerson, T. L., & Neubert, M. J. (2010). The Effects of Ethical Codes on Ethical Perceptions of Actions Toward Stakeholders. *Journal of Business Ethics, 97*(4), 505-516. http://dx.doi.org/10.1007/s10551-010-0521-2.

Mohammadi, A., Mosleh Shirazi, A., Abbasi, A., & Akhlaghpour, S. (2019). Simulating the Linguistic Variables Interactions in Capital Market Development Process Using Fuzzy Inference System in a System Dynamic Context. *Financial Management Strategy, 7*(2), 229-261. https://doi.org/10.22051/jfm.2019.21647.1755.

Molavi, M., Sadeghi, M. R., & Moradi Shirazi, S. A. (2013). Surveying on Different Models of Strategic Human Resource Planning and ranking of them Based on VIKOR and AHP Methodology. *International Journal of Economy, Management and Social Sciences*, *2*(6), 310-317.

Mostafazadeh, M., & Sadeghi, M. R. (2014). Designing the Model of Social Capital Development in Universities and Higher Education Centers. *Social Capital Management*, *1*(2), 161-182. https://doi.org/10.22059/jscm.2014.53460.

Mostafazadeh, M., Sadeghi, M. R., & Tahmasebi, R. (2016). Typology of Employees' Subjectivities in Public Organizations about Training: Research Based on Q Method. *Organizational Culture Management*, *14*(3), 721-744. https://doi.org/10.22059/jomc.2016.58899.

Nijhof, A., Cludts, S., Fisscher, O., & Laan, A. (2003). Measuring the Implementation of Codes of Conduct. An Assessment Method Based on a Process Approach of the Responsible Organisation. *Journal of Business Ethics, 45*(1-2), 65-78. http://dx.doi.org/10.1023/A:1024172412561.

Nourahmadi, M., Rasti, F., & Sadeqi, H. (2022). A Comparative Approach to Financial Clustering Models: (A Study of the Companies Listed on Tehran Stock Exchange). *Iranian Journal of Finance, 6*(4), 31-55. https://doi.org/10.30699/ijf.2022.303980.1267.

Nourahmadi, M., Rasti, F., & Sadeqi, H. (2023). The Art of Investment Portfolio Curation through Centrality Metrics (An Enchanting Network Analysis of Tehran Stock Exchange's Top 50 Companies). *Budget and Finance Strategic Research, 4*(4), 35-61. https://dorl.net/dor/20.1001.1.27171809.1402.4.4.2.8.

O'Dwyer, B., & Madden, G. (2006). Ethical Codes of Conduct in Irish Companies: A Survey of Code Content and Enforcement Procedures. *Journal of Business Ethics, 63*(3), 217–236. http://dx.doi.org/10.1007/s10551-005-3967-x.

Rasti, F., & Sadeqi, H. (2021). Development of Financial Networks Based on Cointegration

Concept (A Study on Tehran Stock Exchange). *Financial Engineering and Portfolio Management, 12*(46), 235-254. https://dorl.net/dor/20.1001.1.22519165.1400.12.46.10.6.

Remišová, A., & Lašáková, A. (2012). On the Risk of Implementation of Codes of Ethics in Academic Environment. *Societal Studies, 4*(1), 61–74. http://dx.doi.org/10.1007/s10551-005-3967-x.

Rezaee, Z., Elmore, R.C., & Szendi, J.Z. (2001). Ethical Behavior in Higher Educational Institutions: The Role of the Code of Conduct. *Journal of Business Ethics, 30*(2), 171–183. http://dx.doi.org/10.1023/A:1006423220775.

Sadeghi, M. R., Moghimi, M. S., & Ramezan, R. (2013a). Identifying and prioritizing effective constructs in readiness of knowledge management implementation by using fuzzy analytic hierarchy process (AHP). *Journal of Knowledge-based Innovation in China, 5*(1), 16-31. https://doi.org/10.1108/17561411311320941.

Sadeghi, M. R., Musavi, S. M., Samiie, S., & Behrooz, A. (2013b). Developing Human Resource Productivity through Organizational Justice. *Journal of Public Administration and Governance, 3*(2), 173-190. https://doi.org/10.5296/jpag.v3i2.3575.

Safari, H., Moradi–Moghadam, M., Soleimani Sarvestani, M. H., & Fathi, M. R. (2013). Assessing process maturity by EFQM and maturity models and ranking by similarity-based approach. *Journal of Applied Sciences Research, 9*(3), 1875-1883.

Seyed Javadein, S. R., Fathi, M. R., Behrooz, A., & Sadeghi, M. R. (2013). Human Resource Manager Selection Based on Logarithmic Fuzzy Preference Programming and TOPSIS Methods. *International Journal of Human Resource Studies, 3*(2), 14-27. https://doi.org/10.5296/ijhrs.v3i2.3591.

Schwartz, M. (2001). The Nature of the Relationship between Corporate Codes of Ethics and Behaviour. *Journal of Business Ethics, 32*(3), 247–262. http://dx.doi.org/10.1023/A:1010787607771.

Sharifikia, I., Khoshnood, Z., Hosseinnejad, A., Farokhzadian, J., & Rohani, C. (2024). Exploring a guide for codes of ethics for the development of ethical competence in Iranian nursing students: a systematic review and meta-synthesis. *BMC Nursing,* 23, 519. https://doi.org/10.1186/s12912-024-02208-0.

Simbar, M., Kiani, Z., Nazarpour, S. (2023). Development and validation of the code of ethics for midwives in Iran. *BMC Medical Ethics,* 24, 76. https://doi.org/10.1186/s12910-023-00963-4.

Somers, M. J. (2001). Ethical Codes and Organizational Context: A Study of the Relationship between Codes of Conduct, Employee Behavior and Organizational Values. *Journal of Business Ethics, 30*(2), 185–195. https://doi.org/10.1023/A:1006457810654.

Stevens, B. (2008). Corporate Ethical Codes: Effective Instruments for Influencing Behavior. Journal *of Business Ethics, 78*(4), 601-609. https://doi.org/10.1007/s10551-007-9370-z.

Stohl, C., Stohl, M., & Popova, L. (2009). A New Generation of Corporate Codes of Ethics. *Journal of Business Ethics, 90*(4), 607–622. https://doi.org/10.1007/s10551-009-0064-6.

Strauss, A. L. (1987). *Qualitative Analysis for Social Scientists*. New York: Cambridge University Press.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theor*y, Sage Publications: London.

Svara, J. (2007). *Ethics Primer for Public Administrators and Nonprofit Organizations*. Sudbury, Massachusetts: Jones and Bartlett publishers.

Svensson, G., & Wood, G. (2009). Implementation, Communication and Benefits of Public Sector Codes of Ethics: A Longitudinal Study of Sweden. *International Journal of Public Sector Management, 22*(4), 364-379. https://doi.org/10.1108/09513550910961637.

Transparency International. (2014). *Corruption Perception Index*. Berlin: Germany.

Trevino, L. K., & Brown, M. E. (2004). Managing to Be Ethical: Debunking Five Business Ethics Myths. *Academy of Management Executive, 18*(2), 69–81. http://dx.doi.org/10.5465/AME.2004.13837400.

Webley S., & Werner, A. (2008). Corporate Codes of ethics: necessary but not sufficient, *Business Ethics: A European Review, 17*(4), 405-415. http://dx.doi.org/10.1111/j.1467-8608.2008.00543.x.

Willig, C. (2008). *Introducing Qualitative Research Methods in Psychology (Second Edition).* Maidenhead: McGraw Hill/Open University Press.

Wood, G., & Rimmer, M. (2003). Codes of ethics: What Are They Really and What Should They Be? *International Journal of Value-Based Management, 16*(2), 181-195. https://doi.org/10.1023/A:1024089509424.

Wood, G., Svensson, G., Singh, J., Carasco, E., & Callaghan, M. (2004). Implementing the ethos of corporate Codes of ethics: Australia, Canada, and Sweden, *Business Ethics: A European Review, 13*(4), 389-403. https://doi.org/10.1111/j.1467-8608.2004.00378.x.

Yin, R. K. (2017). *Case study research: Design and methods*, CA: Sage Publications.

Zakaria, M., Garanca, Z., & Sobeih, A. (2012). Cultural and Legal Challenges in Implementing Code of Conduct in Supply Chain Management of Mobile Phone Industries: Sony Ericsson Case Study. *Social Responsibility Journal, 8*(2), 227- 241. http://dx.doi.org/10.1108/17471111211234851.

Zolingen, S. J., & Honders, H. (2010). Metaphors and the Application of a Corporate Code of Ethics*. Journal of Business Ethics, 92*(3), 385–400. https://doi.org/10.1007/s10551-009-0163-4.

Developing an E-Governance Performance Evaluation Model in Developing Countries (A Delphi Study in Iran)

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ABSTRACT

In the contemporary era, information and communication technology (ICT), through the framework of e-governance, has played a significant role in the advancement and development of various societies. The success of e-governance requires ensuring the effective implementation of e-governance development programs in government-affiliated executive agencies and aligning these programs across all dependent sectors. Accordingly, this study aims to develop a performance evaluation model for e-governance in developing countries. From a purpose perspective, this research is applied, and in terms of data collection method, it falls under qualitative research. The statistical population includes experts in information technology, strategic planning, and public administration. The findings of the research reveal that the main dimensions of the e-governance performance evaluation model are e-administration, e-society, e-citizen, and e-services. This comprehensive model introduces a novel perspective for advancing e-governance in the country. This paper aims to propose a model for evaluating the performance of E-governance in Iran. "Governance" refers to the interactions between government and its broader environment, encompassing political, social, and administrative dimensions. E-governance, or "electronic governance," involves leveraging ICTs at various levels of government and the public sector, as well as beyond, to improve governance processes. Since the application and implementation of E-governance vary across countries, the methods for evaluating it also differ. This study seeks to gather expert consensus on assessing E-governance in Iran, employing the Delphi technique—a research method that collects expert opinions through a series of structured questionnaires. After a brief overview of E-governance and evaluation concepts, the paper presents a model for evaluating the performance of E-governance in Iran. This model, developed through a thorough investigation, introduces a novel perspective on advancing E-governance in the country.

KEYWORDS

Delphi Technique, Developing Countries, E-Governance, Iran, Performance Evaluation.

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Introduction

The primary role of government is to guide society toward achieving the public interest. Governance, as described by Bedi et al. (2001), refers to the connections between the government and its broader environment, including political, social, and administrative dimensions (Shaxnoza, 2024). Sheridan and Riley (2006) define E-governance as a more comprehensive concept that encompasses the entire spectrum of relationships and networks within government regarding the use and application of ICTs, whereas E-government focuses more narrowly on the development of online services. According to this study, E-government represents an institutional approach to political operations within a jurisdiction, while E-governance adopts a procedural approach, emphasizing cooperative administrative relations. This includes establishing fundamental and standardized procedures within the framework of public administration. As Rhodes (2000) noted, E-governance ultimately results in a transformed state of codified governance, a new governing process, or an innovative method by which society is governed.

Despite the fact that many countries utilize control and governance approaches to achieve e-government objectives, significant challenges persist, particularly in developing countries (Abdulnabi, 2024).

Nowadays, many countries focus on controlling approaches and governance aspects to achieve excellence and development via E-governance. In reality, numerous concerns have been raised regarding the benefits of e-governance failing to reach the intended beneficiaries, especially within the context of developing countries (Suri & Sushil, 2017; Klijn *et* al., 2016; Meyerhoff, 2016; UN, 2014). Each country, according to its priorities and attributes, developed special investigations and proper models to cover their charters and obtain requirements regarding their unique aspects (Pintea, 2012; Dash *et* al., 2016; Sangeetha & Rao, 2016).

E-governance provides a transformative approach, enhancing government processes, fostering citizen engagement, and strengthening interactions with and within civil society. It reshapes the relationship between citizens and governments while influencing how citizens connect. Each country's distinct and unique circumstances necessitate a tailored performance model for E-governance (Klijn et al., 2016; Singh, 2013; Navarra, 2007; Allen et al., 2001; Pathak et al., 2007; Sheila, 2005; Pina et al., 2007; Zhang, 2006). The benefits of E-governance can manifest as operational improvements, translating into measurable financial returns (e.g., saving time, effort, and resources), political advancements (such as increased participation, broader democratic engagement, and greater empowerment), and relational improvements through enhanced connections, cooperation, and partnerships between groups (Butt, 2022). Additionally, E-governance offers intangible benefits, including an improved public perception of government (Heeks, 2006; Csetenyi, 2000; Backus, 2001; Stiglitz et al., 2000; Lenk & Traunmuller, 2000; Aichhlozer & Schmutzer, 2000; Allen et al., 2001).

E-governance delivers government services to citizens conveniently, efficiently, and

transparently, providing essential tools and mechanisms for transitional societies to hold both policymakers and service providers accountable for delivering continuous services. It also enables the public sector to ensure citizens receive information tailored to their needs (Pandey, 2023). Ultimately, it contributes to achieving a simple, ethical, responsible, accountable, transparent, efficient, and effective government. For this reason, the development of any country is now dependent on adopting e-governance and penetrating it in various societies (Umbach & Tkalec, 2022).

While many societies have moved toward adopting this approach, practical outcomes—particularly in developing countries—have been limited (Gavriluță et al., 2022). Moreover, e-governance assessment of each country depends heavily on its specific context and conditions. In developing nations, where the level of growth and development in IT infrastructure varies significantly, there is a need for evaluation models tailored to the local conditions of each country (Lee et al., 2022).

Accordingly, examining and evaluating e-governance development is among the most pressing issues for any nation. However, evidence suggests that a comprehensive study on e-governance evaluation, considering the country's cultural context and local conditions has not yet been conducted. Therefore, the present study seeks to develop a performance evaluation model for e-governance tailored to the country's specific context.

This paper presents the findings of research aimed at developing a model for evaluating E-governance performance in Iran, conducted using the Delphi technique. The study begins with a review of the concept of E-governance and the definition of evaluation, followed by an exploration of key characteristics required for E-governance evaluation models. Through a three-round Delphi method involving 15 experts in each round, the research identifies the most suitable conditions for designing this model

Literature Review

E-Governance

Governance, in theory, encompasses a broad spectrum of issues, including administrative reforms, national development policies, democratization, decentralization, corruption, and collaborations among the public, private, and third sectors (Turner et al., 2015). When governance evolves into E-governance—where all government functions such as internal processes, policy-making, decision-making, and service delivery are conducted electronically—it can significantly alter control domains and transactional interactions (Margetts & Dunleavy, 2002). According to UNESCO, E-governance involves the public sector's use of ICTs to enhance service and information delivery, promote citizen participation in decision-making, and ensure greater government accountability, transparency, and efficiency. E-governance introduces new dimensions of citizenship by redefining citizen needs and responsibilities, aiming to engage, enable, and empower individuals (Shailendra et al., 2007).

E-governance initiatives are widespread globally due to their potential to create more citizen-focused governments while reducing operational costs (Saxena, 2005). For

developing countries seeking to leverage ICTs for effective governance, adopting "intelligent intermediaries" during the early stages of E-government implementation is recommended. These intermediaries act as human facilitators between citizens and digital infrastructure, ensuring broad access to government services. Such intermediaries can include existing professionals, public servants, NGOs, or community-based organizations that integrate diverse ICT channels to deliver E-government services effectively (Suri & Sushil, 2017; APT, 2012).

E-governance involves using electronic methods to (1) facilitate interactions between government, citizens, and businesses and (2) streamline internal government operations, enhancing democratic processes and the efficiency of governance and business. Information technology (IT) enables organizations to boost revenue while reducing the need for middle management and clerical roles, a phenomenon often referred to as the "flattening" of organizations (Backus, 2001; Zwahr et al., 2005).

In conclusion, the potential of E-governance is, at least theoretically, immense. Its benefits encompass improved operational efficiency and reduced time, effort, and material resource utilization while maintaining or increasing output through automation, digitalization, and process transformation. Additionally, E-governance enhances operational effectiveness by introducing new and improved services, increasing user convenience and satisfaction, and reengineering processes related to leadership and decision-making.

E-Governance in Developing Countries

Most public sector reforms in developing countries are carried out by external organizations such as the World Bank (Kuzior et al., 2023). As a result of these interventions, many developing countries have faced significant pressure, leading to considerable challenges in their administrative systems. Public administration in these countries has remained bureaucratic and centralized (Mykhalchenko, 2022).

In many developing nations, public sector reforms were primarily driven by external forces, particularly institutions like the World Bank and other international donors (McGill, 1997). However, certain countries, such as Turkey, did not face significant pressure to adopt these reforms (Sozen & Shaw, 2002). As a result, despite economic restructuring efforts in countries like India, public administration in developing nations often remained deeply bureaucratic and highly centralized (Saxena, 2005).

A notable distinction between E-governance in industrialized and developing countries lies in the availability of ICT infrastructure. In industrialized nations, the E-governance movement was largely spurred by Internet technology, enabling cost-effective and remote access to government services. However, these countries already had ICT systems for internal government operations. Conversely, in developing countries, ICT usage within the public sector was minimal, resulting in limited or virtually non-existent ICT infrastructure (Bhatnagar & Bjorn-Andersen, 1990; Yong & Koon, 2003; Klijn et al., 2016). Consequently, the initial phase of E-government in these nations centered on digitizing internal operations and services.

However, E-governance is not a quick solution for achieving economic growth, reducing budgets, or establishing clean and efficient governance. Instead, it represents a gradual and often challenging process that entails financial and political costs and risks (Abdulnabi, 2024; Working Group on E-Government in the Developing World, 2002). These risks can be substantial (Heeks, 2003). Consequently, poorly planned and executed E-government initiatives risk squandering resources, failing to provide valuable services, and heightening public dissatisfaction with the government. Additionally, E-government efforts in developing countries must consider their unique circumstances, requirements, and challenges.

Evaluation and Governance

Evaluation

Over the past three decades, there have been significant theoretical and methodological advancements in evaluation. The primary goal of evaluation is to assess the quality of a program by forming a judgment (Hurteau et al., 2009). It involves collecting, analyzing, and documenting information regarding the value of an object for the organization. Evaluation is considered crucial for every organization, as it is widely recognized that all projects or initiatives carry different levels of risk (Wu & Guo, 2015; Elkadi, 2013). Evaluation is scientifically valuable across various disciplines, providing key insights for decision-making in fields like administration, psychology, and political science (Kanchanawasee, 1994; Mahapoonyanont et al., 2012):

- **Administration**: The findings can serve as tools for administrators to manage and track work performance, ensuring it aligns with effective and efficient plans.
- **Psychology**: Evaluation can function as a method to stimulate interest and raise awareness among workers.
- **Political Science**: Evaluation can be used as a means of ensuring accountability and as a strategy to garner public support.

The American Evaluation Association has established a set of guiding principles for evaluators. The sequence of these principles does not suggest any hierarchy, as their importance may differ depending on the situation and the evaluator's role. The principles are as follows:

- Systematic inquiry
- Competence
- Integrity / Honesty
- Respect for individuals
- Responsibility for the broader and public good

Although the terms "evaluation" and "assessment" share significant similarities, it is essential to distinguish between them. Assessment refers to reviewing data about something or someone from various sources to improve current performance. In contrast, evaluation involves making judgments about the performance of something or someone by measuring it against established standards.

E-governance is an innovative approach to managing a country, grounded in specific indicators and criteria. It seeks to examine performance in the current state using defined standards, avoiding subjective judgments. In this context, the term "governance evaluation" has been adopted (Umbach & Tkalec, 2022)

E-Governance Performance Evaluation

Just like the definition of E-governance, E-governance evaluation does not have a unique definition. It should be characterized according to each country's particular situation and requirements (Madon, 2004; UNDP[1]; Suri & Sushil, 2017). In line with the UN's[2] definition of E-government as an innovation in the public sector, E-governance can be seen as a process of innovation management within the public sector. Since 2001, various UN departments have developed their criteria for evaluating E-governance (Devendra, 2010).

Developing countries face numerous challenges during the implementation of E-governance. These challenges span political, social, economic, and technological sectors (Alam & Hassan, 2011). The first step in measuring E-governance is evaluating information infrastructure availability, which includes access to computers, the Internet, and networks within government institutions. Additionally, the extent to which ICT is integrated into governmental activities for internal purposes, such as communication, data collection, storage, and resource management, should be assessed (Georgiadou et al., 2006; i4donline).

E-governance must be measurable, transparent, and observable (Shaxnoza, 2024).

E-governance initiatives and service levels must be measurable, visible, and transparent, allowing progress to be tracked through benchmarking and effective monitoring and evaluation (MoUD, 2010).

Emphasis should be placed on critical aspects such as E-procurement and E-transactions. Government functions can be broken down into several components: the leadership responsible for E-governance, the infrastructure, the data systems, the preparedness level of each government, and knowledge sharing of best practices and resolving conflicts related to implementing E-governance projects. These elements should work to improve the conditions for E-governance in each country, supporting the National E-governance Plan's goal of delivering reliable, cost-effective, and transparent citizen services by applying international best practices and guidelines (DIT, 2010). Therefore, the following questions should be considered when evaluating the quality of the process:

- Do respondents interpret the same terms in the same way?
- Are the scales and scoring mechanisms consistent?
- Is there equivalence in constructs, structure, measurement, and scale?
- How do people understand the concept of "Trust" (Madon, 2004)?

