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Improving the Adoption of Artificial Intelligence in Library Financial Services: A Comprehensive UTAUT2 Framework with AI-Specific Variables

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ABSTRACT

The use of artificial intelligence (AI) in financial services within library management has the potential to bring about significant transformation. However, the effective implementation of these technologies depends on comprehending the distinct elements that influence consumer approval, particularly in the context of libraries where user trust and resource optimization are critical. This study presents an expanded framework called the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) that is specifically designed for the use of artificial intelligence (AI) in the financial services industry, with a focus on library management. The paradigm incorporates essential AI-related factors, including trust, explainability, data privacy, algorithmic responsibility, and empowerment theory, which are crucial for ensuring effective financial decision-making in libraries. The suggested model provides a theoretical basis for guiding the adoption strategies of financial services in library management using AI and establishes the necessary framework for future empirical evaluation of its prediction powers, thereby helping libraries optimize their financial operations and enhance user services.

Keywords: AI Adoption, Financial Services, Libray Management, UTAUT2, Technology Adoption Models,Trust in AI, Explainable AI (XAI), Algorithmic Accountability, Data Privacy, Financial Regulation

1. 1.INTRODUCTION:

Artificial intelligence (AI) has the capacity to revolutionise operations, decision-making processes, and consumer experiences in the financial services industry (Deshpande, 2020; Maple et al., 2023; Xie, 2019). AI systems offer significant advantages in fraud detection, risk assessment and personalised financial advice (A1-shabandar et al., 2019; Deshpande, 2020; Huang et al., 2021; Maple et al., 2023). However, in order to fully utilise these groundbreaking capabilities, financial institutions must successfully navigate the complexities of AI implementation (Ahi et al., 2022; Coetzee, 2018; Ebbage, 2018; Konigstorfer & Thalmann, 2020; Madanaguli et al., 2024; Zhan et al., 2024).

Understanding the factors that influence the adoption and use of AI technologies in this specific situation is extremely important (Floridi et al., 2020; Gansser & Reich, 2021; Pillai & Sivathanu, 2020; Molton, 2020; Xie,

2019). The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) is a widely recognised framework for examining the adoption of technology. Nevertheless, given the distinct attributes of artificial intelligence and the tightly controlled nature of the financial sector, it is imperative to modify this model. Multiple studies (Allen, 2020; Aswani et al., 2018; Cabrera-Sanchez et al., 2021; Cao et al., 2021; Kelly et al., 2023; Siswanto et al., 2018; Venkatesh et al., 2003; Venkatesh, 2021; Williams et al., 2015; Wiradinata, 2018) have acknowledged the necessity for adaptation. For a successful integration of AI in the financial services sector, it is crucial to take into account factors such as trust, explainability, data privacy, algorithmic accountability, empowerment theory, and core UTAUT2 concepts. In order to take into account these factors, it is imperative to incorporate a comprehensive framework. Multiple studies have investigated this subject, including research conducted by Berman et al. (2024), Cabrera-Sanchez (2021), Deshpande (2020), Diaz-Rodriguez et al. (2023), Elliott et al. (2021), Huang et al. (2021), Kelly et al.
(2023), Mehrotra (2019), Radclyffe et al. (2023), and Venkatesh (2021).

1.1 The use of artificial intelligence (AI) in the financial services industry: its applications and potential opportunities:

Artificial intelligence (AI) is exceptionally proficient at detecting and thwarting fraud by analysing extensive datasets to pinpoint patterns indicative of fraudulent behaviour. This exceeds the abilities of conventional rule-based methods, as evidenced by multiple studies
(Anantharaman et al., 2023; Babina et al., 2024; Choi & Lee, 2018; Dunsin et al., 2024; Makki et al., 2017; Murugesan et al., 2023; West & Bhattacharya, 2016). Artificial intelligence models utilise a broader spectrum of structured and unstructured data to provide more accurate assessments of creditworthiness, market predictions, and investment risk analysis (Carolus et al., 2023; Fatouros et al., 2024; Jain &Vanzara, 2023; Li et al., 2021; Maple et al., 2023; Zhou et al., 2018).

Robo-advisors, utilising artificial intelligence, offer tailored investment guidance, portfolio administration, and financial planning services (Anantharaman et al., 2023; Babina et al., 2024; Diaz-Rodriguez et al., 2023; Zhu et al., 2023). Artificial intelligence is employed in high-frequency trading, where sophisticated algorithms analyse vast amounts of market data to autonomously carry out transactions (Anantharaman et al., 2023; Huang et al., 2018; Jobin
& Ienca, 2019; Papagiannidies et al., 2023).

While AI has already demonstrated its potential in various aspects of the financial sector, these capabilities can be adapted to address the unique financial management challenges faced by libraries. The subsequent sections will explore how libraries can leverage AI for financial decision-making and operational efficiency, drawing on the innovations established in the broader financial industry

1.2 The Role of AI in Enhancing Financial Efficiency in Libraries:

The integration of Artificial Intelligence (AI) into library management is increasingly becoming a focal point for enhancing operational efficiency, particularly in the realm of financial services. Libraries today are not just managing physical collections but also digital resources, requiring sophisticated financial planning and allocation to meet diverse user needs. Traditional financial management in libraries often involves manual processes, which can be time-consuming, prone to errors, and limited in scope. AI presents an opportunity to automate and streamline these processes, leading to improved financial efficiency.