In E-governance evaluation, several key characteristics must be considered, including

1. The United Nations Development Programme *(*UNDP*)*
2. United Nations

E-services, infrastructure, data/information, cost savings, service transformation, human resource development, dependability and adaptability, process reengineering, and social benefits (Tan & Subramanian, 2005).

Various models with different approaches have been proposed for evaluating e-government services. However, selecting the best model is not feasible, as the models depend on each country's specific conditions and priorities (Lee-Geiller & Lee, 2019).

As an accepted approach, in different research and studies about e-governance evaluation, according to special conditions and priorities of different countries, different methods and models were developed to evaluate the performance of e-governance, and there is no best practice or a standard model for this purpose (Pina, 2007; Potnis, 2010; Okezie *et* al., 2013; Sarkar, 2007; Saxena, 2005).

Isah et al. (2024) conducted a study evaluating the implementation of e-governance in university service delivery in Nigeria. The findings indicate that online tuition payment systems have been effectively implemented and utilized by stakeholders, leading to improved efficiency and user satisfaction.

Raei and Baradaran (2023) proposed a maturity model for e-governance based on evaluation components. Their findings classify six components: management, strategy, technology, security, individuals, and evaluation and measurement. The maturity model comprises four levels: awareness, purposeful striving, managed, and optimized ecosystem.

Umbach and Tkalec (2022) evaluated e-governance through e-government initiatives. The findings highlight that e-governance performance factors are sensitive to contextual elements, such as policy domains, systemic setups, institutional configurations, and administrative traditions. Consequently, e-governance evaluation is often restricted to specific tools and contexts, including websites, projects, and policy initiatives.

Suri (2022) examined the effectiveness of strategy implementation and e-governance performance in India. The study revealed that strategic planning, precise governance execution, e-services, and user e-information are key factors for the successful implementation of e-governance.

Lee et al. (2021) presented a model for evaluating e-governance websites. Their findings suggest that transparency in information presentation, consistency in information delivery, website security, and citizen participation are critical factors for assessing website effectiveness.

Methodology

Delphi method (Juri, 1971; Norman & Olaf, 1963) was devised in the early 1950s by researchers at RAND Corporation (Landeta, 2006; Rowe & Wright, 1999). The technique is often referred to more as an art than a science. In essence, it is a structured, multiple-step process for collecting and condensing the knowledge from a group of experts to deal with a complex problem using a series of questionnaires interspersed with controlled feedback (Humphrey-Murto et al., 2020; Yousuf, 2007; Linstone & Turroff, 2002).

The Delphi method aims to maximize the benefits of group input while minimizing the potential for conflict within the group (Sourani & Sohail, 2015; Lang, 1998). To effectively use this approach, the researcher must ensure that the following four essential characteristics are met:

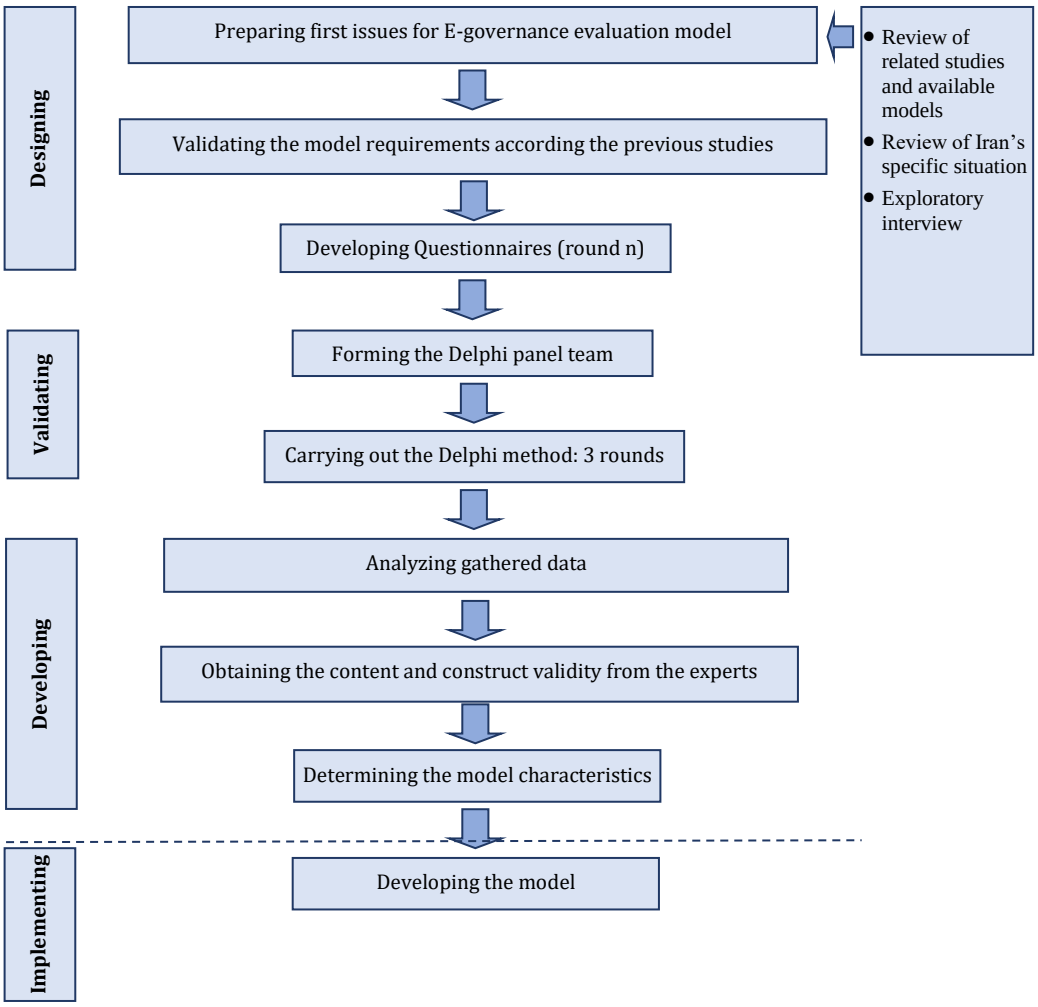
1. Structured questioning in which questionnaires are used. With this method, the moderator can control the whole research process and foster more concrete results.
2. Meaningful interaction of questionnaires is performed in numerous rounds to allow panelists to re-evaluate their responses.
3. Controlled feedback is achieved by giving overall group responses to the panelists in rounds (except Round 1). This means that all the responses of the panel group are considered in the subsequent assessment rounds.
4. Anonymity is an important characteristic because every panelist is free to express his/her views without feeling pressured by other more powerful group (Rowe & Wright, 1999).

As shown, it starts with a deep study of background and contents, so after refining the requirements, it goes ahead with data validation and developing a questionnaire for the Delphi panel. This process ends with analyzing the gathered data, defining the required dimensions, and developing the model.

The research design used to develop the model is shown in Figure 1. It includes three steps:

1. Designing the research instrument,
2. Validating the research instrument,
3. Developing the model, and
4. Implementation.

Figure 1.
Research Design for Iran's E-governance Performance Evaluation Model



(Source: Researcher's Findings)

Given that the Delphi method is an appropriate method for discovering innovative and reliable ideas or gathering suitable information for effective decision-making, and considering the lack of access to experts in the field for conducting interviews, alongside the preference for questionnaire-based responses and the availability of relatively adequate literature on e-governance, the researcher has used the Delphi method to extract the conceptual model of the study.

Findings

Exploratory Interview

For this purpose and to learn more about potential E-governance evaluation models and make any comparisons, exploratory interviews were conducted among knowledgeable people (in this field). The findings of the exploratory interviews were used in developing our model requirements.

Validating Instrument

Two discussion sessions were arranged to validate the model requirements outlined earlier. The participants for these sessions were selected using snowball sampling and were invited by the researcher's supervisor based on their knowledge and experiences.

Developing Round n Questionnaires

According to the reviewed studies, interviews, and previous rounds' results, a questionnaire was developed for each round. According to the requirements of each step, the questionnaires included open and closed questions.

Forming the Delphi Panel Group

According to Adler and Ziglio (1996), the Delphi panel members must meet four key criteria:

1. Having in-depth knowledge and experience,
2. Being dedicated to participation,
3. Having sufficient time to engage in the Delphi process,
4. Possessing strong communication skills.

For this study, the criteria for selecting the Delphi panel included at least 15 years of experience and knowledge in IT management, strategic planning, and governmental affairs. The snowball sampling method was employed to identify and invite qualified individuals to be part of the Delphi panel (Skulmoski et al., 2007).

According to Skulmoski (2007), the number of panelists in previous research has ranged from around 4 to 171 "experts." However, Dalkey (1975) suggests that having 15 or more experts is ideal for maximizing reliability and minimizing group error when assessing the degree of consensus.

According to Adler's criteria, the required knowledge for developing such a model and through the snowball technique, 15 people were selected for this research. In compliance with the available proper people for this study and panel, as in related studies, the research team believed this amount of panel members was adequate and could lead the research to the planned results. Table 1 shows the characteristics of the Delphi panel.

Table 1.
Characterization of the Respondents

Delphi Panel			
		N	%
Age	40-50	5	33
	50-60	7	47
	60-70	3	20
Qualifications	Ph.D	8	53
	MSc, MBA	5	33
	Other	2	14
Area	IT Management	5	33
	Strategic Management	4	27
	Governmental issues	6	40

(Source: Researcher's Findings)

Procedures of the Delphi Method

Each Delphi panel member was contacted either in person or by phone. They were provided with a brief explanation of the research objectives and what was expected from them. The panelists were given ten days to complete the questionnaires for Round 1. A reminder email was sent two days before the deadline to notify panel members about incomplete tasks.

The data collected from Round 1 were analyzed and used to create the questionnaires for Round 2. New items were added to the Round 2 questionnaires based on the suggestions provided by the experts in Round 1. The research team checked both face and content validity. Panel members were also allowed to refer to the comments from other panel members and their ratings in Round 1. They were given ten days to respond to the Round 2 questionnaires, and a reminder email was sent two days before the due date.

The questionnaires for Round 3 were prepared, and the research team checked the face and content validity again. All panel members were given ten days to respond.

Delphi Data Analysis

All feedback and comments gathered from the three Delphi rounds were documented and analyzed. Consensus among the experts was confirmed after each round before proceeding with any interpretations. The reliability and consistency of the experts' responses were also evaluated.

Young (2007) proposes that researchers can assess the consensus achieved in Rounds 1 and 2 to present it to the panel as an indicator of reliability. If consensus is reached after Round 2, it suggests that the researcher has effectively summarized the panel's feedback from Round 1. Using this method, the researcher can provide solid evidence to support the assumption that an acceptable level of reliability has been met (Fish & Busby, 2005).

Consistency refers to the stability of responses. In this study, the response patterns of experts were analyzed in terms of consistency across rounds. This is crucial for ensuring that the collected data has adequate quality and reliability for reference.

Model Development

In the Delphi method, we asked the invited experts to tell us which model(s) is (are) better for assessing the E-governance function in Iran.

In the first round, we insisted that Iran's existing issues and conditions, such as economic, political, and sociological factors, IT infrastructures, E-government situation, and E-governance perspectives, must be regarded.

The first-round question was about selecting a suitable model for Iran's E-governance performance evaluation, using the available models, or developing a new model according to the specific situation of Iran. Table 2 shows the result.

Table 2.
Round 1 Analysis Result

Question	Frequency
Using the available models	0
Developing a new model according to specific situation of Iran	15

(Source: Researcher's Findings)

The questionnaire of the second round focused on the model kind. Among the suggestions, such as sequential and multidimensional models, all experts agreed on using a multidimensional model.

After the third round of analysis, the answers showed that the model should consist of two dimensions: main *characteristics*- (E-administration, E-Citizen, E-services, and E-society) (Heeks, 2006) and their corresponding *attitudes.* The EAF framework also mentioned some attributes for assessing the performance of E-governance). Thus, the developed model is structured around these two dimensions: characteristics and attributes. In the following sections, we first discuss these dimensions and then present the model.

Model Dimensions

Characteristics

As previously discussed, the first dimension of our model encompasses three core areas of E-governance:

A. Enhancing government processes: E-Administration
B. Connecting citizens: E-Citizens and E-Services
C. Fostering interactions within civil society: E-Society

A. Enhancing Processes: E-Administration

These initiatives primarily focus on improving the internal operations of the public sector and include:

Reducing process costs: Automation can substitute high human costs with lower ICT costs, boosting efficiency and productivity. Information aids decision-making and implementation during downsizing or rightsizing initiatives. The aim is to address excessive public sector spending and/or inefficiencies in various processes.

Managing process performance: This involves planning, monitoring, and controlling the performance of resources (human, financial, etc.). Information plays a critical role in this process by offering insights into performance metrics and standards. The goal is to use resources more efficiently and effectively.

Establishing strategic connections within government: This involves linking departments, agencies, levels, and data repositories within the government to strengthen the ability to investigate, develop, and implement strategies and policies guiding government actions. Automation and information systems aid by digitizing existing communication channels, while transformation creates new digital channels. The purpose is to give clearer direction to public sector processes and foster a more evidence-based approach to policymaking and decision-making.

Creating empowerment: This entails redistributing power, authority, and resources from traditional centers to new locations within processes. Transformation supports this by establishing new information flows to decision-makers and implementers in new locations. The objective is to reduce costs, accelerate decision-making, and/or create more flexible and responsive processes.

B. Connecting Citizens: E-Citizens and E-Services

These initiatives focus primarily on the interaction between government and citizens, either as voters/stakeholders from whom the public sector gains legitimacy or as consumers of public services.

Engaging with citizens: This involves providing citizens with information about government activities. Informatization and transformation support this by establishing new information flows from the government to citizens, which are essential for accountability. The objective is to pressure government employees to perform well and improve public understanding of government operations.

Listening to citizens: This aims to amplify citizens' involvement in governmental decisions and actions. Informatization and transformation facilitate this by creating new information channels from citizens to the government. The goal is to make public decisions more responsive to the views or needs of citizens.

Enhancing public services: This focuses on improving the quality, convenience, and cost of services delivered to citizens. ICTs are leveraged to provide informational components of public services digitally. The direct benefit is obvious, but there is also an indirect benefit in terms of saving citizens' time and money that would otherwise be wasted due to inefficient service delivery.

Since all these initiatives depend on the new connectivity offered by ICTs, they are relatively recent additions to E-governance, highlighting the extensive opportunities for development it offers. The sequence begins with publishing (delivering information to citizens), progresses to interaction (a two-way information exchange between citizens and government), and advances to transactions (executing government processes online).

These aspects have been largely overlooked in developing countries, yet even simple publishing activities can have a substantial impact. Citizens in information-poor regions may be vulnerable to exploitation, such as bribery, due to their lack of basic knowledge about government services- specifically, who provides them, where they are available, and how to access them.

C. Building External Interactions: E-Society

These initiatives focus on the relationships between public agencies and other organizations, including other public agencies, private sector service providers, non-profit organizations, and civil society institutions.

Improving collaboration with businesses: Enhancing the interaction between government and businesses, including digitizing procurement processes and services to improve their quality, convenience, and cost. This utilizes the full potential of ICTs to provide the informational components of public services to businesses in a digital format. The main rationale is to reduce costs and improve quality within the government while indirectly enhancing the efficiency and responsiveness of local businesses.

Developing community: Strengthening the social and economic capacities of local communities. ICTs reinforce existing information connections and create new

connections within communities and between them and other institutions. The goal is to enhance community members' wealth-creation potential and overall quality of life.

Building partnerships: Strengthening relationships between institutions. This involves two components: first, building government partnerships by improving ties between government and other institutions, such as NGOs or international organizations, and second, strengthening civil society partnerships, such as those between NGOs. ICTs help to improve current information exchanges and establish new ones between these institutions. The purpose is to create a strong economic, social, and political fabric within society.

Like E-citizens and E-services, E-society initiatives rely on the connectivity enabled by ICTs, making them relatively new elements within E-governance. They represent significant development opportunities offered by E-governance.

Attributes to Be Assessed

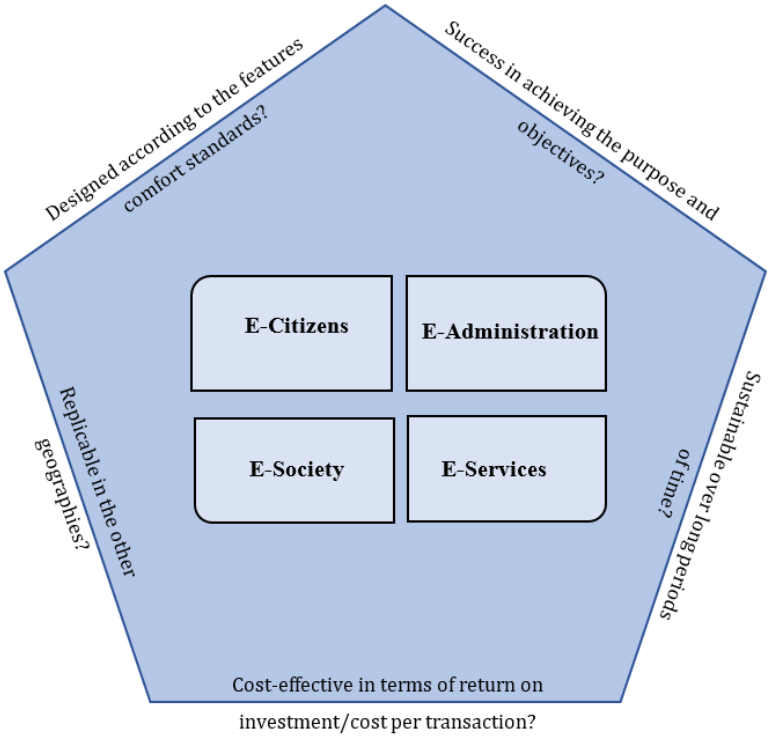
The developed model must be comprehensive, holistic, and, above all, fulfill the designed objectives. Essentially, the EAF should provide clear and unambiguous answers to questions such as the following (EAF, 2004):

A) How far has the Project achieved its purpose and objectives?
B) Has the Project been designed and developed with all the elegant and comfortable technological features widely accepted by architectures and standards?
C) Is the Project sustainable over long periods of time, with or without the motive force that initiated the Project?
D) Is the Project cost-effective in terms of return on investment or in terms of cost per transaction?
E) Is the Project replicable in other geographies?

Model Development

Figure 2 presents the model we developed through the Delphi method. This model shows innovation in evaluating E-governance measurement for Iran, addresses special requirements of Iran, and mentions the malfunction of different parts of E-governance.

Figure 2.
Evaluation Model of Iran's E-governance Performance



(Source: Researcher's Findings)

Electronic administration, citizens, services, and society are the characteristics that must be assessed in Iran (the center of the model). This model can evaluate E-governance through criteria such as performance, technology, and costs (sides of the model). The criteria mentioned here can enrich the evaluation process and direct the characteristics of the model to a right and tangible understanding of E-governance performance.

The panel believes that, among the different available models, this one is the most suitable for Iran. They noted that the current activities in Iran's E-government can be seamlessly integrated into this model, which also has the potential to encompass future developments in both electronic government and governance in Iran.

Discussion and Conclusion

E-governance is a new movement in most developed countries. It demonstrates a country's power to use IT to prepare better governance in society. It uses IT at various levels of government, the public sector, and beyond to enhance governance.

According to the concept and definition of E-governance, there is no unique definition for it; according to its special condition, each country has a different usage and description of this concept. E-governance performance must be evaluated. Therefore, we looked forward to developing a model for performance evaluation of Iran's E-governance. After a literature review, with the help of a 15-member Delphi team and three rounds of circulation, we developed a model. Using the Delphi method, we evaluate and prove the performance and reliability of the model.

The model developed through this research, according to the special requirements of Iran, consists of two main dimensions: E-administration, E-citizen, E-services, and E-society are characteristics of this model and five items related to target, technology, and cost are the attributes.

Examining the progress and performance of governmental institutions in implementing e-governance requires specific components and factors for evaluation. By introducing a performance evaluation model for e-governance, governments, and their associated organizations can assess the progress of programs, their effectiveness, deviations from planned actions, and more. In this context, the present study aims to propose a performance evaluation model for e-governance in developing countries. While e-governance has been extensively studied to identify influencing factors, implementation barriers, and deployment models, limited research has focused on performance evaluation, especially in developing countries, where this subject is critically important. This study, therefore, offers both theoretical and practical innovations. To achieve its objectives, the researchers utilized the Delphi method. The final model includes four dimensions: e-administration, e-society, e-citizens, and e-services.

In evaluating e-governance, attention must be paid to all dimensions derived from government, society, and citizens. E-administration refers to a set of mechanisms that transform paper-based processes into electronic processes, aiming to establish a paperless office. E-administration leads to cost reduction, better process management, strategic communications with the government, and employee empowerment.

E-citizens have at least basic knowledge of ICT concepts, the ability to connect to the Internet, and the capability to send and receive electronic messages via email. They can search for information, services, goods, and software they need through the Internet. Evaluating e-governance must consider the extent of digitization among citizens, which can be improved by providing technology-related education, such as internet basics, email fundamentals, computer skills, search proficiency, and more.

Another dimension of e-governance evaluation is e-services, services provided over the internet to deliver fast, remote services without requiring physical presence. E-services improve interactions with citizens and increase their participation in e-governance.

To achieve e-governance, the existence of an e-society is essential. An e-society is characterized by electronic interactions between governmental organizations and other entities, such as private service providers, non-profit organizations, and civil society institutions. This dimension underscores the interconnectedness and collaboration among various sectors within an electronic framework.

Comparison with Previous Research

In comparing the results of the present study with the previous research, it is observed that in service delivery, the results of this study align with the findings of Isah et al. (2024) and Suri (2022). In terms of the knowledge and information required by citizens for e-governance, the results of this study align with the findings of Suri (2022) and Lee et al.

(2021). The technology, security, and personnel components mentioned in the research by Raei and Baradaran (2023) are consistent with the results of the present study.

Suggestions for Government Officials

It is recommended that government managers and officials use new technologies, such as artificial intelligence, in e-governance evaluation programs. It is also suggested that authorities prepare an e-governance roadmap, which defines the goals and final objectives for achieving e-governance within specified timeframes, considering the country's facilities and infrastructure, and using it for evaluation purposes. To improve e-services, one of the components of the evaluation model related to the government, it is suggested that this dimension be improved by increasing bandwidth, enhancing internet speed, removing filtering, and reducing users' access costs to e-services.

Limitations and Suggestions for Future Research

Time constraints and the inability to generalize the results of this study to other organizations due to the qualitative nature of the research are some of the limitations encountered. This is because different interpretations of the phenomenon under study are possible. Given the qualitative approach of the research and the lack of validation of the extracted model by other researchers, it is suggested that the extracted model be tested using a quantitative methodology. Researchers should also design a model through in-depth interviews to better understand the subject. Furthermore, it is suggested that other researchers identify the dimensions and components using statistical techniques such as the analytical hierarchy process, analytical network process, and best-worst method

and determine their significance in evaluating e-governance. It is also recommended that other researchers determine the state of e-governance in the four identified dimensions, compare them, and, based on that, identify the strengths and weaknesses of e-governance in the country. Finally, it is recommended that other researchers work on developing key performance indicators for evaluating e-governance.

REFERENCES

Abdulnabi, S. M. (2024). Issues and challenges of implementing e-governance in developing countries: a comprehensive analysis of civil service models. Cogent Business & Management, 11(1), 2340579.

Adler, M. & Ziglio, E. (1996). Gazing into the oracle. Bristol, PA: Jessica Kingsley.

Aichhlozer, G., & Schmutzer, R. (2000). Organizational challenges to the development of electronic government. In Proceedings of the 11th International Workshop on Database and Expert Systems Applications (DEXA'00), IEEE Press.

Alam, S., & Hassan, S. (2011). Problems when implementing egovernance systems in developing countries: a quantitative investigation of implementation problems in Bangladesh. Master's thesis in Informatics, University of Boras.

Allen, B.A., Juillet, L., Pacquet, G., & Roy, J. (2001). E-governance and government online in Canada: partnerships, people, and prospects. Government Information Quarterly, 18, 93-104.

APT (Asia-Pacific Telecommunity). (2012). APT report on e-government implementation in Asia-Pacific developing countries and its challenges and obstacles. ASTAP/REPT 5 (ASTAP20, Bangkok, 2012).

Backus, M. (2001). E-governance in developing countries. IICD Research Brief, 1(3), 1-51.

Bedi, K., Singh, P.J., & Srivastava, S. (2001). Government net, new governance opportunities for India. New Delhi: Sage.

Bhatnagar, S.C. & Bjorn-Andersen, N. (1990). Information technology in developing countries. Elsevier, North-Holland, Amsterdam.

Butt, S. (2022). Challenges and Benefits of E-Governance in the Education Sector of Pakistan during COVID-19. Pakistan Social Sciences Review, 6(2), 576-591.

Csetenyi, A. (2000). Electronic government: perspectives from e-commerce. In Proceedings of the 11th International Workshop on Database and Expert Systems Applications (DEXA'00), IEEE Press.

Dalkey, N. C. (1975). Towards theory of group estimation. In H. A. Linstone, & M. Turoff (Eds.) The Delphi method techniques and applications, 231-256, Massachusetts: Addison-Wesley Publishing.

Dash, S. S., Sethi, I. P. S., & Gupta, O. P. (2016). Measuring performance outcome of e-Governance projects through eTaal. Proceedings of the 3rd International Conference on Computing for Sustainable Global Development (INDIACom).

Devendra, D. P. (2010). Measuring e-governance as an innovation in the public sector. Government Information Quarterly, 27, 41–48.

DITa. (2010). Quality assurance framework (QAF) for e-governance applications. Dept. of IT, India.

DITb. (2010). Conformity assessment requirements for quality assurance in e-governance. Dept. of IT, India.

EAF. (2004). E-governance assessment frameworks for E-governance (assessment & replication) division, E-governance and e-rural group. National Institute for Smart Government (NISG).

Elkadi, H. (2013). Success and failure factors for e-government projects: A case from Egypt. Egyptian Informatics Journal, 14, 165–173.

Fish, L. S., & Busby, D. M. (2005). The Delphi method. In D. H. Sprenkle & F. P. Piercy (Eds.), Research Methods in Family Therapy, 2nd Ed, New York: Guilford.

Gavriluță, N., Stoica, V., & Fârte, G. I. (2022). The official website as an essential E-governance tool: A comparative analysis of the Romanian cities' websites in 2019 and 2022. Sustainability, 14(11), 6863.

Georgiadou, Y., Rodriguez-Pabon, O., & Lance, K. T. (2006). Spatial data infrastructure (Sdi) and e-governance: A quest for appropriate evaluation approaches. Journal of the Urban and Regional Information Systems Association, 18 (2), 43-55.

Heeks, R. (2003). Most e-government for development projects fail: how can risks be reduced? Government Working Paper Series, Institute for Development Policy and Management, University of Manchester, Manchester, U.K.

Heeks, R. (2006). Understanding and measuring eGovernment: International benchmarking studies. UNDESA Workshop, Budapest, Hungary.

http://www.eval.org/Publications/GuidingPrinciples.asp

http://www.i4donline.net/issue/nov03/quantifying.htm

http://www.unesco.org

Humphrey-Murto, S., Wood, T. J., Gonsalves, C., Mascioli, K., & Varpio, L. (2020). The delphi method. Academic Medicine, 95(1), 168.

Hurteau, M., Houle, S., & Mongiat, S. (2009). How legitimate and justified are judgments in program evaluation?. Evaluation, 15, 307-319.

Isah, I. S., Chiroma, A. A., & Dance, A. M. (2024). Assessment of E-Governance Implementation on Service Delivery in Nasarawa State University, Keffi (2017-2021). AKSU Journal of Administration and Corporate Governance, 1(1), 89-100.

Juri, P. (1971). The Delphi method: substance, context, a critique and an annotated bibliography. Socio-Economic Planning Sciences, 5 (1), 57-71.

Kanchanawasee, S. (1994). Evaluation theory. Bangkok: Chulalongkorn University Press.

Klijn, E. H., Sierra, V., Ysa, T., Berman, E., Edelenbos, J., & Chen, D. Y. (2016). The influence of trust on network performance in Taiwan, Spain, and the Netherlands: A cross-country comparison. International Public Management Journal, 19(1), 111-139.

Kuzior, A., Pakhnenko, O., Tiutiunyk, I., & Lyeonov, S. (2023). E-governance in smart cities: Global trends and key enablers. Smart Cities, 6(4), 1663-1689.

Landeta, J. (2006). Current validity of the Delphi method in social sciences. Technological Forecasting and Social Change, 73(5), 467-482.

Lang, T. (1998). An overview of four future methodologies. Retrieved August 13, 2012, from http://www.soc.hamaii.edu/~future/j7/LANG.html.

Lee, T. D., Lee-Geiller, S., & Lee, B. K. (2021). A validation of the modified democratic e-governance website evaluation model. Government Information Quarterly, 38(4), 101616.

Lee-Geiller, S., & Lee, T. D. (2019). Using government websites to enhance democratic E-governance: A conceptual model for evaluation. Government Information Quarterly, 36(2), 208-225.

Lenk, K. & Traunmuller, R. (2000). A Framework for electronic government. In Proceedings of DEXA2000, IEEE press, 271-277.

Linstone, H. A., & Turroff, M. (2002). The Delphi method: Techniques and applications. Journal of Marketing Research 18(3), 210-233.

Madon, S. (2004). Evaluating the developmental impact of e-governance initiatives: an exploratory frame work. EJISDC, 20 (5), 1-13.

Mahapoonyanont, N., Mahapoonyanont, T., & Samrit, S. (2012). The development of a project evaluation model for basic education Institutions. Procedia - Social and Behavioral Sciences, 46, 277–282.

Margetts, H., & Dunleavy, P. (2002). Cultural barriers to e-government. In Better Public Services through e-government: Academic Article in support of better public services through e-government, National Audit Office, London, UK.

McGill, R. (1997). Civil service reform in developing countries: a strategic perspective from an institutional development base. International Journal of Public Sector Management, 10 (4), 254- 267.

Meyerhoff, N. M. (2016). E-governance and stage models: Analysis of identified models and selected Eurasian experiences in digitising citizen service delivery. International Journal of Electronic Government Research, 12(2), 107–141.

MoUD. (2010). Toolkit for monitoring and evaluating for e-governance under JNNURM. MoUD, India.

Mykhalchenko, O. (2022). E-governance in the management decision-making process. Ekonomichnyy analiz, 32(1), 81-94.

Navarra, D.D. (2007). The architecture of global ICT programmes: a case study of e-governance in Jordan. Proceedings of the 9th International Conference on Social Implications of Computers in Developing Countries, São Paulo, Brazil.

Norman, D., & Olaf, H. (1963). An experimental application of the Delphi method to the use of experts. Management Science, 9(3), 458-467.

Okezie, C.C., Kennedy, O. C., & Chidiebele, U. C. (2013). Performance analysis of smart infrastructure model for E-governance integration. Academic Research International, 4 (4), 219-231.

Pandey, J. K. (2023). Public trust and collaborative e-governance performance: a study on government institutions and services. Transforming Government: People, Process and Policy, 17(4), 510-531.

Pathak, R. D., Singh, G., Belwal, R., & Smith, R.F.I. (2007). Governance & corruption – developments and issues in Ethiopia. Public Organization Review, 7(3), 195-208.

Pina, V., Torres, L., & Acerete, B. (2007). Are ICTs promoting government accountability? A comparative analysis of e-governance developments in 19 OECD countries. Critical Perspectives on Accounting, 18(5), 583–602.

Pintea, M. O. (2012). Performance evaluation: Literature review and time evolution. Annals of University of Oradea, Economic Science Series, 21(1), 753-758.

Potnis, D. D. (2010). Measuring e-Governance as an innovation in the public sector. Government Information Quarterly, 27 (1), 41–48.

Raei, B., & Baradaran, V. (2023). A Staged Capability Maturity Model for E-Governance Based on Classification of the Evaluation Components. Public Administration Perspective, 14(2), 93-137.

Rhodes, W. R. (2000). Public administration and governance. In Debating governance: authority, steering, and democracy, Oxford University Press.

Rowe, G., & Wright, G. (1999). The Delphi technique as a forecasting tool: issues and analysis. International Journal of Forecasting, 15(4), 353-375.

Sangeetha, G., & Rao, L. M. (2016). Modelling of E-governance framework for mining knowledge from massive grievance redressal data. International Journal of Electrical and Computer Engineering (IJECE), 6(1), 367-374.

Sarkar, S. (2007). E-Government adoption and diffusion. National Informatics Centre, Bidyut Bhavan, Saltlake, Kolkata.

Saxena, K.B.C. (2005). Towards excellence in e-governance. International Journal of Public Sector Management, 18 (6), 498–513.

Shailendra, C., Palvia, J., & Sharma, S.S. (2007). E-Government and E-Governance: definitions/domain framework and status around the world. In Foundations of e-government, A. Agarwal et al. Ed. CSISIGeGOV, 2008, 1-12.

Shaxnoza, J. (2024). Impact of E-Governance on Public Service Efficiency. International Journal of Law and Policy, 2(10), 31-47.

Sheila, V.S. (2005). E-governance at the local government level in the Philippines: An assessment of city government websites. Philippine Journal of Development, 32 (2), 135-168.

Sheridan, W., & Riley, T.B. (2006). Common wealth center for e-Governance. E-Gov Monitor.

Singh, A. (2013). A Critical impulse to e-governance in the Asia Pacific. Springer.

Skulmoski, G. J., Hartman, F. T., & Krahn, J. (2007). The Delphi method for graduate research. Journal of Information Technology Education, 6, 1-21.

Sourani, A., & Sohail, M. (2015). The Delphi method: Review and use in construction management research. International journal of construction education and research, 11(1), 54-76.

Sozen, S., & Shaw, I. (2002). The international applicability of 'new' public management: lessons from Turkey. International Journal of Public Sector Management, 15 (6), 475-486.

Stiglitz, J., Orszag, P., & Orszag, J. (2000). The Role of government in a digital age. http://www.ccianet.org/

Suri, P. K. (2022). Effectiveness of strategy implementation and e-governance performance. Evaluation and Program Planning, 92, 102063.

Suri, P.K., & Sushil (2017). Strategic Planning and Implementation of E-Governance. Springer.

Tan, W., & Subramanian, R. (2005). E-Government: Implementation policies and best practices from Singapore. Electronic Government strategies and implementation, Idea Group Publishing, 305-324.

Turner, M., Hulme, D., & McCourt, W. (2015). Governance, administration & development: Making the state work. Macmillan Press.

Umbach, G., & Tkalec, I. (2022). Evaluating e-governance through e-government: Practices and challenges of assessing the digitalisation of public governmental services. Evaluation and program planning, 93, 102118.

UN (2014). UN E-Government Survey 2014: E-government for the future we want. United Nations, New York.

UNDP. "E-Governance in Azerbaijan". http://www.un-az.org/undp/doc/egov/intro.php

Working Group on E-Government in the Developing World. (2002). Roadmap for e-government in the developing world. Pacific Council on International Policy, http://www.pacificcouncil.org

Wu, J., & Guo, D. (2015). Measuring e-government performance of provincial government website in China with slacks-based efficiency measurement. Technological Forecasting & Social Change, 96, 25–31.

Yong, J.S.L., & Koon, L.H. (2003). E-government: enabling public sector reform, In e-government in Asia: Enabling public service innovation in the 21st century. Yong, JSL (ed.), Times Media, Singapore, 3-21.

Young, D.E. (2007). Effective leadership characteristics for student performance as perceived by high performing Texas High School principals: A Delphi study. PhD Thesis, Texas A & M University.

Yousuf, M. (2007). Using experts' opinion through Delphi technique. Practical Assessment, Research & Evaluation, 12(4), 1–8.

Zhang, J. (2006). Good governance through e-governance? Assessing China's e-government strategy. Journal of E-Government, 2(4), 39-71.

Zwahr, T., Finger, M., & Mueller, P. (2005). More than digitization—The transformative potential of E-Governance: An exploratory case study. Proceedings of the 38th Hawaii International Conference on System Sciences.

Designing a Framework of Determinants for Users' Continuous Use of Mobile Banking: A Qualitative Study

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ABSTRACT

While the intention to adopt mobile banking services (m-banking) has been extensively studied, the factors influencing continuous use of m-banking services post-adoption remain relatively underexplored. Employing a qualitative approach, this study aims to develop a comprehensive framework for understanding sustained mobile banking usage determinants. Data were collected through open and in-depth interviews with 10 experts and specialists in the field of information technology and analyzed using a phenomenological approach. The results were categorized into three main dimensions: organizational, environmental, and individual factors. The organizational dimension encompasses 15 factors, including performance / service quality, information quality, aesthetic design, user compatibility, human interactive features, confidentiality assurance/ privacy protection, system integration, authenticity, reducing interactive costs, security measures/ security of banking apps, ease of use, reputation / organizational credibility, customer support, secure authentication, and customization. The environmental dimension comprises four factors, including cultural context and social distance, economic development, education and digital literacy, and technological development. The individual user dimension identifies 12 factors such as such as perceived service value, user trust, satisfaction, perceived self-efficacy, previous experience, subjective norms, attitudes, digital resilience, and adaptability to technological changes.

KEYWORDS

Adoption Intention, Continuous Use, Mobile Banking.

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Introduction

The complex and growing developments in information technology (IT) have significantly affected service and non-service companies (Andani & Hidayat, 2022). IT systems, alongside rapid growth in internet-mobile communications and smartphones, have led to major advancements in mobile commerce (m-commerce) (Ngai & Gunasekaran, 2007; Tiwari et al., 2021; Naruetharadhol et al., 2021; Lee et al., 2023; Nguyen & Dao, 2024). This digital landscape has become a key tool for service and non-service industries to maintain their competitive position in the business world (Andani & Hidayat, 2022). As a result, businesses are keen to offer their electronic services to consumers (Poromatikul et al., 2020) because they need to provide fast and simple services that are directly accessible and under their customers' control (Rahma & Sofyani, 2024).

Recent technological advancements have influenced consumer demand, shifting it toward online transactions and increasing user accessibility (Souiden et al., 2021; Cassioli & Balconi, 2022; Che et al., 2023). Customer interaction and online experiences are recognized as part of electronic or digital service quality (Rahma & Sofyani, 2024). Accordingly, to address or limit the changes in consumer behavior, organizations must understand the key factors that influence consumer decision-making in banking (Hidayat, 2023). Banks have been at the forefront of financial services sector in rapidly transitioning interpersonal services to mobile-based channels (Alsmadi et al., 2022; Souiden et al., 2021).

Today's banking customers seek 24/7 access to their accounts. They want the same services on their mobile devices, which are available at a physical bank branch. To improve their electronic services and make informed decisions, banks must understand the key factors that may lead to user satisfaction and continuous use. Mobile banking (m-banking) is a rapidly developing sector that utilizes mobile technology to offer banking services anytime and anywhere (Hidayat, 2023).

Since most existing studies consider continuous use as a post-adoption behavior, the intention for mobile banking services (m-banking) post-adoption has not been extensively examined (Basu et al., 2024). Therefore, to understand post-adoption consumer behavior from a mobile banking perspective, it is crucial to identify and examine the key factors that influence consumers' continuous use intention (Hidayat, 2023). A comprehensive understanding of continuous use factors can guide banks in developing effective strategies to increase user engagement and satisfaction with mobile banking services (Ginting, 2023).

According to reports, digital transactions are expected to reach $14.79 trillion by 2027, with an average annual growth rate of 11.79%. Among the key players, China and the United States lead the digital banking services market, followed by the UK, Japan, and Germany (Nguyen & Dao, 2024). Given the importance of this trend, providing a framework for the determinants of continuous use of mobile banking services is essential. As a result, the present study aims to identify factors influencing users' continuous use of mobile banking.

Mobile Banking and Continuous Use

Mobile banking is a specialized application developed by banks to provide services to their customers. This app enables users to carry out various financial transactions, such as transferring money, recharging credit, etc., quicky and simple. With mobile banking, customers can manage these tasks conveniently through a user-friendly app, eliminating the need to visit ATMs (Andani & Hidayat, 2022). When customers find that the mobile banking app meets or exceeds their expectations, they will likely experience satisfaction, leading to a higher likelihood of continued use (Sharma, 2024).

Mobile banking leverages mobile technology to deliver banking services anytime and anywhere, offering various functions, such as checking account balances, transferring funds, and even engaging in stock trading (Lacmanovic et al., 2012). The expansion of mobile banking has been greatly driven by the widespread use of smartphones, with research indicating that 80% of users access mobile banking via these devices (Khan et al., 2020). Financial institutions and banks provide comprehensive services, such as money transfers, online payments, financial transactions, and account balance inquiries, through mobile banking applications installed on smartphones, accessible at any time and place. Mobile banking services are gradually gaining individual users and are expected to emerge as the dominant payment method for customers (Khoa, 2021). Mobile banking continuously improves the customer experience through several key factors, including service quality, user satisfaction, and design aesthetics (Issahaku et al., 2024).

Continuous intention refers to the strength of an individual's willingness to perform specific behaviors and can measure a person's inclination to repeat those behaviors. In this context, customer satisfaction and trust lead to increased customer intentions to repeatedly use mobile banking, turning them into loyal users of these services (Amoroso & Chen, 2017). Continuous use of mobile banking refers to customers' ongoing use and trust in mobile banking applications, which is critical for retaining users in a digital banking environment. Studies show that experienced users are committed to their banking relationships, and mobile banking brings significant added value to them (Shaikh et al., 2015).

Continuous intention indicates the strength of an individual's intention to continue a specific behavior. This is a proxy for the continuous use of a system or IT (Amoroso & Chen, 2017). Despite technological advancements and the rapid growth of mobile commerce, there is insufficient information about the factors that drive continuous use of mobile financial services after adoption (Kang et al., 2012). This is because researchers have mainly focused on initial adoption rather than continuous intention, making the study of continuous use in mobile banking an important topic requiring further research. Given the above facts, understanding post-adoption behaviors is essential to grasp the factors influencing consumers' continuous intention to use mobile banking (Hidayat et al., 2021). A comprehensive understanding of these dynamics can help banks improve their customer retention strategies and enhance mobile banking experiences (Che et al., 2023). Since banks can only achieve success by retaining their users (Foroughi et al., 2019;

Rabaa'i & ALMaati, 2021), and mobile banking payments involve a large ecosystem, customers are increasingly inclined toward using digital-based online banking services or mobile banking apps for continuous use (Tam & Oliveira, 2016).