AI can assist libraries in several key financial areas, including budgeting, forecasting, and resource allocation. For example, AI algorithms can analyze historical expenditure data to predict future budgetary needs with greater accuracy, allowing libraries to plan more effectively. This predictive capability can also extend to identifying trends in resource usage,

helping libraries allocate funds to the most in-demand materials and services. By optimizing the allocation of resources, libraries can ensure that they are meeting user needs while also maintaining financial sustainability.

Furthermore, AI can play a crucial role in cost optimization by automating routine financial tasks such as invoice processing, procurement, and inventory management. By reducing the need for manual intervention, AI can help libraries minimize operational costs and reallocate savings to areas that directly benefit users, such as acquiring new materials or improving digital access. Additionally, AI can provide libraries with data-driven insights into the return on investment (ROI) for different services and programs, guiding strategic decisions on where to invest limited resources for maximum impact.

The adoption of AI in library financial management is not without challenges, including issues related to trust, transparency, and ethical use of technology. However, when implemented thoughtfully, AI can significantly enhance the financial efficiency of libraries, allowing them to provide better services while operating within budgetary constraints. This integration is crucial for libraries seeking to adapt to the evolving landscape of information services and to continue serving their communities effectively.

1.1 1.3 Obstacles and Factors to Take into Account while Implementing AI in the Finance Industry:

Trust is of utmost importance in the field of finance. Users must have confidence in the reliability, fairness, and clarity of AI-generated recommendations (Afroogh et al., 2024; Berman et al., 2024; Berman et al., 2024; Cao et al., 2021; Diaz-Rodriguez et al., 2023; Konigstorfer & Thalmann, 2020). Explainable AI (XAI) is essential due to the inherent opacity of certain AI models, such as deep learning, which hinders comprehension. Thorough explanations of their decision-making processes are crucial, especially in situations where there is a high potential for significant financial consequences (Berman et al., 2024; DiazRodriguez et al., 2023; Hacker, 2023; Haque et al., 2023; Gaczek et al., 2023). Financial institutions have the responsibility of managing sensitive data and therefore must establish robust data protection and cybersecurity protocols in compliance with regulations.

Ensuring algorithmic accountability is of utmost importance in the financial sector to ensure the responsible and ethical implementation of AI systems. To achieve this, it is necessary to create explicit governance frameworks, mechanisms for oversight, and the ability to conduct audits of these systems. Multiple studies (Anantharaman et al., 2023; Diaz-Rodriguez et al., 2023; Gupta, 2022; Hacker, 2023; Truby et al., 2020) highlight the significance of these measures.

1.4 The purpose of Empowerment Theory:

Furthermore, user empowerment should be taken into account alongside the fundamental elements of UTAUT2. Users are more inclined to embrace AI technologies when they feel empowered by their capabilities (Chen et al., 2023; Gansser& Reich, 2021; Pillai &Sivathanu, 2020; Sharma & Sharma, 2019; Venkatesh, 2021).

1.5 Objectives and Importance of the Research:

This study introduces an extended Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework specifically tailored for the adoption of artificial intelligence (AI) in the financial services sector, with a focus on library management. The framework aims to provide strategic guidance for implementing AI effectively in this context. By integrating crucial AI-related elements such as trust, explainability, data privacy, and algorithmic accountability alongside the established UTAUT2 components, the framework addresses the unique challenges associated with AI adoption in library financial services.

The theoretical contribution of this study lies in enhancing the understanding of AI implementation in the financial services industry, particularly within libraries. The enhanced UTAUT2 framework helps identify the factors that facilitate or hinder the efficient use of AI technology in this setting. This serves as a valuable tool for financial institutions and libraries, enabling them to optimize their financial operations and enhance user services through the strategic adoption of AI.

2. 2.LITERATURE REVIEW:

This literature review examines the progress of artificial intelligence (AI) in enhancing financial management within libraries, its potential benefits, and the current approaches to implementing AI technology in this context. It also explores the unique challenges libraries face in adopting AI for financial services, such as budgeting, resource allocation, and cost optimization. By focusing on these specific challenges, the review aims to provide a

tailored understanding of how AI can be effectively integrated into the financial aspects of library management to improve efficiency and decision-making.

2.1 The growing influence of artificial intelligence in transforming the financial services industry:

To effectively guide AI adoption efforts, it is essential to examine the ways in which AI is changing traditional processes and the tangible benefits it offers. The ability of AI to analyse vast datasets exceeds that of traditional methods in identifying anomalous patterns indicative of fraudulent behaviour. Multiple studies consistently demonstrate that artificial intelligence (AI) consistently achieves greater precision in identifying fraudulent activities, thereby greatly improving the security of financial transactions and systems (Al-Hashedi & Magalingam, 2021; Awosika et al., 2023; Dunsin et al., 2024; Hajipour et al., 2023; Han et al., 2020; Sowmya & Sathisha, 2023).