Literature Review

The literature on Information Systems (IS) in mobile banking services reveals a substantial body of research examining the factors influencing the adoption stages of mobile banking services across various countries. Researchers in the field of IS have utilized a range of theoretical models to explore the factors that impact the pre-adoption or adoption phases of mobile banking services (Rabaa'i & ALMaati, 2021). Several studies have employed well-established theories, including the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Task-Technology Fit (TTF), and the Theory of Planned Behavior (TPB), to identify the key factors influencing the adoption of mobile banking. However, there is a gap in research concerning the factors that affect the decision to continue using mobile banking applications once they have been initially adopted (Al-Laheebi, 2022). Below, some studies in this area are discussed.

Mobile banking transactions face significant security threats. In their study, Sripada and Chattopadhyay (2023) described major threats, vulnerabilities, and strategies to counter these risks, emphasizing the need for robust security measures in today's mobile banking applications. They provided a comprehensive framework of threats and identified strategies to mitigate them.

Similarly, another study introduced a secure authentication solution to improve the security of mobile banking applications. This solution uses a convolutional neural network model to integrate facial recognition into mobile banking apps, highlighting the critical role of authentication in ensuring secure mobile banking transactions (Oguntimilehin et al., 2022).

Given the importance of investing in digital technologies to enhance banking services and customer satisfaction, research findings indicate that perceived self-efficacy and ease of use positively influence the intention to continue using digital banking services. Perceived usefulness was found to affect these relationships, acting as a key mediator between perceived self-efficacy and continuous usage intention, as well as between perceived ease of use and continuous usage intention (Asamoah et al., 2024).

Issahaku et al. (2024) conducted a study to examine the factors influencing the continuous use of mobile banking applications in Ghana. Data analysis from a survey of 300 respondents using the Expectation-Confirmation Model combined with user satisfaction showed that perceived usefulness, satisfaction, design aesthetics, information quality, and confirmation determine the continuous use of mobile banking (Issahaku et al., 2024).

Another study focused on identifying the predictors of mobile banking usage among Generation Z. The findings emphasized the importance of improving mobile banking services to satisfy Generation Z. Using structural equation modeling, the study revealed

significant relationships between satisfaction, commitment, trust, service value, quality, anxiety and continuous mobile banking use (Sari & Nikmah, 2024).

Nguyen and Dao (2024) surveyed 523 consumers in Vietnam to identify the factors affecting continuous mobile banking use. Their findings indicated that perceived usefulness, satisfaction, compatibility, and self-efficacy influence continuous usage intention. Based on their findings, they provided insights for banks to strengthen these factors to maintain customer trust, which leads to improved relationships with mobile banking customers.

Simovic et al. (2024) conducted a comparative study on the perceptions of mobile banking among students in Kuwait and Serbia. Their findings showed diverse perceptions of continuous mobile banking use due to cultural and developmental factors. In other words, they identified these differences as being influenced by cultural, economic, and technological factors.

Saibaba (2024) investigated the factors influencing the continued use of mobile banking apps in India, using data from a sample of 345 mobile banking app users. The findings revealed that enhancing service quality, trust, and customer satisfaction are key to ensuring the success of post-adoption behavior in mobile banking (Saibaba, 2024).

Given the research background, previous research has not taken a comprehensive approach to the topic. Therefore, this research has comprehensively reviewed the relevant literature, and i to enrich and localize the findings, conducted exploratory interviews with managers and users. This led to designing a framework identifying the key factors influencing users' continuous use of mobile banking, an area not comprehensively addressed in previous research.

Methodology

Despite growing interest from both industry and academic research in mobile banking, few studies have identified the factors influencing its continuous use. To address this gap, an exploratory study is necessary. The primary goal of the current research is to develop a framework of factors that drive the continued use of mobile banking, using a qualitative approach.

Qualitative content analysis was employed for this research. This method, also known as latent content analysis, is used to reduce and interpret data. It is commonly applied to analyze large volumes of textual data, such as interview responses, recorded observations, open-ended answers, narratives, and various media, including drawings, photos, and videos (Julien, 2008).

Content analysis aims to uncover the author or interviewee's objectives, values, culture, and desires. In other words, content analysis seeks to identify the unconscious aspects of the text and its creator (Freud, 1989). Qualitative content analysis allows researchers to interpret data subjectively while maintaining scientific rigor, ensuring objectivity through a systematic coding process. This approach looks beyond the literal content of texts to examine themes or patterns, whether explicitly stated or implied.

The movement path in qualitative content analysis involves extracting categories from the text and creating conceptual models and maps. Hence, the greater use of inductive logic in considering these characteristics has been accepted (Elo & Kingas, 2007, p. 107). Qualitative content analysis emerges where quantitative analysis reaches its limits. Thus, qualitative content analysis can be regarded as a research method that subjectively interprets textual data by systematically classifying, coding, and thematizing or identifying known patterns (Hsieh, 2005). It can be seen as an empirical, methodological, and controlled step-by-step approach that considers the studied elements (Mayring, 2000). The content analysis method is grounded in the assumption that by analyzing linguistic messages, it is possible to uncover meanings, priorities, attitudes, perceptions, and the organization of the world (Wilkinson, 2003).

Looking more closely at the qualitative content analysis method, its common steps can be identified as follows:

1. Understanding the topic, and specifying the questions that need to be answered through referring to the text.
2. Selecting parts of the text that need to be analyzed.
3. Coding, classifying, and abstracting the codes into categories and themes.
4. Analyzing the coding results.
5. Determining validity and reliability (Zhang & Wildemuth, 2009).

To collect qualitative data, exploratory interviews were conducted with experienced managers, experts, and users who were willing to participate. The number of participants was determined based on the theoretical saturation rule (Maykut & Morehouse, 1994), and data collection continued until no new information was obtained. Accordingly, 15 interviews were conducted.

Table 1.
Profile of Interviewees

Education	Majer	Experience	Interview code
master	Information system management	3	P1
master	Information Technology Management	4	P2
master	Information system management	4	P3
PhD	Information system management	5	P4
PhD	Information Technology Management	7	P5
master	Information system management	5	P6
master	Information system management	6	P7
master	Information system management	5	P8
PhD	Information Technology Management	4	P9
master	User	3	P10
Bachelor's	User	3	P11
Bachelor's	Information Technology Management	4	P12
master	User	5	P13
master	Information Technology Management	6	P14
Bachelor's	User	3	P15

(Source: Researcher's Findings)

To ensure the validity and reliability of the interview data, the Lincoln and Guba evaluation method (1985), which is equivalent to validity and reliability in quantitative research, was used (Lincoln & Guba, 1985). Thus, four criteria—credibility, confirmability, dependability, and transferability—were examined. To ensure credibility, the "member checking" method was employed. During the interviews, efforts were made to ensure that participants agreed with the researcher's understanding of what they had said and provided any additional feedback. This process validated the interviews. Additionally, by allocating sufficient time for conducting the interviews, the credibility of the research data was considerably enhanced.

To assess confirmability, the interview process was approved by several experts. To ensure consistency in coding, another expert reviewed several interview samples. Dependability was achieved by documanting the data obtained during the interviews, which included writing extensive field notes, recording all interview details, and taking notes throughout the interview process. To ensure the transferability of the research findings, sufficient information and details about the actions taken during the interview process were provided, allowing interested researchers to assess the applicability of the findings to other research settings.

Findings

Continuous use of electronic services is a complex issue, as users can easily switch to other service providers (Chea et al., 2008). For this reason, recent literature suggests that banks globally have invested approximately $115 billion to enhance customer convenience (Baabdullah et al., 2019). Given these facts, examining post-adoption behaviors is crucial for understanding the factors influencing consumers' continued intention to use mobile banking.

To achieve the main objective of the research, a comprehensive review of the literature was conducted. Subsequently, the focus group method was employed to examine and classify the main factors. The key dimensions and elements affecting the continued use of mobile banking are presented in Table 2.

Table 2.
Research Findings

Dimensions	Factors	Source
Organizational Dimension	Performance / Service Quality / System	(Kumalasari et al., 2022); (Adhikari & Gyawali, 2023); (Sari & Nikmah, 2024); (Erdoğan, 2023); (Saibaba, 2024); (Albashrawi, 2021); (Rabaa'i & ALMaati, 2021)
	Information Quality	(Issahaku et al., 2024); (Erdoğan, 2023)
	Aesthetic Design	(Issahaku et al., 2024)
	User Compatibility	(Nguyen et al., 2024)
	Human Interactive Features	(Yin & Lin, 2022)
	Confidentiality Assurance, Privacy Protection	(Bhosale et al., 2023); (Che et al., 2023)
	System Integration	(Bhosale et al., 2023)
	Authenticity	(Bhosale et al., 2023)

Dimensions	Factors	Source
	Reducing Interactive Costs	(Foroughi et al., 2019)
	Security Measures, Security of Banking Apps	(Chattopadhyay & Sripada, 2023); Oguntimilehin et al., 2022); (Ginting et al., 2023); (Khudzaeva et al., 2023); (Che et al., 2023); (Yin & Lin, 2022); (Hidayat-ur-Rehman et al., 2021); (Albashrawi, 2021); (Aashima et al., 2023)
	Ease of Use	(Asamoah et al., 2024); (Che et al., 2023); (Al-Laheebi, 2022); (Al Amin et al., 2022); (Albashrawi, 2021)
	Reputation / Organizational Credibility	(Che et al., 2023); (Garrouch, 2021)
	Customer Support	(Che et al., 2023)
	Secure Authentication	Oguntimilehin et al., 2022
	Customization, Tailoring to User Capabilities	(Albashrawi, 2021)
Environmental dimension	Cultural Context and Social Distance	(Simovic et al., 2024); (Al Amin et al., 2022)
	Economic Development Levels	(Simovic et al., 2024)
	Education and Digital Literacy Levels	Interview
	Technological Development Levels	(Simovic et al., 2024)
Individual Dimension	Perceived Service Value and User Perception	(Shaikh & Karjaluoto, 2016); (Sari & Nikmah, 2024); (Yin & Lin, 2022)
	Perceived Usefulness	(Issahaku et al., 2024); (Ginting et al., 2023); (Khudzaeva et al., 2023); (Erdoğan, 2023); (Al-Laheebi, 2022); (Hidayat-ur-Rehman et al., 2021); (Albashrawi, 2021)
	Practical and Emotional Experiences, Previous Experience	(Sharma, 2024); (Che et al., 2023); (Kumalasari et al., 2022); (Adhikari & Gyawali, 2023)
	Perceived Self-efficacy	(Asamoah et al., 2024); (Ginting et al., 2023); (Erdoğan, 2023); (Rabaa'i & ALMaati, 2021)
	User Trust	(Nguyen et al., 2024); (Sari & Nikmah, 2024); (Che et al., 2023); (Erdoğan, 2023); (Saibaba, 2024); (Al-Laheebi, 2022); (Andani & Hidayat, 2022); (Rabaa'i & ALMaati, 2021)
	User Satisfaction	(Sari & Nikmah, 2024); (Ginting et al., 2023); (Erdoğan, 2023); (Saibaba, 2024); (Yin & Lin, 2022); (Andani & Hidayat, 2022); (Rabaa'i & ALMaati, 2021); (Albashrawi, 2021)
	User Commitment	(Sari & Nikmah, 2024)
	User Anxiety Level	(Sari & Nikmah, 2024)
	Perceived User Risk	(Saibaba, 2024); (Al-Laheebi, 2022)
	Subjective Norms	(Al Amin et al., 2022)
	Individual Attitudes	(Al Amin et al., 2022)
	Individual digital resilience/flexibility, Adapting to technological changes	(Alhassan & Butler, 2021)

(Source: Researcher's Findings)

Table 2 summarizes the key findings of the study, highlighting the dimensions and factors influencing the continuous use of mobile banking services, along with the respective sources.

Discussion and Conclusion

A key trend in the financial sector is the growth and adoption of mobile banking applications, which appears to be closely associated with the increasing use of smartphones (Issahaku et al., 2024). Over time, mobile banking services have gained attraction among users and are expected to become the primary means for meeting customers' payment needs (Khoa, 2021). As a result, this study seeks to explore the factors and components that influence the continuous use of mobile banking by users.

The study's findings categorize these components into three main dimensions: organizational, environmental, and individual. Within the organizational dimension, the components include service performance and quality, information quality, aesthetic design, user compatibility, consideration of human interaction features, ensuring confidentiality and privacy, reducing interaction costs, implementing security measures, ease of use, organizational credibility (bank), and customizing mobile banking apps to suit user capabilities.

Garrouch (2021) highlights that a company's reputation influences the perceived security of its mobile app, with trust playing a critical role in the relationship between organizational reputation and customer support in shaping users' perceptions of mobile banking apps. Furthermore, organizational reputation and customer support significantly affect customers' assessments of privacy assurances, security features, and information quality within mobile banking apps. This suggests that a strong reputation and customer support from banks not only serve as direct indicators of reliability but also as indirect indicators of the perceived reliability and information quality of their apps (Che et al., 2023).

Consumers' previous experiences can provide valuable insights for policymakers in both the public and private sectors, as well as for industry leaders, to better understand trust-related issues in mobile banking (Basu et al., 2024). The ease of use of mobile banking services may be influenced by factors such as the user-friendly interface design, the style of information presentation, and the overall ease of interaction with the app (Jebarajakirthy & Shankar, 2021; Lee & Chung, 2009). Moreover, digital financial services are known to reduce transaction costs and enhance individuals' access to social communications (Lyons et al., 2019; Alhassan & Butler, 2021). According to expert interviews, lowering interaction costs improves customer experience and can serve as an incentive for frequent, small transactions, which ultimately encourages more engagement with banking apps. Research findings suggest that mobile banking technology benefits customers by reducing operational costs and enhancing the quality of banking services through features like ease of use, increased interaction, lower fees, instant connectivity, immediate access to information, and optimized time efficiency (Foroughi et al., 2019).

Given that cybersecurity threats on mobile platforms can impact customer experiences (Basu et al., 2024), strengthening the security of mobile banking apps is of great importance. According to interviewees, incorporating app features for users with physical limitations and capabilities can lead to user commitment and continuous usage.

Environmental factors include cultural, economic, and technological contexts that affect the continuous use of mobile banking. In societies with a welcoming attitude towards new technologies and a culture that encourages the adoption and use of innovation, mobile banking is more likely to be used consistently. Additionally, since digital security and privacy protection are crucial for individuals, using mobile banking services might be limited unless banks provide strong security measures. In other words, the perceived level of security can play a significant role in the continuous use of mobile banking (Garrouch, 2021).

Therefore, in societies where digital education and IT skills are part of public educational programs, people are more familiar with mobile banking services and use them more easily. For example, societies that have integrated technology and innovation into their daily lives tend to use mobile banking services more. In an environment where individuals have a positive attitude towards new technologies and have accepted them as part of modern life, they are expected to continue using banking apps. It is noteworthy that with access to high-speed internet and advanced mobile networks, mobile banking becomes easier to use, and continuous usage is anticipated. In communities with weaker infrastructure, unstable connectivity and limited access to digital services may negatively impact usage. Additionally, generational differences in technology adoption should not be overlooked, as younger generations accustomed to new technologies are likely to use mobile banking more. In comparison, older generations may adhere more to traditional methods. Consider the following part from one of the interviews in this regard:

> "However, using mobile banking requires a basic familiarity with technology. If individuals are not familiar with how to use smartphones or applications, even if these services are very efficient."

The third dimension, titled individual characteristics of users, refers to components such as perceived service value, perceived usefulness, previous practical and emotional experiences, perceived self-efficacy, user trust, user satisfaction, user commitment, user anxiety level, perceived user risk, subjective norms, attitudes, and individual digital resilience/flexibility. According to the Expectancy-Disconfirmation Theory, satisfaction directly influences the continuation of usage intention. User satisfaction, perceived usefulness, and perceived self-efficacy significantly impact the intention of continued use. The role of trust in customer relationships is also emphasized, with findings indicating that customers have greater concerns about security and privacy when using mobile banking services on smartphones (Al-Laheebi, 2022). Individual digital resilience refers to the ability of individuals to adapt, learn, and cope with digital challenges and technological changes. This concept includes technical skills, cybersecurity awareness, and the ability to overcome issues that may arise from digital technologies such as mobile banking. Mobile banking continually updates due to advancements in features and security. Individuals with digital resilience adapt more quickly to these changes and continue to use these services, helping them resolve issues calmly rather than abandoning mobile banking. These individuals find digital solutions to new challenges easily and do not stop using the technology. In this regard, consider the following sentence from one of

the interviews:

> Definitely. If someone cannot cope with the problems, they will soon abandon mobile banking and prefer to return to traditional methods. But someone who is more resilient will still try to use these services even if challenges arise such as internet outages or transaction errors.

Thus, digital resilience is more than a skill for coping with technology; it affects continued service use after experiencing fraud (Alhassan & Butler, 2021).

Suggestions for Future Research and Practical Applications

1. *Exploring Emerging Technologies*: Future research should explore the impact of emerging technologies such as blockchain and artificial intelligence on mobile banking applications. Understanding how these technologies influence security, user experience, and service efficiency could provide valuable insights for enhancing mobile banking platforms.
2. *Cross-Cultural Studies*: Conducting studies in diverse contexts to examine how cultural differences affect mobile banking adoption and its continuous use. Comparative analyses of different regions or countries could highlight specific cultural factors influencing user behavior and preferences.
3. *Longitudinal Studies*: Implementing longitudinal studies to track user behavior and satisfaction changes over time. This approach can help identify long-term trends and evolving user needs, offering more profound insights into the factors driving sustained mobile banking service usage.
4. *User Experience Optimization*: Future research can focus on optimizing user experience through personalized and adaptive interfaces. Investigating how user customization and adaptive features impact user satisfaction and engagement could lead to more user-friendly mobile banking applications.
5. *Security and Privacy Enhancements*: Given the critical importance of security and privacy, future research can focus on developing advanced security measures and privacy protection strategies. Evaluating the effectiveness of these measures in preventing cyber threats and ensuring user trust is essential.
6. *Impact of Regulatory Changes*: Examining how changes in financial regulations and data protection laws affect mobile banking adoption and usage. Understanding the implications of regulatory changes on user behavior and service delivery can help banks adapt to evolving legal requirements.
7. *Integration of Financial Literacy Programs*: Investigating the impact of integrating financial literacy programs into mobile banking applications. Assessing how educational content affects user decision-making and financial behavior could enhance the overall value of mobile banking services.
8. *Customer Support and Interaction*: Exploring innovative approaches to customer support within mobile banking apps, such as AI-driven chatbots or virtual assistants to understand their effect on user satisfaction, problem resolution, and improved customer service.

9. *User Segmentation and Personalization*: Conducting studies on user segmentation to identify different user groups and their specific needs can enable tailored mobile banking services, resulting in more effective marketing strategies and higher user satisfaction.
10. *Assessing Digital Inclusion*: Evaluating the role of mobile banking in promoting digital inclusion, particularly in underserved or rural areas. Researching how mobile banking services can bridge gaps in financial access and literacy can contribute to more equitable financial systems.
11. *Improving users' digital literacy*: Banks can take the following initiatives to increase their users' digital literacy: conducting in-person and online workshops and courses for users to learn how to use banking apps, producing simple and accessible educational content, providing short videos, infographics, and text guides on banking apps and social media to teach basic concepts, focusing on specific groups such as older people or those who are less familiar with technology.
12. *Improving app user experience*: Banks can improve their user experience by simplifying app design (e.g., developing a simple and intuitive user interface that can be easily used by people of all levels of digital literacy), increasing security and trust (e.g., providing transparent security features such as two-factor authentication and security alerts) to help users feel more confident), and adding in-app educational features such as interactive guides or step-by-step guidance on first use.
13. *Expanding public awareness and culture*: Banks can increase public awareness through the following means: information campaigns (using media, SMS, and social networks to inform about the benefits of mobile banking and how to use it properly), encouraging early use experience, and offering incentives such as prizes or discounts on services to those who use the application for the first time.
14. *Continuous evaluation and monitoring of services*: Banks can assess their services through conducting periodic surveys (continuously receiving user feedback and improving applications and services based on it.) and providing transparent and annual reports on the performance of online banking applications and services to gain public trust.

These suggestions aim to address current gaps and explore new opportunities for enhancing mobile banking applications and user experiences.

REFERENCES

Aashima, A., Chandrasekeran, I., Rana, A., Naredla, S., Ibrahim, W. K., & Alazzam, M. B. (2023, May). Blockchain Technology for Secured Transactions in Banking. In 2023 3rd *International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)* (pp. 655-660). IEEE.

Adhikari, U., & Gyawali, S. (2023). Customer Satisfaction of Service Quality: Assessing Mobile Banking Practices. *Journal of Tilottama, 1*(1), 125-139.

Al Amin, M., Arefin, M. S., Alam, M. S., & Rasul, T. F. (2022). Understanding the predictors of rural customers' continuance intention toward mobile banking services applications during the COVID-19 pandemic. *Journal of Global Marketing, 35*(4), 324-347.

Albashrawi, M. A. (2021). Mobile banking continuance intention: The moderating role of security and customization. *Journal of Information Technology Research, 14*(1), 55-69.

Alhassan, M. D., & Butler, M. (2021). Digital Resilience and the Continuance Use of Mobile Payment Services. ArXiv preprint arXiv: 2108.09743.

Al-Laheebi, G. A. J. (2022). Continuous intention to use mobile banking apps: Empirical study in Iraq. *Theory Methodology Practice-Review of Business and Management, 18*(1), 61-74.

Alsmadi, A., Alfityani, A., Alhwamdeh, L., Al_hazimeh, A., & Al-Gasawneh, J. (2022). Intentions to use FinTech in the Jordanian banking industry. *International Journal of Data and Network Science, 6*(4), 1351-1358.

Amoroso, D. L., & Chen, Y. A. N. (2017). Constructs Affecting Continuance intention in consumers with mobile financial apps: a dual factor approach. *Journal of Information Technology Management, 28*(3), 1-24.

Andani, A. D., & Hidayat, F. (2022). The Effect of Satisfaction, Trust and Continuance Intention on Mobile Banking User Loyalty. *AL-ARBAH: Journal of Islamic Finance and Banking*, *4*(1), 1-18.

Asamoah, C. A., Klapalová, A., & Nsiah, T. K. (2024). Digital Transformation in the Banking Sector: Evaluating Continuance Usage Intention. *Proceedings of the International Conference on Business Excellence*,18 (1), 3332-3342.

Basu, B., Sebastian, M. P., & Kar, A. K. (2024). What affects the promoting intention of mobile banking services? Insights from mining consumer reviews. *Journal of Retailing and Consumer Services, 77*, 103695.

Bhosale, V. P., Naik, P. G., Desai, S. B., & Patekar, P. (2023, January). Secure QR Code Transactions Using Mobile Banking App. In *International Conference on Smart Trends for Information Technology and Computer Communications* (pp. 35-46). Singapore: Springer Nature Singapore.

Cassioli, F., & Balconi, M. (2022). Advertising in app: a neuroscientific approach. *International Journal of Internet Marketing and Advertising, 16*(3), 257-270.

Chattopadhyay, A., & Sripada, D. (2023). Security Analysis and Threat Modelling of Mobile Banking Applications. In *2023 14th International Conference on Computing Communication and Networking Technologies* (ICCCNT) (pp. 1-6). IEEE

Che, M., Say, S. Y. A., Yu, H., Zhou, Q., Shu, J., Sun, W., ... & Xu, H. (2023). Investigating customers' continuous trust towards mobile banking apps. *Humanities and Social Sciences Communications, 10*(1), 1-10.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of advanced nursing*, *62*(1), 107-115.

Erdoğan, G. (2023). Examining the Determinants of the Customer's Continuance Intention in Mobile Banking: Integrating ECM and D&M Model. *Sosyal Bilimler Metinleri, 2023*(2), 137-152.

Foroughi, B., Iranmanesh, M., & Hyun, S. S. (2019). Understanding the determinants of mobile banking continuance usage intention. *Journal of Enterprise Information Management, 32*(6), 1015-1033.

Freud, S. (1989), *Introduction a La Psychanalyse*, Petit Bibliotheque Payot.

Garrouch, K. (2021). Does the reputation of the provider matter? A model explaining the continuance intention of mobile wallet applications. *Journal of Decision Systems, 30*(2-3), 150-171.

Ginting, M. A. V. (2023). Effect of E-Service Quality on E-Satisfaction in using Mobile Banking through User Experience at Bank Sumut. In *Proceedings of the 4th International Conference on Social and Political Development*, *1 (pp.* 85-90*).* SciTePress.

Hidayat, F. (2023). The Influence of Perceived Usefulness, Perceived Ease of Use, and Perceived Enjoyment on Customer Intentions to Move from Non-Digital Banks to Digital Banks. *Journal of Business Management and Islamic Banking, 2(1),* 51-64. doi: 10.14421/jbmib.2023.0201-04 .

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative health research, 15*(9), 1277-1288.

Issahaku, I., Kuada, E., Kumah, P., & Yaokumah, W. (2024). Determinants of Continual Use of Mobile Banking Applications: An Integrated Theoretical Perspective. In *Exploring Global FinTech Advancement and Applications* (pp. 19-41). IGI Global.

Jebarajakirthy, C., & Shankar, A. (2021). Impact of online convenience on mobile banking adoption intention: A moderated mediation approach. *Journal of Retailing and Consumer Services, 58,* 102323.

Julien, H. (2008). Content analysis. *The SAGE encyclopedia of qualitative research methods*, *1*, 120-121.

Kang, H., Lee, M. J., & Lee, J. K. (2012). Are you still with us? A study of the post-adoption determinants of sustained use of mobile-banking services. Journal of Organizational Computing and Electronic Commerce, 22(2), 132-159.

Khan, N., Siddiqui, B. N., Khan, N., Khan, F., Ullah, N., Ihtisham, M., ... & Muhammad, S. (2020). Analyzing mobile phone usage in agricultural modernization and rural development. *International Journal of Agricultural Extension, 8*(2), 139-147.

Khoa B. T. (2021) The Impact of the personal data disclosure's tradeoff on the trust and attitude loyalty in mobile banking services. *Journal of Promotion Management 27*(4):585–608.

Kumalasari, R. A. D., Permanasari, K. I., Karismariyanti, M., & Munandar, D. (2022). Mobile Banking: System Quality, Information Quality, Service Quality, Customer Satisfaction, and Loyalty. *Jurnal Administrare: Jurnal Pemikiran Ilmiah dan Pendidikan Administrasi Perkantoran, 9*(1), 141-148.

Lacmanovic, D., Lacmanovic, I., & Markoski, B. (2012). Mobile Banking - financial services technology. In *2012 Proceedings of the 35th International Convention MIPRO*, (pp. 1451-1455). Opatija, Croatia.

Lee, J. C., Tang, Y., & Jiang, S. (2023). Understanding continuance intention of artificial intelligence (AI)-enabled mobile banking applications: an extension of AI characteristics to an expectation confirmation model. *Humanities and Social Sciences Communications, 10*(1), 1-12.

Lee, K. C., & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with computers, 21*(5-6), 385-392.

Lincoln, Y. S., & Guba, E. G. (1985) *Naturalistic inquiry*. Sage.

Lyons, B., & Zhu, M. (2019). Consumer Uptake of Internet Banking, Endogenous Market Structure and Regional Integration in Europe (No. 2019-04). Centre for Competition Policy, University of East Anglia, Norwich, UK.

Maykut, P. S., & Morehouse, R. E., (1994). Beginning qualitative research: A philosophic and practical guide, (Vol. 6). Psychology Press.

Mayring, P. (2000). Qualitative content analysis. *Qualitative social Research,1*(2). Retrieved from http//:WWW.qualitative.-research.net/fqs-texte/2-00/02-00 mayring –e.htm .2000

Naruetharadhol, P., Ketkaew, C., Hongkanchanapong, N., Thaniswannasri, P., Uengkusolmongkol, T., Prasomthong, S., & Gebsombut, N. (2021). Factors affecting sustainable intention to use mobile banking services. *Sage Open, 11*(3), 21582440211029925.

Ngai, E. W., & Gunasekaran, A. (2007). A review for mobile commerce research and applications. *Decision support systems, 43*(1), 3-15.

Nguyen, G. D., & Dao, T. H. T. (2024). Factors influencing continuance intention to use mobile banking: an extended expectation-confirmation model with moderating role of trust. *Humanities and Social Sciences Communications, 11*(1), 1-14.

Oguntimilehin, A., Akukwe, M. L., Olatunji, K. A., Abiola, O. B., Adeyemo, O. A., & Abiodun, I. A. (2022, November). Mobile Banking Transaction Authentication using Deep Learning. In 2022 *5th Information Technology for Education and Development (ITED)* (pp. 1-7). IEEE.

Poromatikul, C., De Maeyer, P., Leelapanyalert, K., & Zaby, S. (2020). Drivers of continuance intention with mobile banking apps. *International Journal of Bank Marketing, 38*(1), 242-262.

Rabaa'i, A. A., & ALMaati, S. A. (2021). Exploring the determinants of users' continuance intention to use mobile banking services in Kuwait: extending the expectation-confirmation model. *Asia Pacific Journal of Information Systems, 31*(2), 141-184.

Rahma, N., & Sofyani, H. (2024). The influence of islamic banking digital service quality on intention to continue using islamic banking: a case of Indonesia. *Journal of Accounting and Investment, 25*(1), 269-288.

Saibaba, S. (2024). Examining the determinants of mobile banking app continuance intention in India: An extension of the IS success model. *Journal of Internet Commerce, 23*(1), 50-89.

Sari, A., & Nikmah, N. (2024). Pengaruh Penggunaan Mobile Banking Bri Terhadap Continuance Intention Pada Generasi Z. *Journal of Economic, Business and Accounting (COSTING), 7*(3), 4738-4748.

Shaikh, A. A., & Karjaluoto, H. (2014). Mobile banking adoption: A literature review. *Telematics and Informatics, 32*(1), 129–142. https://doi.org/10.1016/j.tele.2014.05.003

Sharma, N. (2024). A digital cohort analysis of consumers' mobile banking app experience. *International Journal of Consumer Studies, 48*(1), e12989.

Simovic, V., Theofanidis, F., Antonijevic, M., Rahat, M., & Nissi, Y. (2024). The differences in perceptions of continuous intention to use mobile banking apps: Evidence from Kuwait and Serbia. In C*onvergence of Digitalization, Innovation, and Sustainable Development in Business* (pp. 185-205). IGI Global.

Souiden, N., Ladhari, R., & Chaouali, W. (2021). Mobile banking adoption: a systematic review. *International Journal of Bank Marketing, 39*(2), 214-241.

Tam, C., & Oliveira, T. (2016). Understanding the impact of m-banking on individual performance: DeLone & McLean and TTF perspective. *Computers in Human Behavior, 61*, 233-244.

Tiwari, P., Tiwari, S. K., & Gupta, A. (2021). Examining the impact of customers' awareness, risk and trust in m-banking adoption. *FIIB Business Review*, *10*(4), 413-423.

Wilkinson, D. & Brimingham, P. (2003). *Using Research Instruments: A Guide for Researchers*. London: Routledge.

Yin, L. X., & Lin, H. C. (2022). Predictors of customers' continuance intention of mobile banking from the perspective of the interactivity theory. *Economic research, 35*(1), 6820-6849.

Zhang, Y., & Wildemuth, B. M. (2009). Qualitative analysis of content. *Applications of social research methods to questions in information and library science, 308*(319), 1-12.

Evaluating Open-Source Digital Library Systems: A Comparative Study

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ABSTRACT

Digital Libraries (DLs) enable the development, organization, and administration of digital resources and collections while offering search, retrieval, and other information services through computer networks and electronic platforms. The efficient management of digital content in these libraries bolsters the knowledge economy and fosters an environment conducive to scientific advancements and innovations. Open source is increasingly viewed as a viable alternative to commercial digital library systems, largely due to dissatisfaction with their functionality. Additionally, budget constraints faced by libraries and the rising costs of software development and maintenance have further fueled this shift. Open-source digital library software offers free access alongside reliable functionality, making it an appealing option. Selecting high-quality software is a critical decision in designing a digital library, as it forms the foundation for delivering services. However, the wide range of available options can make the selection process challenging. The key issue lies in clearly defining the library's information requirements and its intended usage. To simplify the decision-making process, we evaluated six widely adopted open-source digital library systems including CDSware, DSpace, Fedora, Greenstone, Keystone, and EPrints. The assessment was based on a checklist comprising eight categories of key criteria. Among these, DSpace emerged as the top performer, followed by Fedora, Greenstone, CDSware, and EPrints. Conversely, Keystone was ranked as the lowest one due to inadequate support for several essential features outlined in the checklist. This study aims to assist decision-makers in selecting and implementing open-source digital library systems effectively in their institutions.

KEYWORDS

Content Management, Digital Library, Knowledge Economy, Open Source.

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Introduction

Digital Libraries (DLs) are integral to the knowledge economy, which is an economy primarily driven by the production, distribution, and use of knowledge and information rather than traditional industries like manufacturing. As the global economy shifts toward an increased reliance on intellectual capital and data-driven decision-making, DLs serve as critical hubs for storing, managing, and disseminating information (Ajani et al., 2024). DLs provide unprecedented access to a wealth of knowledge, including academic research, publications, datasets, and historical archives. This easy access supports knowledge dissemination, enabling individuals, businesses, and institutions to quickly find the information needed to innovate, solve problems, and make informed decisions. In a knowledge economy, access to relevant, up-to-date content can directly affect economic performance, productivity, and competitiveness (Das, 2008). The knowledge economy thrives on innovation, and research is its cornerstone. DLs support researchers by offering access to scientific journals, academic papers, technical reports, and data sets. Researchers can collaborate more easily, explore the existing works, and build on past findings, fostering the creation of new knowledge and technological advances. This leads to innovations in fields like technology, medicine, and environmental sustainability (Anyim, 2018). DLs support economic development by providing small businesses, startups, and Entrepreneurs access to valuable resources, market insights, and research reports that might otherwise be out of reach. For example, a small business might access market research to help make strategic decisions or obtain scientific literature to innovate and develop new products (Dent, 2007). The knowledge economy heavily depends on intellectual property rights, including patents, copyrights, and trademarks. DLs help protect and manage this IP by storing relevant legal documents and ensuring easy access to these records. This ensures the proper use and attribution of intellectual capital, which are essential for fostering innovation and maintaining a fair marketplace (Kahn & Wu, 2020; Kallinikou et al., 2009). DLs are not just passive repositories but dynamic, evolving resources that actively shape the knowledge economy. By improving access to information, supporting research, fostering collaboration, and enabling lifelong learning, DLs provide a foundation for the continuous growth and development of knowledge-based industries. As the global economy continues to evolve, DLs will remain central to ensuring that knowledge is accessible, preserved, and used effectively to drive progress (Patra, 2006; Zharinov, 2020).

Content management in DLs is crucial for the knowledge economy. DLs serve as repositories for vast amounts of information, research, and educational resources, all of which are fundamental to the growth and dissemination of knowledge. In the context of the knowledge economy, efficient content management ensures:

- Information Accessibility: Well-organized DLs make knowledge more accessible to a broader audience, enabling students, researchers, and professionals to find and use information quickly and effectively.
- Knowledge Preservation: Digital content management systems help preserve

valuable intellectual resources, ensuring that knowledge is not lost over time due to technological or physical degradation.

- Collaboration and Innovation: A well-managed digital library facilitates collaboration across disciplines, industries, and borders by providing a central place for sharing and accessing diverse resources, thus fostering innovation.
- Efficient Use of Resources: Content management in DLs enables organizations to efficiently store, retrieve, and utilize data, reducing redundancy and improving productivity across sectors like education, business, and government.
- Economic Growth: By making high-quality information and research accessible, DLs contribute to the development of new ideas, products, and services, directly impacting the knowledge economy's growth (Du Plessis & Mabunda, 2016; Moahi, 2012; Paul, 2024; Srivastava et al., 2024; Stamou, 2017; Vijayakumar et al., 2024)

Therefore, content management in DLs plays a central role in ensuring the smooth flow of information and fostering innovation, which are vital to the functioning of a knowledge-driven economy. Meanwhile, using open source DLs is valuable in the knowledge-based economy. Open source DLs are typically free to use, reducing the financial burden on institutions. This is particularly advantageous for universities, libraries, and non-profit organizationsthat have limited budgets for proprietary systems (Kissa et al., 2024). Open source software allows institutions to modify and adapt the system to meet their specific needs. Customization is possible without relying on vendor-specific solutions or incurring high licensing fees. Open source projects are often supported by active communities of developers, scholars, and professionals. This fosters collaboration, encourages innovation, and provides a wide range of resources, such as forums, documentation, and user-driven development (Moradia et al., 2024). Open source code is open to inspection by anyone, which means that vulnerabilities can be identified and addressed quickly. This transparency also fosters trust, as users can verify that the system does not have hidden features or security risks (Ahammad et al., 2024). Open source DLs often adhere to widely accepted standards and protocols (e.g., OAI-PMH, MARC, Dublin Core), promoting easier integration with other platforms and systems. This can enhance resource discovery and sharing across institutions and regions (Hussein, 2017). Since open-source systems do not depend on the financial viability of a single vendor, they are less likely to become obsolete or unsupported over time. Institutions can continue using and evolving the software without worrying about licensing changes or corporate decisions (Ahammad et al., 2024). Open source DLs offer substantial cost savings over the long term compared to commercial solutions. The absence of licensing fees, lower initial setup costs, and more flexible customization options make open-source systems attractive, especially for institutions looking to minimize their total cost of ownership. However, these savings come with the need for more in-house technical expertise or reliance on third-party service providers for support (Ahammad et al., 2024).

Based on some research findings (e.g., Jabeen, 2024; Kampa & Kaushik, 2019; Khan &

Sheikh, 2022), evaluating open-source DLs content management is crucial in the knowledge-based economy. By leveraging the strengths of open-source technologies, organizations can contribute to a more open, collaborative, and innovative global knowledge infrastructure. Therefore, this article evaluates the content management in open source DLs' applications.

Literature Review

Vijayakumar et al. (2024) explored the role of Digital Libraries (DLs) in enhancing e-commerce growth by providing access to market research, best practices, and training resources, which are crucial for competitive advantages. They also examined the challenges that digital libraries face, such as funding constraints, digital divides, and technological advancements. By addressing these issues, Digital Libraries can continue to foster e-commerce development, contributing to the broader digital economy.

The study by Kampa and Kaushik (2019) investigated the adoption and utilization of open-source software (OSS) in libraries belonging to India's Institutions of National Importance (INIs) and examined its economic implications for these libraries. Furthermore, the research explored the business model associated with OSS. Through an online survey targeting library professionals in INIs, the study assessed the extent of OSS adoption, usage, and acceptance. To analyze the data, descriptive statistics and Pearson's chi-square test were employed.

The results showed that INI libraries utilize open-source software (OSS) for Integrated Library Systems (ILS) (18.4%), digital repositories (95.2%), and library websites (65.5%). The most widely used OSS solutions in these libraries are Koha, DSpace, Drupal, and Joomla! The findings suggested a strong positive correlation between the adoption and usage of OSS and factors such as favorable attitudes towards OSS and the presence of an OSS policy. Additionally, the study estimated that Indian university libraries could potentially save around ₹417 million by adopting open-source ILS platforms like Koha, Evergreen, NewGenLib, and ABCD.

Garzarelli et al. (2008) leveraged classical economic theories on the division of labor and institutional analysis to examine the comparative costs and benefits of open-source software (OSS) and proprietary software development. They contended that OSS, with its unique licensing model, facilitates market expansion more effectively than proprietary alternatives by encouraging voluntary contributions from a diverse pool of participants. This collective effort results in a division of labor described as 'redundant economies'. By continuously generating, reusing, and sharing knowledge, these redundant economies produce increasing returns, which are crucial for fostering the economic growth.

As a result, there has been a growing interest in the development of open-source software for DLs, with developers from various locations and organizations collaborating to share codes and enhance programs. From an economist's perspective, the behavior of individual programmers and commercial entities involved in open-source DL projects is of significant importance. Background checks showed while there has been significant

research on digital libraries and content management in general, the specific application of open-source solutions in this area seems underexplored.

There is a lack of research that specifically evaluates the role of open-source DL software in content management for the knowledge economy. By focusing on this gap, the article could contribute new insights into the advantages and challenges these open-source platforms present for managing knowledge.

Methodology

DLs play an essential role in creating, organizing, and managing digital content and collections, offering users tools for search, retrieval, and a range of information services through electronic platforms and computer networks. Technological advancements in DL systems have transformed the way people access and interact with information, redefining libraries as entities beyond physical spaces.

In recent years, open-source software has emerged as a viable alternative to commercial digital library systems, largely due to functionality concerns and the financial constraints faced by many libraries. Budget reductions, coupled with the rising costs of software development and maintenance, have made open-source DL software an increasingly attractive option. These platforms offer free access while maintaining robust functionality, contributing to their growing popularity.

A critical step in designing a digital library is selecting the appropriate software platform to deliver services effectively. With a wide array of options available, this decision can be complex. The key issue lies in clearly identifying the type of information the library will manage and its intended use.

To support this decision-making process, this study compares six widely used digital library systems that are implemented globally. DSpace[1], developed by the MIT Libraries and Hewlett-Packard Labs, is distributed under the BSD open-source license. Fedora[2], a collaboration between Cornell University and the University of Virginia Library, is released under the Educational Community License. Greenstone[3], developed by the University of Waikato, is distributed under the GNU General Public License. Keystone[4], developed by Index Data, is also licensed under the GNU General Public License. EPrints[5], created by the University of Southampton, is an open-source system for managing digital repositories. CDSware[6], developed by CERN, the European Organization for Nuclear Research, CDSware is used for document server software in one of the world's largest particle physics laboratories.

The six digital library systems were systematically assessed based on their content management features, as outlined in the subsequent sections (Table 1). The weighting of

1. DSpace Federation: Available at http://www.dspace.org/.
2. Fedora Project. Available at http://www.fedora.info/
3. Greenstone Digital Library Software. Available at http://www.greenstone.org/
4. Keystone DLS. Available at http://www.indexdata.dk/keystone/
5. EPrints for Digital Repositories. Available at http://www.eprints.org/
6. CDSware developed the CERN document server software. Available at http://cdsware.cern.ch

evaluation criteria was adapted from the method proposed by Dawood et al. (2021), who utilizes the Fuzzy Delphi technique. This technique traditionally involves a committee assigning weights to criteria anonymously, using questionnaires. For this study, the approach was modified by enlisting a panel of 10 individuals, all trained in information science and knowledgeable about Digital Library (DL) concepts, to independently assign weights to each category and its associated items.

Subsequently, the six selected DL software systems were evaluated using a comprehensive checklist. The evaluation was conducted by the same 10-member panel during a separate session, where they collaboratively scored the software. If disagreements arose regarding whether the software met specific criteria, a simple majority vote was used to resolve the issue. In cases of a tie, the matter was clarified by reaching out to the software developers via email or consulting additional resources.

Table 1.
Verbal Phrases for Confirming the Evaluation Indicators

Linguistic Variable	Fuzzy equivalents	Inverse Fuzzy Equivalents
Not important	1-1-1	1-1-1
Very low importance	3-2-1	0.5-1-0.333
Low importance	4-3-2	0.5-0.333-0.25
Relatively low importance	5-4-3	0.333-0.25-0.2
Somewhat essential	6-5-4	0.25-0.2-0.166
A little essential	7-6-5	0.2-0.16 -0.142
Somewhat necessary	8-7-6	0.166-0.142-0.125
Essential to a great extent	9-8-7	0.142-125.0-0.111
Completely necessary	9-9-9	0.111 -0.111 -0.111

(Source: Researcher's Findings)

Research Elaborations

The criteria for the initial selection of DLsoftware were as follows:

1. *Availability for free download and installation*: The software must be available for download and installation at no cost under an open-source license to facilitate evaluation.
2. *Widespread use*: The software should be relatively well-known and commonly used. This was inferred from the number of installations, especially in reputable institutions such as universities.
3. *Platform compatibility*: The software must be supported on either Linux or Windows, as these are widely used platforms.

Based on these criteria, six digital library software packages were selected for evaluation: CERN Document Server (CDSware), DSpace, Fedora, Greenstone, Keystone, and EPrints.

The following are the primary content management features expected in modern integrated DL software:

1. *Object model*: This pertains to the internal structure of digital objects, which integrate metadata and digital content within the DL system. Unique identifiers for each object and its components are vital for ensuring long-term preservation and accessibility.

2. *Collections and relationship management*: This includes metadata for describing collections, defining sub-collections, and using templates to determine the format of digital objects or how collections are presented. It also encompasses establishing relationships between various types of objects.
3. *Metadata and content storage*: This feature addresses storage functionality and preservation concerns. The DL system should support both standardized and customized metadata sets while managing diverse digital content formats.
4. *Search and navigation*: This involves mechanisms for indexing and searching metadata. The system should provide indexing capabilities not only for a limited range of metadata but also for specific metadata fields to enhance the search functionality.
5. *Object management tools*: These tools include interfaces and processes for managing metadata and digital content, enabling users to insert, update, or delete records effectively.
6. *End-user interfaces*: These interfaces provide users with seamless access to the digital library, its collections, and digital objects, ensuring a user-friendly experience.
7. *Access control mechanisms*: This includes user and group management, as well as authentication and authorization methods. The system should provide granular access and update controls across various levels, including the digital library, collections, individual objects, and content.
8. *Multilingual support*: The software must support multiple languages across its user interface, metadata, and digital content. Proper character encoding is essential to ensure full functionality in multilingual environments (Kamdar, 2019; Mandal, 2018; Rahman & Islam, 2020).

The defining features of effective open-source DL software were identified through a review of the literature. Key categories of content management features were first outlined and subsequently broken down into their supporting components. To evaluate these features comprehensively, a checklist was created encompassing all identified content management attributes. The outcomes of the Fuzzy Delphi panel are summarized in Table 2.

Table 2.
Fuzzy Delphi Panel Results

Indicator	Definite Average	Confirmation Status
Search and browse	8.8	Approved
User interfaces	8.8	Approved
Metadata and digital content storage	8.7	Approved
Object management	8.5	Approved
Access control	8.2	Approved
Object model	7.8	Approved
Multiple languages support	7.7	Approved
Collection support and relations	7.4	Approved

(Source: Researcher's Findings)

In this study, the threshold number was considered to be 7 (Wu & Fang, 2011). Based on the findings in Table 2, it was determined that after analyzing the data from the Fuzzy Delphi questionnaire and in two stages, a total of 8 indicators was confirmed and selected to evaluate content management in open source DL.

The checklist was applied to evaluate six widely used open-source DL software packages—CDSware, DSpace, Fedora, Greenstone, Keystone, and EPrints. This assessment aimed to determine their suitability for DL projects, as guided by the insights of the Fuzzy Delphi Panel members.

Each of the six DL systems was evaluated across the eight categories mentioned earlier. Based on the analysis of these categories, the DL systems were graded for each characteristic, with the scores ranging from **1** (the lowest) to **5** (the highest). This grading system helped to provide a clear comparison of the systems based on their features and suitability for the project.

Next, the Simple Additive Weighting (S.A.W.) method was used. In this method, the scores obtained from the evaluation of each software in each indicator were multiplied by the weighted average determined in the Fuzzy Delphi Evaluation List for each indicator, and based on the results, the open access software of the studied digital library was compared with each other in terms of their content management status.

Findings

In this section, we present our findings regarding the six selected DL software packages considering 8 basic content management features:

Table 3.
Evaluation Results for 8 Basic Content Management Features

	DSpace	Fedora	Greenstone	Keystone	EPrints	CDSware
Search and Browse	• The system automatically indexes the core metadata set (qualified DC) using a relational database. • It also indexes additional metadata sets using the Lucene API (Apache Lucene). • Lucene enables field-specific search, stemming, and the exclusion of stop words. • Searches can be limited to specific collections or communities. • By default, browsing options are available for title, author, and date fields.	• The default indexing system accommodates both the DC metadata set and the system metadata of digital objects. • Indexing and search functions are managed through relational databases like MySQL, Oracle, or PostgreSQL. • Searches can be performed across all indexed fields, with the flexibility to apply constraints combining multiple fields. • A generic search interface is available using search engines like Lucene or Zebra. • Relationships between digital objects are indexed and searchable via the Fedora resource index. • The system does not provide a browsing mechanism by default.	• Indexing is supported for text documents and specific metadata fields. • The search function allows queries to target specific sections within a document or the entire document. • Stemming and case-sensitive searches are enabled. • Open-source tools are used to handle large data volumes for indexing and searching operations. • Catalogs can be browsed and organized by specific fields using a hierarchical structure.	• Indexing is available for designated document types across the entire metadata set. • Free-text search functionality is provided. • No browsing mechanism is available.	• All metadata fields are supported with MySQL as the database and full-text indexing are available for selected fields. • Users can perform both combined fielded searches and free-text searches. • Browsing is enabled using specific fields.	• Supports full-text search and allows searching across all metadata fields. • The CDSware system utilizes its proprietary indexing technology and a search engine tailored for large data repositories. • Indexing and searching are handled through a relational database, such as MySQL.

	DSpace	Fedora	Greenstone	Keystone	EPrints	CDSware
User Interfaces	• A default web user interface is provided, allowing users to browse collections, view the qualified Dublin Core (DC) metadata of items, and access their bitstreams. • Navigation within an item is supported through its structural metadata. • A search interface is included by default, enabling users to perform keyword searches.	• The web interface provides a search environment for users. • By default, digital objects are displayed with system metadata and their associated datastreams. • The presentation or manipulation of datastreams is determined by the behavior of digital objects. • Developers have the ability to create custom web services and associate them with digital objects as behaviors. • Dublin Core (DC) metadata is included as default behaviors.	• The default web user interface enables users to browse and search collections, as well as navigate through hierarchical objects using a table of contents. • The display of documents or search results can vary based on the specified XSLTs.	• The presentation of the document is controlled by an XSLT stylesheet customized for its document type. • The main web user interface is structured in a portal-like format, enabling users to browse the document directory and search within the digital library.	• The web user interface allows browsing by specific metadata fields. • Browsing can be hierarchical, especially for subject fields. • The search environment enables users to refine their queries by using multiple fields and selecting values from predefined lists.	• CDSware allows users to store repository content in personal files within the system. • Each collection can have its own dedicated interface. • Multilingual support is provided for the interfaces.
Metadata and Digital Content Storage	• The qualified DC metadata is maintained in a relational database, such as PostgreSQL or Oracle. • Other metadata collections and digital content are stored as bitstreams on the file system. • Each bitstream is linked to a particular format. • A support level is assigned to each bitstream format, which indicates the level of preservation for the corresponding file format.	• Metadata and digital content are handled as data streams within the digital object. • Data streams can be stored in three different ways: (a) within the digital object XML file, (b) as managed content on the file system, or (c) from an external source. • Multiple metadata sets can be used at the same time. • Basic technical metadata, such as MIME type, file size, and checksums, are stored for each data stream to ensure content preservation. • Versioning is available for specific data streams, allowing users to access previous versions of the data stream instances.	• Documents and resources are stored on the file system. • Metadata is user-defined and embedded within documents using an internal XML format.	• Each item keeps its metadata in an XML file. • The metadata is not restricted to a particular standard but is specified using a custom XML schema for each type of document. • The digital content is stored within a directory system that contains the XML files.	• The user defines the metadata fields. • The data object, including metadata, is stored in a MySQL database, while the documents themselves are kept on the file system.	• Metadata fields can be added or removed as needed. Accepted content is updated and indexed in real-time. The data object, including metadata, is stored in a MySQL database.
Object Management	• Items are created through the Web submission interface or by using the batch item importer, which uploads XML metadata documents and associated content files. • A workflow process may be triggered in both cases, depending on the collection's configuration. • The workflow can be customized with one to three steps, allowing different users or groups to participate in the item submission process. • Collections and communities are created via the Web user interface.	• Digital objects can be created using the administrator client or the batch import utility, which supports XML files in METS or FOXML format. • Metadata can be added or edited through a text editor within the administrator client. • The same client is also used for adding or removing digital content (data streams).	• New collections and the documents within them are created using the Greenstone librarian interface or the command-line building program.	• Keystone's content management system offers a web interface for document editing. • It allows designated users to manage both the content of documents and the file structure.	• A default web user interface is available for creating and editing objects. • Authority records are utilized to assist in completing specific fields, such as authors, titles, etc. • Objects can also be imported from text files in various formats, including METS, DC, MODS, BibTeX, and EndNote.	CDSware supports multiple collections within the system. The collected data is always converted into MARC XML format, ensuring compatibility with OAI. Additionally, it allows for format conversions, such as from MARC XML to MARC21 or Dublin Core (DC), among others.

	DSpace	Fedora	Greenstone	Keystone	EPrints	CDSware
Access Control	• Supports users with different levels of access rights. • Authentication is managed through user passwords or the Lightweight Directory Access Protocol (LDAP). • Access control permissions are configured for each item, specifying the actions users are allowed to perform.	• Supports users and groups with authorized access to specific digital objects through XACML policies. Authentication is provided via LDAP or for specific IP addresses.	• A user is assigned to one of two predefined groups: administrator or collection builder. The administrator group has the rights to create and delete users, while the collection builder group is responsible for building and updating collections. End users have access to all collections and documents.	• A basic access control system is supported, allowing the definition of administrators and standard users, each with specific access rights to designated parts of the document structure.	• Registered users can create and edit objects by logging in with their username and password.	• CDSware recognizes multiple resources within the system. Users have the option to select their own passwords and are provided with password reminder features.
Object Model	• The fundamental unit is an item, which encompasses both metadata and digital content. It employs Qualified Dublin Core for metadata. The internal structure of an item is determined by its structural metadata. Each item is assigned a globally unique identifier using the CNRI handle system, and persistent identifiers are also applied to the bitstreams linked to each item.	• The primary entity is the digital object, structured according to the Fedora Object XML, which follows the METS standard. This digital object consists of both metadata and digital content, with each being managed as data streams. Additionally, the digital object contains links to its associated behaviors. Data streams are uniquely identified by a combination of the digital object's persistent identifier and the DataStream identifier.	• The primary entity is the document, represented in XML format. Documents are associated with one or more other entities. Each document is assigned a unique identifier, though persistent identifiers for the resources are not supported.	• The core entity is the document, with its internal structure defined by a user-specified XML schema. The directory organization of the documents mirrors the structure of the objects.	• The fundamental entity is the data object, which consists of a record that includes metadata. This data object can be linked to one or more documents (files), and each data object is assigned a unique identifier.	• CDSware includes a versioning system to manage updated or enhanced versions of registered objects. Additionally, it offers a function for managing and correcting submitted objects. Like other software in this category, CDSware emphasizes allowing creators to submit digital objects themselves.
Multiple Languages Support	• Employs Unicode character encoding. • Supports multiple languages in both metadata fields and digital content.	• Utilizes Unicode character encoding. • Supports multiple languages within the metadata fields and digital content.	• Employs Unicode character encoding. • Supports multiple languages in both metadata fields and digital content. • Offers pre-translated multilingual interfaces ready for use in various languages.	• Utilizes Unicode character encoding. • Supports multiple languages in metadata fields and digital contents. • Provides an XML attribute in metadata fields to specify the language of the field value.	• Employs Unicode character encoding. • Supports multiple languages within metadata fields and digital contents. • Includes an XML attribute in metadata fields to specify the language used for each field value.	• Unicode support enables the use of nearly all languages. • Document formats can be defined as short or detailed HTML, XML DC, and XML MARC21.
Collections and Relations Support	• Allows the creation of collections of items and communities that contain multiple collections. • An item can be part of several collections, but it has only one primary collection. • Default values for metadata fields can be set within a collection. • The collection's descriptive metadata includes the title and description. • There is no support for establishing relationships between different items.	• Fedora supports collections via the RELSEXT DataStream, which includes a fundamental relationship ontology. • This DataStream utilizes the Resource Description Framework (RDF) to express relationships between digital objects (W3C). • However, Fedora lacks a built-in mechanism to manage or manipulate these relationships.	• A collection specifies a set of attributes that define its functionality. • These attributes encompass capabilities such as indexing, searching, browsing, supported file formats, conversion plugins, and import entry points for digital content. • A hierarchical structure is supported for text documents, including elements like chapters, sections, and paragraphs. • Specific sections within a text document are marked using special XML tags. • XLinks within a document can be used to create links to other documents or resources.	• Collections are not explicitly defined but are implied by the hierarchical organization of the documents. • The XML schema for the documents outlines shared characteristics for documents of a particular type. Relationships between documents are not formally defined, but can be indicated by using URLs in specific metadata fields.	• Collections are not explicitly considered. • Data objects are categorized based on specific fields like subject, year, or title. • Relationships between documents are not formally defined, except by using URLs in specific metadata fields.	• CDSware enables repository administrators to pre-set specific values for metadata fields, making data entry more efficient. • Collections are organized using a hierarchical structure. • Metadata and full-text information are kept separate. Metadata only contains the necessary information to access the full-text source using the OpenURL Protocol.

(Source: Researcher's Findings)

In Table 3, the six open access DL systems are compared according to the characteristics outlined in the previous section. The level of support for each characteristic is discussed and specific considerations for each DL system are provided. The table displays the scores for each category across the six evaluated DL software systems.

Table 4.
Evaluation Results for Individual Categories

Characteristics	DSpace	Fedora	Greenstone	CDSware	EPrints	Keystone
Search and browse	35.2	26.4	35.2	35.2	35.2	17.6
User interfaces	35.2	17.6	35.2	35.2	35.2	35.2
Metadata and digital content storage	34.8	43.5	26.1	26.1	26.1	26.1
Object management	34	17	17	25.5	34	25.5
Access control	41	32.8	16.4	24.6	16.4	16.4
Object model	31.2	39	23.4	23.4	15.6	23.4
Multiple languages support	23.1	23.1	30.8	23.1	30.8	30.8
Collection support and relations	29.6	29.6	37	22.2	7.4	14.8
Total	264.1	229	221.1	215.3	200.7	189.8

(Source: Researcher's Findings)

Table 4 showed that DSpace was found to be the best performer followed by Fedora, Greenstone, CDSware, EPrints and Keystone. In contrast, Keystone was the worst performer due to its poor support for certain features deemed important in our checklist.

Discussion and Conclusion

It is challenging to recommend a single DL system as the most suitable one for all scenarios. Each system has its own strengths and weaknesses, as highlighted in the comparison above, which categorizes them based on fundamental characteristics and features. This comparison should only serve as a guide for organizations to determine whether one of these DL systems fits their needs for hosting digital collections. Typically, an organization's requirements vary based on factors such as the number of collections, the types of objects, the nature of the content, update frequency, content distribution, and time constraints for DL development. The following paragraphs offer guidance on selecting a DL system based on different organizational needs.

1. In a scenario where a university or institution needs a digital repository for research papers and dissertations from students and staff, DSpace would be the most appropriate digital library system. It naturally supports the organization of communities (e.g., university departments) and collections (e.g., research papers and dissertations), and its workflow management is vital for handling item submissions from individuals.

2. If an organization needs a single digital collection to publish content quickly and integrate the digital library's interface with a portal-like website, Keystone or EPrints would be the ideal choices. These systems allow separation of presentation and storage, are flexible in metadata standards, and offer simple web interfaces for submitting and displaying documents and metadata.

3. For an organization focused on digitizing collections from libraries, archives, and museums and managing them in one digital library system, Fedora is the best option. Its highly customizable and modular architecture suits organizations with the resources and time to tailor the system and develop additional modules. It supports preservation needs, multiple metadata standards, and a variety of digital content formats. Although it lacks user-friendly web interfaces or built-in functionalities, it is the best choice for managing diverse collections. CDSware is also a viable option for handling large repositories with various materials, such as museum object descriptions or classified documents.

4. When an organization wants to electronically publish books in a user-friendly and customizable digital library system, Greenstone is the most suitable choice. It supports hierarchical representation of books, including tables of contents, and enables full-text search within chapters.

In today's knowledge-driven economy, knowledge flows in new ways, leading to shifts in an organization's structure and function. Digital libraries, as organizations, often innovate in how they deliver information services to clients, leveraging information and communication technologies. The growth of technological applications is transforming how digital libraries serve their clients, with content management continuously redefining how DL collections are utilized.

This article made an attempt to explore the content management in six DL software systems including CDSware, DSpace, Fedora, Greenstone, Keystone, and EPrints. The research adopts a qualitative paradigm and a case study design, allowing for an in-depth analysis of the participants' perceptions and experiences while ensuring real-life situations are considered. A key finding from the study is the emphasis on the critical role of the content management in open-source DLs.

Content management in DLs plays a crucial role in the knowledge economy by facilitating the organization, preservation, and accessibility of information. As knowledge becomes a primary driver of economic growth, the ability to manage vast quantities of digital content effectively ensures that valuable data, research, and intellectual capital are readily available to individuals, organizations, and governments. Here are a few reasons why content management is essential in this context:

- *Efficient Knowledge Sharing and Collaboration*: Digital libraries make it possible for individuals across the world to access research, academic papers, datasets, and other forms of knowledge. Effective content management ensures that this information is well-organized, searchable, and up-to-date, fostering collaboration and innovation in various fields.
- *Preservation of Intellectual Capital*: In the knowledge economy, intellectual property and research outputs are central to productivity and innovation. Digital libraries ensure that digital assets are preserved for future generations, reducing the risk of knowledge loss due to technological obsolescence or data corruption.
- *Support for Lifelong Learning and Skills Development*: Content management systems allow learners at all levels to access a vast repository of educational

resources, which is essential in an economy that requires continuous skill development. A well-managed digital library provides both structured learning materials and informal knowledge-sharing platforms.

- *Data Curation and Integration*: The knowledge economy often relies on the integration of vast amounts of data from diverse sources. Digital libraries with strong content management practices enable the curation and integration of datasets from various fields, supporting data-driven decision-making, research, and development.
- *Facilitating Innovation*: Access to well-managed, high-quality content allows researchers, entrepreneurs, and organizations to build upon the existing knowledge and create new products, services, and solutions. In this way, effective content management can directly contribute to the innovation and development of new industries.
- *Compliance and Security*: Proper content management ensures that the content within digital libraries is protected against unauthorized access and complies with legal and ethical standards, such as copyright laws and data protection regulations. This is vital in maintaining the integrity of digital knowledge resources.

In conclusion, content management in DLs plays a crucial role in supporting the knowledge economy by ensuring that knowledge is easily accessible, reliable, and secure. This facilitates learning, innovation, and sustainable economic growth. The goal of this study was to create a checklist for evaluating DL's content management systems. The checklist consists of eight key categories of object model, collections and relations support, metadata and digital content storage, search and browse, object management, user interfaces, access control, and multiple languages support. This checklist was applied to evaluate six open-source DL software packages (CDSware, DSpace, Fedora, Greenstone, Keystone, and EPrints). Based on the evaluation, DSpace emerged as the top performer, followed by Fedora, Greenstone, CDSware, EPrints, and Keystone. Keystone was considered as the worst due to its lack of support for important features in the checklist. The developed checklist is flexible, allowing users to add new categories to suit different DL needs.

Search Engine Optimization (SEO) is also vital in the knowledge economy, as it ensures that the information remains accessible, relevant, and visible to the right audience, promoting growth, engagement, and authority in a competitive digital environment. As shown in Table 4, DSpace and Greenstone were identified as the best performers in search and browse functionality and user interfaces. A case study by Formanek (2021) on worldwide repositories using DSpace demonstrated more than 59% improvement in SEO variables compared to a fresh installation. Additionally, Begum et al. (2012) found that the Digital Library Network in South Asia (DLNETSA), East West University, and BANBEIS enhanced their search and browse capabilities and user interfaces using Greenstone DL Software.

The research findings showed that Fedora was ranked as second in the evaluation checklist. However, according to Khan and Sheikh (2022), Fedora has not been used by any university libraries in Pakistan yet, and it is recommended that its use be explored by Pakistani library authorities.

Overall, the findings highlighted the importance of content management, user-friendly interfaces, usability, and efficient information search and retrieval. These insights can guide library professionals in making informed decisions about the successful implementation of open-source DL software in libraries and the improvement of library technologies.

It is important to note that selecting a specific open-source DL system is challenging because each system has its own advantages and disadvantages, as outlined in the comparison of their features. Organizations must use the comparison as a guideline to determine which system is best suited for their digital collections, considering factors such as the number of collections, types of objects, content nature, update frequency, distribution, and development timelines.

While open-source DL Software offers flexibility, cost savings, and customization options, it also comes with challenges such as security vulnerabilities, the need for extensive internal resources, potential technical limitations, and reliance on community support. Compared to commercial software, which typically offers professional support, regular updates, and comprehensive features, open-source DLS may require more effort to maintain, scale, and secure. Organizations must carefully evaluate these challenges against the benefits before committing to an open-source DLS solution, ensuring that they have the necessary resources and expertise to manage it effectively (David, et al., 2023; Khatami & Zaidman, 2024; Verma & Kumar, 2018).

In the end, it should be mentioned that the intersection of open source DLs with AI, Big Data, and Blockchain technology is shaping up to be a transformative force in content management. Future trends indicate that these technologies will drive more intelligent, scalable, and secure solutions for managing vast amounts of data and content. By making open source DLs more accessible and transparent, these trends promise to unlock new possibilities for digital library innovation (Panda & Kaur, 2023; Tella et al., 2022; Viji, 2025).

REFERENCE

Ahammad, N., Bahry, F. D. S., & Hussaini, H. (2024). Influence of open-source software on Bangladesh academic library service sustainability: a conceptual framework. *Journal of Information, Communication and Ethics in Society*, (ahead-of-print).

Ahammad, N., Saiful Bahri, F. D., & Husaini, H. (2024). Exploring the open-source impact on Bangladesh academic library service sustainability. *Journal of Information, Communication and Ethics in Society*.

Ajani, Y. A., Adefila, E. K., Olarongbe, S. A., Enakrire, R. T., & Rabiu, N. (2024). Big data and the management of libraries in the era of the Fourth Industrial Revolution: implications for policymakers. *Digital Library Perspectives*, *40*(2), 311-329. https://doi.org/10.1108/DLP-10-2023-0083.

Anyim, W. O. (2018). E-Library resources and services: Improvement and innovation of access and retrieval for effective research activities in university e-libraries in Kogi State Nigeria. *Library Philosophy and Practice*, 0_1-21.

Begum, D., Rashid, M. M., & Mahamud, R. (2012, October). Greenstone digital library software: A case study of Bangladesh. In *Proceedings of International Seminar on Digital Libraries for Digital Nation* (pp. 125-138).

Das, A. K. (2008). *Open access to knowledge and information: scholarly literature and digital library initiatives-the South Asian scenario*. UNESCO, New Delhi.

David, I., Latifaj, M., Pietron, J., Zhang, W., Ciccozzi, F., Malavolta, I., & Hebig, R. (2023). Blended modeling in commercial and open-source model-driven software engineering tools: A systematic study. *Software and Systems Modeling*, *22*(1), 415-447.

Dawood, K. A., Sharif, K. Y., Ghani, A. A., Zulzalil, H., Zaidan, A. A., & Zaidan, B. B. (2021). Towards a unified criteria model for usability evaluation in the context of open source software based on a fuzzy Delphi method. *Information and Software Technology*, *130*, 106453.

Dent, V. F. (2007). Local economic development in Uganda and the connection to rural community libraries and literacy. *New library world*, *108*(5/6), 203-217. https://doi.org/10.1108/03074800710748777.

Du Plessis, T., & Mabunda, T. T. (2016). Change management in an academic library in the knowledge economy. *South African Journal of Libraries and Information Science*, *82*(1), 53-61.

Formanek, M. (2021). Solving SEO Issues in DSpace-based Digital Repositories: A Case Study and Assessment of Worldwide Repositories. *Information Technology and Libraries*, *40*(1). https://doi.org/10.6017/ital.v40i1.12529.

Garzarelli, G., Limam, Y. R., & Thomassen, B. (2008). Open source software and economic growth: A classical division of labor perspective. *Information Technology for Development*, *14*(2), 116-135. https://doi.org/10.1002/itdj.20092.

Hussein, D. I. R. M. (2017). Open source digital repository software in Egyptian university libraries and its role in supporting economic development: Reality and Aspiration. *Cybrarians Journal*, (47), NA-NA.

Jabeen, M. (2024). The adoption footprints of Koha as a library management system in university libraries of Pakistan. *Journal of Information Science*, 01655515231214980.

Kahn, A., & Wu, X. (2020). Impact of digital economy on intellectual property law. *J. Pol. & L.*, *13*, 117.

Kallinikou, D., Papadopoulos, J. M., Kaponi, A., & Strakantouna, V. (2009). Intellectual property issues for DLs in the Internet networked public sphere. In *8th International Conference Computer Ethics: Philosophical Enquiry* (Vol. 344).

Kamdar, N. H. (2019). Open Source Software for Libraries. *LIBRARIANSHIP DEVELOPMENT THROUGH INTERNET OF THINGS AND CUSTOMER SERVICE*, 49.

Kampa, R. K., & Kaushik, P. (2019). Economics of open source library software: evidences from Indian libraries. *Global Knowledge, Memory and Communication*, *68*(4/5), 337-355. https://doi.org/10.1108/GKMC-04-2018-0036.

Kampa, R. K., & Kaushik, P. (2019). Economics of open source library software: evidences from Indian libraries. *Global Knowledge, Memory and Communication*, *68*(4/5), 337-355.

Khan, M. K., & Sheikh, A. (2022). Open source software adoption for development of institutional repositories in university libraries of Islamabad. *Information Discovery and Delivery*, *51*(1), 47-55.

Khan, M. K., & Sheikh, A. (2022). Open source software adoption for development of institutional repositories in university libraries of Islamabad. *Information Discovery and Delivery*, *51*(1), 47-55.

Khatami, A., & Zaidman, A. (2024). State-of-the-practice in quality assurance in Java-based open source software development. *Software: Practice and Experience*.

Kissa, B., Georganta, Z., Gounopoulos, E., & Kitsios, F. (2024). Exploring the Cost Effectiveness of Services in Academic Libraries: A Case Study with the Use of Time-Driven Activity-Based Costing. *College & Research Libraries, 85*(2), 187.

Mandal, S. (2018). Designing and developing digital content management system through open source software and standards. *Parameters*, *4*(1), 1-14.

Moahi, K. H. (2012, September). Promoting African indigenous knowledge in the knowledge economy: Exploring the role of higher education and libraries. In *Aslib proceedings* (Vol. 64, No. 5, pp. 540-554). Emerald Group Publishing Limited. https://doi.org/10.1108/00012531211263157.

Moradia, S., Singh, S., & Aravind, S. (2024). The Role of Technology in Facilitating Open Access and Knowledge Sharing in Libraries. *Library Progress International*, *44*(3), 4418-4423.

Panda, S., & Kaur, N. (2023). Blockchain: A New Technology in Library System and Management. In *Handbook of Research on Advancements of Contactless Technology and Service Innovation in Library and Information Science* (pp. 211-230). IGI Global.

Patra, C. (2006). Developing a digital library on ceramics. *The Electronic Library*, *24*(4), 453-469. https://doi.org/10.1108/02640470610689160.

Paul, N. (2024). The Future of Information Science: Exploring the Role of Libraries in Data Management and Digital Curation. *Library Progress International*, *44*(3), 4703-4710.

Rahman, M. H., & Islam, M. S. (2020). Building a Model for Digital Content Management in Agricultural University Libraries in Bangladesh. *Knowledge Management & E-Learning*, *12*(3), 359-379.

Srivastava, S., Bejalwar, S. A., Ramachandran, R., & Mishra, B. R. (2024). E-Commerce and DLs: Exploring the Future of Information Access in the Digital Economy. *Library Progress International*, *44*(3), 11348-11358.

Stamou, A. (2017). Knowledge management in doctoral education toward knowledge economy. *International Journal of Educational Management*, *31*(3), 320-331. https://doi.org/10.1108/IJEM-11-2014-0143.

Tella, A., Amuda, H. O., & Ajani, Y. A. (2022). Relevance of blockchain technology and the management of libraries and archives in the 4IR. *Digital Library Perspectives*, *38*(4), 460-475.

Verma, L., & Kumar, N. (2018). Comparative analysis of open source digital library softwares: A case study. *DESIDOC Journal of Library & Information Technology*, *38*(5), 361.

Vijayakumar, P., Ramki, R., Priya, M. G., Rohith, M., Mohideen, A. S., & Rajalakshmi, M. (2024). The Role of DLs in Supporting Ecommerce Growth in the Digital Economy. *Library Progress International*, *44*(3), 15622-15632.

Viji, C., Jagannathan, J., Rajkumar, N., Mohanraj, A., Nachiappan, B., & Kovilpillai, J. A. J. (2025). Leveraging Blockchain Technology to Enhance Library Security. In *Enhancing Security and Regulations in Libraries with Blockchain Technology* (pp. 181-200). IGI Global.

Wu, C. H., & Fang, W. C. (2011). Combining the Fuzzy Analytic Hierarchy Process and the fuzzy Delphi method for developing critical competences of electronic commerce professional managers. *Quality & Quantity*, *45*, 751-768.

Zharinov, S. (2020). The role of the library in the digital economy. *Information Technology and Libraries*, *39*(4), 12-21. https://doi.org/10.6017/ital.v39i4.12457.

Identifying Organizational Learning Barriers in Knowledge-Based Companies

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ABSTRACT

This study aimed to identify the barriers to organizational learning within knowledge-based companies. Utilizing a qualitative approach, the research employed thematic analysis to delve into the managers' perspectives of knowledge-based firms situated in Qom Science and Technology Park and university professors specializing in organizational learning. Semi-structured interviews were conducted with purposively selected participants. Data was collected through both library research and field studies. The findings revealed three primary barriers to organizational learning: knowledge creation, knowledge sharing, and knowledge-based performance. Notably, the study indicated that barriers to knowledge sharing were significantly more prevalent across the examined organizations. Key obstacles included ineffective communication among organizational members, resistance to learning, traditional managerial mindsets, and inadequate financial support. Additionally, challenges related to knowledge creation and knowledge-based performance encompassed outdated systems, flawed analysis, and a lack of transparency for employees. Based on the research outcomes, several practical recommendations are proposed to address these barriers. These include implementing effective training programs, enhancing communication systems, and providing financial support for learning initiatives. Given the potential of knowledge-based companies located in Qom Science and Technology Park, it is anticipated that overcoming these obstacles will foster greater growth and success in innovation, research, and development.

KEYWORDS

Knowledge Creation, Knowledge Economy, Knowledge Sharing, Knowledge-Based Companies, Knowledge-Based Performance, Organizational Learning Barriers, Organizational Learning, Science and Technology Park.

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Introduction

Knowledge-based firms, where intellectual capital is the primary driver of value creation, heavily rely on organizational learning to maintain their competitive edge (Sunnemark et al., 2024). However, several barriers hinder effective organizational learning across the three critical dimensions: knowledge creation, knowledge sharing, and knowledge application. These barriers can significantly impede an organization's ability to innovate, adapt to change, and achieve sustainable growth (Pasieczny & Rosiak, 2022).

Knowledge creation, the first step in the organizational learning cycle, is often hindered by various factors. A lack of a conducive organizational culture that stifles creativity, discourages risk-taking, and rewards conformity can impede the generation of new ideas and insights. Additionally, inadequate resources allocated to research and development can limit the organization's capacity to explore new knowledge frontiers. Furthermore, cognitive biases such as confirmation bias and groupthink can distort decision-making processes and hinder the emergence of innovative thinking (Massimo & Nora, 2022).

Once knowledge is created, it must be effectively shared across the organization to maximize its value. However, several barriers can impede knowledge sharing. Organizational silos can create information silos, preventing knowledge from flowing freely between different departments and functions. Lack of trust among employees can hinder open communication and the willingness to share knowledge. Additionally, time constraints and workload pressures can limit individuals' ability to participate in knowledge-sharing activities (Scipioni et al., 2021).

Even when knowledge is created and shared, it may not be effectively applied to improve organizational performance. Resistance to change can hinder the adoption of new ideas and practices. Lack of leadership support can undermine efforts to implement knowledge-based initiatives. Furthermore, inadequate infrastructure and systems can impede the transfer and application of knowledge (Shahmoradi et al., 2017).

By understanding the multifaceted nature of these barriers, organizations can develop targeted strategies to overcome them and foster a learning culture. This may involve creating a supportive organizational culture, investing in training and development, implementing effective knowledge management systems, and encouraging collaboration and knowledge sharing (Pasieczny & Rosiak, 2022). By addressing these barriers, knowledge-based firms can unlock the full potential of their intellectual capital and achieve sustainable competitive advantage (Nadason et al., 2017).

The necessity of the present research can be summarized in its results as follows:

- The results of this research can help managers' develope educational frameworks to improve organizational learning.
- The results of this research can assist in identifying the barriers to organizational learning in knowledge-based companies.

This research has focused on identifying the barriers to organizational learning in knowledge-based companies affiliated with the Science and Technology Park. The findings of this study can provide an operational framework for improving organizational

learning processes and assist managers in enhancing their capabilities and competitive sustainability. This research's main question is: What are the barriers to organizational learning in knowledge-based companies? Therefore, given the problem and the research gap in this area, this study aims to utilize existing theoretical and empirical literature to identify the barriers to organizational learning in knowledge-based companies.

Literature Review

In today's fast-paced and ever-changing world, organizations face complex and unpredictable environments, necessitating precise decision-making and rapid adaptation. Organizations that establish the capability for continuous learning and adaptation based on acquired knowledge can respond effectively to environmental changes and ensure sustainable competitive advantage. Organizational learning, a cornerstone of organizational management in the 1990s, plays a crucial role in enhancing productivity, innovation, and organizational performance (Nonaka, 1994). Organizational learning and knowledge management are key concepts in advancing competitiveness and innovation in knowledge-based companies. However, organizational learning processes face various barriers and challenges that can hinder the effective transfer of knowledge and learning within organizations (Massimo & Nora, 2022).

De Moraes and de Souza (2021) discussed barriers to organizational learning in software companies, including challenges in knowledge sharing and the integration of tacit and explicit knowledge. They proposed improving organizational memory and fostering collaboration as solutions to these challenges.

Chatterjee (2014) emphasized barriers to organizational learning in knowledge-based companies, pointing to bureaucratic and hierarchical structures that hinder knowledge creation, distribution, and transfer. Additionally, the implicit nature of knowledge and the challenges associated with managing tacit knowledge were highlighted. This research suggested that organizations should establish lateral knowledge-sharing flows to overcome these barriers and propose new tools for managing tacit knowledge.

Gani and Moussa (2017) explored barriers to learning in knowledge-based organizations in the Béjaïa region of Algeria. Their study revealed that environmental stability negatively impacts learning through exploration, while there is a positive correlation between environmental stability and learning through exploitation. The research demonstrated that environmental barriers could negatively affect organizational learning processes uing survey methods and statistical analysis.

Almeida and Soares (2015) focused on organizational learning challenges in project-based organizations. They identified issues such as inadequate information architecture, weak collaborative culture, and the lack of information management strategies as factors hindering learning and knowledge sharing in such organizations. Their study proposed mechanisms for improving knowledge sharing and emphasized the need for formalizing and customizing knowledge processes in project-based organizations.

Nadason et al. (2017) identified various barriers to organizational learning, including

individual barriers (fear and lack of motivation), cultural barriers (conflict avoidance and bureaucracy), technological barriers (lack of training and poor usability), and organizational barriers (lack of leadership and insufficient rewards). The research emphasized the importance of knowledge sharing for organizational competitiveness and suggested that organizations must understand the cultural and social impacts to overcome these barriers.

Shahmoradi et al. (2017) identified barriers to knowledge sharing in organizations, including limitations in specialized knowledge, a culture of independent work, non-standardized processes, and inadequate Knowledge Information Systems (KIS). They propose solutions such as addressing organizational culture, increasing employee training, and raising awareness about the benefits of knowledge management.

Blašková et al. (2023) highlight barriers to the development of sustainable creativity in knowledge-based organizations, such as a lack of vision-related knowledge, poor financial conditions, and fear of presenting ideas. They recommend improving communication, motivation, leadership, and organizational processes to foster creativity.

Mogea (2023) focuses on the importance of knowledge management for organizational effectiveness and competitiveness in globalization. While the article does not specifically address the barriers and solutions to organizational learning in knowledge-based companies, it emphasizes the critical role of knowledge management in achieving organizational goals.

These findings underscore the various obstacles to organizational learning in knowledge-based companies that can negatively impact knowledge transfer and management. Understanding and addressing these barriers are essential for improving learning processes and ensuring the success of knowledge-based firms.

While these barriers pose significant challenges, some organizations may strategically address these issues to find growth opportunities, potentially transforming obstacles into catalysts for innovation. Thus, identifying and examining organizational learning barriers is crucial for improving organizational performance and determines their success and sustainability in today's dynamic world.

The barriers to organizational learning have become particularly significant in the current era, where rapid and unpredictable changes occur in economic and workplace environments. Organizations today must continuously adapt and update themselves to meet new challenges. However, barriers such as resistance to change, a lack of skills necessary for learning, and an absence of supportive policies can hinder these efforts.

Given this critical issue and the research gap in this area, this study seeks to explore organizational learning barriers in knowledge-based companies, with a specific focus on firms within the Science and Technology Park.

Various models and classifications, such as those based on different levels (individual, group, organizational) and categories (educational, managerial, organizational, cultural, individual), were reviewed to investigate this topic. After extensive evaluation, the study

selected the "create, disseminate, and act on knowledge" model due to its comprehensive nature and ability to address existing research gaps.

Methodology

This study is applied in nature, aiming to explore the barriers to organizational learning within knowledge-based companies. Adopting a qualitative approach, it employs a survey method to gather data and identify the obstacles hindering organizational learning.

The target population of this study includes managers from companies based in the Science and Technology Park, managers from knowledge-based companies outside the park, and university professors with expertise in organizational learning. These individuals were selected based on their specialized knowledge and experience in the field. Non-random and purposive sampling techniques were employed, and interviews were conducted with ten experts until theoretical saturation was reached. Data collection was stopped when the information gathered during the interviews became repetitive (Patton, 2014).

In field studies, we employed thematic analysis to explore barriers to organizational learning in knowledge-based companies. We conducted and transcribed interviews with ten managers. These interviews were conducted in person, online, and via telephone. The data analysis, which used thematic analysis based on the six-step model of Braun and Clarke (2006), involved repeated reviews of the recorded files and notes, leading to the identification of key themes.

Initial codes were generated by identifying significant features relevant to our research question. These codes were then examined to identify patterns and potential themes, which were refined to ensure they accurately represented the data. We defined and named each theme, providing clear descriptions and ensuring they were distinct and coherent. Finally, we wrote a detailed report of the findings, organizing the themes into three general components and 25 categorized themes

The following steps were implemented to ensure the credibility of the research: First, participants relevant to the research topic were selected, focusing on those directly involved with the research issue, especially those in managerial positions at knowledge-based companies (Lincoln & Guba, 1985). Additionally, to guarantee the proper analysis of the data based on relevant theories, three experts familiar with the research area reviewed the findings and provided their feedback on the quality of the analysis. Furthermore, data were collected and analyzed simultaneously. After recording the interviews, transcripts and notes were examined, and coding was applied. This process was repeated several times and four interviewees were invited to review the coding stage and provide feedback to enhance accuracy. These insights were incorporated into the analysis and coding process, and the participants also contributed to the interpretation and analysis of the data, especially during the interviews.

The results were compared with the theoretical foundations and previous research.

Additionally, the interview protocol was developed based on the core research questions, which included:

1. What are the barriers to knowledge creation in knowledge-based companies?
2. What are the barriers to knowledge dissemination in knowledge-based companies?
3. What are the barriers to acting on knowledge in knowledge-based companies?

These questions were formulated to identify the various barriers to organizational learning in knowledge-based companies from knowledge creation, dissemination, and operationalization perspectives. The analysis of the research findings follows.

Findings

This research aims to identify the barriers to organizational learning in knowledge-based companies. Semi-structured interviews were conducted with experts based on a literature review and a qualitative approach to achieve this goal. The data analysis from these interviews led to identifying codes, concepts, and categories related to the barriers to organizational learning, emphasizing the process model (knowledge creation, knowledge sharing, and acting on knowledge).

Results from the Interview Analysis

The research tool for this study was semi-structured interviews. Each interview lasted between 30 to 50 minutes. During the interviews, the researcher either took notes on the participants' responses or recorded the conversations for later review. The themes and key points derived from the interviews were examined several times. In total, seven face-to-face interviews, two online interviews (via email and Eitaa), and one telephone interview were conducted.

The following are the extracted indicators from the respondents, along with parts of their responses. Due to the large volume of interview text, only the parts of the responses that contained frequently recurring and extracted codes are presented. Some codes were removed in subsequent reviews due to low frequency or because experts excluded them. Table 1 presents a summary of the interviewees' responses alongside the initial themes identified. It encompasses responses concerning the barriers to knowledge creation, dissemination, and application within knowledge-based companies.

Respondents' Answers and Initial Themes

The following section highlights the extracted indicators from the respondents, accompanied by excerpts from their conversations.

Table 1.
Summary of Interviewees' Responses and Initial Themes

What are the barriers to knowledge creation in knowledge-based companies? What are the barriers to knowledge dissemination in knowledge-based companies? What are the barriers to knowledge-based action in knowledge-based companies?		**questions**
Primary Themes	**Interview Excerpt**	**Person**
• Failure to document experiences • Weak experience documentation • Lack of attention to knowledge creation necessity • Poor inter-departmental communication • Absence of healthy competition • Not utilizing documented information • Lack of organizational buy-in • Insufficient employee motivation • Undefined knowledge sharing processes • High degree of personal bias in the organization • Lack of specialized staff for knowledge dissemination	• "...Organizations fail to realize the importance of knowledge creation in the conflict between operational tasks and knowledge creation. It is considered a low priority and is not included in their plans. One reason is that they don't understand the significance, the 'why,' and the impact it has on the organization, which is why knowledge creation does not occur, and in fact, experience documentation does not happen to enable knowledge creation..." • "...Due to the lack of a systematic approach, individualism, and being person-dependent, organizations often do not view knowledge systematically or from a broader perspective. In other words, the knowledge created is not analyzed in terms of its relevance to the organization. Knowledge is dealt with individually and subjectively, leading to a biased approach..."	P1
• Lack of concern for learning • Incorrect use of recorded information • Stinginess in sharing experiences • Lack of communication with different departments • Inexperienced instructors • Incorrect training • Outdated teaching methods • Lack of feedback • Daily work pressure on employees • Non-competitive organizational environment • Failure to encourage risk-taking • Incorrect analysis • Managers' reluctance to take risks and accept new ideas	• "... This is the main barrier to learning: we always wait and we don't consider our locus of control as internal; we view it as external. We are always waiting for someone to prepare and deliver something to us, and often, even when things are prepared, we can't use them properly..." • "... People are instinctively attracted to experiencing new methods as the organization grows and the world progresses. The methods of the teacher-student relationship, classroom lessons, and discussions take us back to our unpleasant past experiences with our teachers and the atmosphere of school, university, and class. This creates a psychological resistance within us."	P2
.....	.....	...
• Individuals' fixed mindset • Tendency to believe that things have always been done this way • Resistance to new ideas • Lack of time to learn new material • Lack of suitable resources for learning • Absence of a learning culture in the organization • Lack of appreciation for the present instructors in the organization • Dissatisfaction and lack of employee motivation • Viewing training as a cost rather than an investment • Lack of organizational self-confidence • Overburdened employees • Frequent changes in management	• "... Individuals personally resist learning, meaning that what I am right now is enough to do the job I am currently doing..." "... Employees say there are no suitable resources for them to read and learn from..." "... There are barriers that prevent individuals from being motivated to learn, and the most important of these, in my opinion, is the lack of a learning culture within organizations..." "... Often, the view of training is seen as a cost, not an investment, and the smaller organizations become, the less they believe they are investing..."	P10

(Source: Researcher's Findings)

Primary and Secondary Themes

The codes obtained in the research process related to the essential actions of organizational learning—namely, knowledge creation, knowledge sharing, and knowledge-based performance—have been collected and categorized. In table 2, similar codes are grouped.

Table 2.
Primary Themes Identified in the Research Process: Barriers to Organizational Learning and Their Organizers

	Components	Primary Themes	Secondary Themes
Barriers to Organizational Learning	Barriers to Organizational Learning: Knowledge Creation	Failure to document experiences	Weak Experience Documentation
		Lack of an experience documentation system	
		Absence of an Appropriate Environment for Sharing Experiences	
		Outdated and Simple Information Registration Systems	Outdated System
		Repetitive Technology	
		Using Old Methods for Documenting Experiences	
		Deficiencies in IT Infrastructure	
		Insufficient Budget for Documenting Insights	Lack of Financial Support for Documenting Experiences
		Inadequate Petty Cash	
		Lack of Negotiation with External Parties	Lack of External Communication
		Avoidance of Sharing Embarrassing Results Outside the Organization	
		Managers' Outdated Mindset Regarding Knowledge Creation	Incorrect Behavior of Managers
		Managers' Intolerance to Listening	
		Prevalence of Arrogance Among Managers	
		Excessive Subjectivity in Managerial Approaches	
		Incorrect Conclusions	Incorrect Analyses
		Lack of Clarity in Cause-and-Effect Relationships	
		Misunderstanding of Objectives	Lack of Clear Vision
		Focusing on Smaller Goals	
	Barriers to Organizational Learning: Knowledge Sharing	Lack of Communication Between Different Organizational Departments	Poor Communication
		Failure to Connect with Different Sections	
		Disconnected Teams	
		Linear Communication	
		Insufficient Employee Motivation	Resistance to Learning and Training
		Lack of Concern for Learning	
		Employee Non-Cooperation in Training	
		Employees' Disinterest in Learning Beyond Their Expertise	
		Absence of Incentives for Knowledge Sharing	
		Lack of a Learning Culture Within the Organization	
		Resistance to Acquiring New Knowledge	
		Resistance to New Ideas	
		Lack of Organizational Confidence	
		Erosion of Education-Centered Culture in Organizations	
		Lack of Organizational Support for Learning	
		Employee Dissatisfaction and Lack of Motivation	
		Absence of Specialists for Knowledge Dissemination	Lack of Proper Training
		Failure to Utilize Expertise and Elites' Experiences	
		Inexperienced Trainers	
		Inadequate Training	
		Undefined Processes for Knowledge Sharing	
		Outdated Teaching Methods	
		Repetitive and Traditional Training Processes	
		Lack of Continuity in Training	
		Schools and Universities' Weak Educational Systems	
		Using Traditional Teaching Methods	

	Components	Primary Themes	Secondary Themes
		Absence of Proper Training	
		Lack of Suitable Resources for Learning	
		Lack of Proper System for Managing and Sharing Knowledge	
		Daily Work Pressure on Employees	Heavy and Exhausting Work
		Busy Work Schedules	
		Overwhelming Responsibilities	
		Lack of Time to Learn New Material	
		Management's Pessimistic View of Training as a Cost Rather Than an Investment	Outdated Mindset of Managers
		Belief That New Knowledge Is Unnecessary	
		Cost-Oriented Perspective on Training	
		Lack of Awareness of the Benefits of Knowledge Sharing	
		Resistance from Managers Against Training Programs	
		Management's Failure to Encourage and Recognize Knowledge Sharing	Lack of Encouragement and Appreciation
		Lack of Appreciation for Experience Sharers	
		Lack of Recognition for Trainers in the Organization	
		Failure to Meet Financial Needs for Training	Lack of Financial Support
		Insufficient Budget for Knowledge Transfer and Training	
		Fear of Losing Position	Unhealthy Competition
		Desire to Maintain Power and Position	
		Lack of Healthy Competition	
		Prevention of Employee Empowerment	
		Non-Competitive Organizational Environment	
		Reluctance to Share Experiences	
		Unwillingness to Compete	
		Complex Hierarchies	Excessive Bureaucracy
		Excessive Bureaucracy	
		Red Tape in Processes	
	Barriers to Organizational Learning: Acting Based on Knowledge	Failure to Clarify Organizational Objectives	Lack of Clarity for Employees
		Misunderstanding of Goals	
		Lack of a Clear Vision	
		Focus on Short-Term Solutions	
		Emphasis on Smaller Goals	
		Neglect of Long-Term Organizational Progress	
		Lack of Awareness of What Needs to Be Known	
		Improper Use of Recorded Information	Incorrect Analysis Leading to Improper Performance
		Failure to Utilize Existing Data	
		Incorrect Analyses	
		Failure to Review Self and Others' Results	Lack of Proper Evaluation
		Lack of Performance Evaluation Systems	
		Failure to Give and Receive Feedback	Lack of Attention to Feedback
		Neglecting Feedback Culture	
		Lack of Opportunity to Test New Ideas	Lack of Encouragement for Risk-Taking
		Risk Aversion	
		Managerial Reluctance to Embrace New Ideas and Risk-Taking	
		Viewing Standard Practices as Sacred	Resistance to Change
		Adherence to Routine Work Stability	
		Excessive Subjectivity in the Organization	
		Preferring Traditional Methods	
		Resistance to Change Based on Modern Knowledge	
		Fixed Mindsets Among Individuals	
		Tendency to Maintain "Business As Usual"	
		High Employee Turnover	Drastic Changes
		Frequent Management Changes	
		Complex and Overlapping Regulations	Incorrect Rules
		Insistence on Outdated Policies	
		Lack of Expertise in Current Roles	Lack of Individuals' Expertise
		Shortage of Skilled and Experienced Personnel	
		Managers' Weak Specialized Knowledge	

(Source: Researcher's Findings)

In the following, the secondary themes extracted from the interviews during the research process are presented, along with the frequency of their occurrence in the interviews. These data reflect the main barriers in various organizational learning processes, including knowledge creation, knowledge sharing, and knowledge-based performance. The frequency of themes in the interviews directly indicates the importance of these barriers, as the more frequently a barrier is mentioned in the interviews, the greater its impact on the organization. The table below presents the secondary themes obtained in each of these processes, along with their frequency in the interviews:

Table 3.
Secondary Themes Identified in the Research and Their Frequency in Interviews

Components	Secondary Themes Obtained in the Research Process	Frequency in Interviews
Barriers to Organizational Learning: Knowledge Creation	Weak experience documentation	P1, P5, P7, P8
	Obsolete systems	P3, P5, P7
	Lack of financial support for experience recording	P6, P7
	Lack of external organizational communication	P5, P9
	Managers' misbehavior	P1, P3, P4, P5, P6, P9
	Incorrect analyses	P2, P7
	Lack of clear vision	P4, P6
Barriers to Organizational Learning: Knowledge Sharing	Poor communication	P1, P2, P6, P7
	Resistance to learning and training	P1, P2, P3, P4, P5, P8, P9, P10
	Lack of proper training	P1, P2, P3, P5, P6, P9, P10
	Overwhelming workload	P2, P4, P10
	Managers' obsolete mindset	P4, P6, P8, P9, P10
	Lack of encouragement and appreciation	P3, P5, P10
	Lack of financial support	P3, P6
	Unhealthy competition	P1, P2, P4, P7, P8, P9
	Excessive bureaucracy	P3, P7, P8
Barriers to Organizational Learning: Performance Based on Knowledge	Lack of clarity for employees	P1, P4, P5, P6, P9
	Incorrect analysis leading to incorrect performance	P1, P2, P7
	Lack of proper evaluation	P3, P9
	Lack of attention to feedback	P2, P8
	Lack of encouragement for risk-taking	P2, P7, P8
	Resistance to change	P1, P4, P6, P9, P10
	Severe changes	P6, P10
	Incorrect regulations	P6, P7
	Lack of specialization in individuals	P4, P5, P6

(Source: Researcher's Findings)

Identified Barriers in Organizational Learning

Based on the interviewees' responses, the main barriers were identified in three categories: knowledge creation, knowledge sharing, and acting based on knowledge in knowledge-based companies. In terms of knowledge creation, issues such as failure to document experiences and weak experience recording, as well as the lack of attention to the importance of knowledge creation, especially in organizations that prioritize execution over knowledge creation, were observed.

In knowledge sharing, barriers such as the lack of concern for learning and the incorrect use of recorded information were identified. In acting based on knowledge,

resistance to acquiring new knowledge and fear of losing status were highlighted. These findings indicate that organizations need to establish up-to-date and systematic processes for documenting and transferring knowledge and create a competitive and motivational environment to encourage employees to learn and apply new knowledge.

The results of this study show that various barriers exist in the three key stages of knowledge management processes (knowledge creation, sharing, and application) within the knowledge-based companies located in the Science and Technology Park. These barriers, which directly impact the efficiency and effectiveness of these companies, include issues related to organizational attitudes and behaviors, technological infrastructure, financial resources, educational processes, and internal and external communications. The analysis obtained from this research can assist in identifying weaknesses and proposing solutions to improve knowledge management processes in these companies.

Analysis of Barriers to Knowledge Processes in Knowledge-Based Companies

The findings show that the primary obstacles to the creation, sharing, and application of knowledge in knowledge-based companies in Science and Technology Park are related to a wide range of structural, behavioral, managerial, and systemic issues. Some of the obtained codes have commonalities with other research in the field of knowledge management

1. *Knowledge Creation Barriers*: Structural barriers such as inadequate documentation of experiences, reliance on outdated systems, insufficient financial support for knowledge management, and poor external communications have been identified. These barriers hinder establishing an environment conducive to creativity and innovation, resulting in ineffective knowledge transfer. Additionally, managerial attitudes and incorrect data analysis significantly contribute to these issues (Milway & Saxton, 2011; Kluge, 2009).
2. *Knowledge Sharing Barriers*: In the domain of knowledge sharing, communicative, educational, and motivational barriers are prominent. Challenges include weak communication among organizational members, resistance to learning, and inadequate training. High work pressure and outdated managerial attitudes towards the importance of knowledge sharing further obstruct interaction and collaboration. The lack of incentive systems and the presence of unhealthy internal competition prevent knowledge from being shared effectively (Milway & Saxton, 2011; Kasapoğlu et al., 2021; Bridgespan, 2011).
3. *Knowledge Application Barriers*: The main barriers include weak policy clarification, incorrect data analysis, and failure to use received feedback. Moreover, resistance to change, insufficient expertise among employees, and lack of necessary support for risk acceptance have diminished the effectiveness of execution processes. The existence of ineffective regulations and changes in

organizational policies has also led to instability and reduced employee trust (Kezar & Holcombe, 2020).

These findings suggest that to improve knowledge processes in these companies, attention should be given to structural changes, strengthening organizational culture, and providing continuous training for employees and managers. Additionally, the creation of supportive and incentive systems and a review of existing laws and procedures can help facilitate knowledge management and enhance organizational performance.

Discussion and Conclusion

Organizational learning, one of the essential requirements for coping with environmental changes and increasing competition, enables organizations to achieve flexibility and continuous innovation. However, several barriers were identified in the path of organizational learning, including barriers to creating, sharing, and applying knowledge. Based on the present research findings, the most significant challenges in knowledge sharing include incorrect communication, resistance to learning, outdated managerial mindsets, and lack of financial support, which significantly affect learning processes. These results suggest that to transform organizations into learning entities, focusing on overcoming these barriers is essential.

Organizational learning should be considered as a continuous and endless journey. This journey requires the precise identification of barriers, the creation of an appropriate environment for innovation, and continuous performance evaluation. Knowledge-based organizations, particularly companies located in Science and Technology Parks, can pave the way for long-term progress and success by addressing these barriers and promoting learning.

Recommendations

Recommendations related to knowledge creation:

- *Creating an open space for idea exchange*: A platform should be provided where employees can share their experiences and ideas without fear.
- *Setting common goals*: By defining clear organizational goals, individuals aligned with these goals should be identified and encouraged.
- *Using advanced information documentation systems*: Using advanced tools to document successful experiences and failures is recommended.

Recommendations related to knowledge sharing:

- *Holding training workshops*: Managers and employees should become familiar with learning processes and their importance.
- *Encouraging learning as an organizational value*: Individuals who succeed in learning should be identified and rewarded.
- *Improving horizontal and vertical organizational communication*: Bureaucracy should be reduced and department collaboration should be increased.

Recommendations related to knowledge application:

- *Clarifying roles and responsibilities*: Employees should know their goals and missions.
- *Encouraging risk-taking*: By supporting innovations, organizations should encourage prudent risks.
- *Providing opportunities for continuous feedback*: Effective feedback processes should be established to evaluate actions and identify improvement opportunities.

Future Outlook

This research can serve as a foundation for further studies into organizational learning and its barriers. Future research is suggested to focus on evaluating the impact of overcoming these barriers on the overall performance of the organization, as well as on conducting comparative studies between successful and unsuccessful organizations in this domain.

REFERENCES

Almeida, M., & Soares, A. L. (2015). From project's information management to project-based organizational learning: The role of knowledge sharing. In *Handbook of Research on Effective Project Management through the Integration of Knowledge and Innovation* (pp. 190-211). IGI Global.

Armesjö, E., & Leo, A. (2024). *Enhancing Knowledge Transfer for Optimized Product Development in Manufacturing Organizations*. [Master's thesis, Chalmers University of Technology].

Blašková, M., Sokół, A., & Figurska, I. (2023). Organizational Barriers of a Knowledge-Based Organization in the Aspect of Sustainable Creativity Development. *Journal of Vasyl Stefanyk Precarpathian National University, 10*(4), 46-62.

Braun, V., & Clarke, V. (2006). *Using thematic analysis in psychology. Qualitative research in psychology, 3*(2), 77-101.

Chatterjee, S. (2014). Managing constraints and removing obstacles to knowledge management. *IUP Journal of Knowledge Management*, *12* (4), 24-38

Davenport, T. H. (1998). *Working knowledge: How organizations manage what they know*. NewYork, Harvard Business School.

De Moraes, C. R. B., & de Souza, L. P. P. (2021). Knowledge, organizational learning, and memory at software companies. In *Role of Information Science in a Complex Society* (pp. 35-44). IGI Global.

Gani, K., & Moussa, B. (2017). Barriers to investment toward Barriers to learning: the case of B ├⌐ jaia area's companies in Algeria. *Journal of Management and Innovation, 3* (1), 1-21.

Hassanzadeh, M., & Rahimian, S. (2024). Investigating and identifying barriers and organizational limitations of establishing knowledge management in Municipality) case study: Tehran municipality. *International Journal of Knowledge Processing Studies (KPS)*, *4*(2), 92-107.

Hislop, D., Bosua, R., & Helms, R. (2018). Knowledge management in organizations: A critical introduction. Oxford university press.

Kasapoğlu, E. B., Küçükaltan, B., Açık, A., Ayaz, İ. S., & Saatçioğlu, Ö. (2021). Prioritizing different types of barriers to knowledge sharing: A cause-and-effect analysis of the views of academics in Turkey. *Yükseköğretim Dergisi*, *11*(3), 578-596.

Kezar, A. J., & Holcombe, E. M. (2020). Barriers to organizational learning in a multi-institutional initiative. *Higher Education*, *79*, 1119-1138.

Lincoln, Y. S., & Guba, E. G. (1988). Criteria for Assessing Naturalistic Inquiries as Reports.

Massimo, B., & Nora, A. (2022). Barriers to organizational learning and sustainability: The case of a consumer cooperative. *Journal of Co-operative Organization and Management*, *10*(2), 100182.

Milway, K. S., & Saxton, A. (2011). The challenge of organizational learning. *Stanford Social Innovation Review*, *9*(3), 44-49.

Mogea, T. (2023). Knowledge Management and Organizational Learning in Organizational Development. *POPULER: Jurnal Penelitian Mahasiswa, 2*(1), 215-229.

Nadason, S., Saad, R. A. J., & Ahmi, A. (2017). Knowledge sharing and barriers in organizations: A conceptual paper on knowledge-management strategy. *Indian-Pacific Journal of Accounting and Finance, 1*(4), 32-41.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization science, 5*(1), 14-37.

Pasieczny, J., & Rosiak, T. (2022). Barriers to Implementing the Concept of Learning Organization in Public Administration-the Example of PIORiN. *Annales Universitatis Mariae Curie-Skłodowska, sectio H–Oeconomia*, *56*(5), 171-184.

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.

Scipioni, S., Russ, M., & Niccolini, F. (2021). From barriers to enablers: The role of organizational learning in transitioning SMEs into the circular economy. *Sustainability*, *13*(3), 1021.

Shahmoradi, L., Safdari, R., Piri, Z., Mahmodabadi, A. D., Shahmoradi, S., & Nejad, A. F. (2017). Knowledge sharing as a powerful base for management: Barriers and solutions. *The health care manager, 36*(2), 176-183.

Sunnemark, F., Lundqvist Westin, W., Al Saad, T., & Assmo, P. (2024). Exploring barriers and facilitators to knowledge transfer and learning processes through a cross-departmental collaborative project in a municipal organization. *The Learning Organization*, *31*(3), 358-374.

Zhao, S., Peerally, J. A., De Fuentes, C., & Gonzalez-Perez, M. A. (2024). The determinants of multinational enterprises' sustainable innovations. *International Business Review*, *33*(5), 102318.