Given the success of AI in transforming financial services, there is an opportunity to transfer these advancements to library management. By adapting AI's capabilities, such as risk assessment and fraud detection, libraries can improve their financial operations, ensuring efficient use of resources and enhanced user services.

2.2 AI models risk assessment and market predictions:

AI models enhance risk assessment and market predictions by integrating a broader array of data sources, encompassing both structured and unstructured data. This results in more precise assessments of creditworthiness, examination of investment hazards, and predictions of market patterns. Multiple studies have provided evidence for the efficacy of artificial intelligence (AI) in these domains (Anantharaman et al., 2023; Babina et al., 2024; Berradi et al., 2020; Ferreira et al., 2021; Jain & Vanzara, 2023; Nazareth & Reddy, 2023; Use cases and applications of AI in banking and finance, Shiva et al., 2023). Studies have shown that using AI-generated insights can improve decision-making in banks and investment firms, leading to potentially more effective risk management strategies (Ashta & Herrmann, 2021; Aziz & Dowling, 2018; Deshpande, 2020; Diaz-Rodriguez et al., 2023; Giudici, 2018; Huang et al., 2021; Konigstorfer & Thalmann, 2020; Scarpi & Pantano, 2024).

2.3 AI Algorithms as Robo-Advisors:

AI algorithms are employed in robo-advisors to deliver customised financial guidance, investment suggestions, and portfolio administration services. This technology has increased the availability of customised financial planning. The following references are cited: Aziz & Dowling (2018), Belanche et al. (2019), Breid (2024), Diaz-Rodriguez et al. (2023), Jung et al. (2018), and Salampasis et al. (n.d). In order to create AI-driven financial services that are accessible and efficient, it is crucial to comprehend the variables that impact the acceptance of robo-advisors. The factors encompass perceptions of trust, potential biases, and user demographics. The significance of these factors has been emphasised in multiple studies (Atwal & Bryson, 2021; Belanche et al., 2019; Boreiko & Massarotti, 2020; Brenner & Meyll, 2020; Lee, 2020; Shiva et al., 2023; Zhu et al., 2023; Zhu et al., 2024). Similar to robo-advisors in personal finance, libraries can use AI to develop automated tools that assist in financial planning and resource allocation, ensuring optimal budgeting and investment decisions that align with the institution's long-term goals.

2.4Analysing Adoption: The UTAUT2 Model and its Possible Constraints:

Established frameworks like the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) offer a solid basis for understanding the factors that impact the adoption of technology. The fundamental concepts of UTAUT2, such as performance expectation, effort expectancy, social influence, and enabling conditions, form the basis for evaluating user motivations (Alghatrific & Khalid, 2091; Venkatesh et al., 2023). An examination of the implementation of UTAUT2 in finance and other industries offers valuable insights into its effectiveness and limitations in understanding the complexities of AI adoption in this specific field (Alghatrifi & Khalid, 2019; Cabrera-Sanchez., 2021; Gharaibeh et al., 2018; Gansser & Reich, 2021; Hunag& Kao, 2015).

2.5 Adoption challenges in using AI in the field of finance need a customised approach:

2.5.1 Trust:

Trust is paramount in the context of AI-driven systems, particularly in scenarios that entail significant financial decisions. This is corroborated by numerous studies (Afroogh et al., 2024; Ameen et al., 2021; Diaz-Rodriguez et al., 2023). The study investigates the crucial factors that influence confidence in AI, such as the reliability of the system, the absence of algorithmic bias, and the ability to comprehend the rationale behind AI recommendations (Berman et al., 2024; Kelly et al., 2023). In the context of library management, trust in AI is equally crucial.

Libraries must ensure that AI-based financial decisions, such as budget allocation or resource investments, are transparent and align with the institution's mission to serve its community effectively.

2.5.2 Explainable AI (XAI):

Explainable AI (XAI) is a field that focuses on developing techniques to elucidate the complex decision-making processes of AI, especially in scenarios with significant financial consequences (Clarke, 2020; Gilpin et al., 2018; Haque et al., 2023; Haque et al., 2023; Linardatos et al., 2020).

2.5.3 Data Privacy and Security:

In order to foster user trust in AI systems, institutions must demonstrate strict data protection policies and compliance with relevant laws when handling sensitive personal and financial information (Bae et al., 2018; Jin, 2018; Lepri et al., 2021; Scarpi&Pantano, 2024). The study examines the technological and psychological aspects of data security, with a specific emphasis on how users perceive and protect their information in the financial sector.

2.5.4 Algorithmic accountability:

Ensuring algorithmic accountability is of utmost importance as artificial intelligence-powered systems become increasingly prevalent in the field of finance. This necessitates the implementation of transparent governance frameworks, robust monitoring systems, and the ability to carry out audits. The research investigates the ethical consequences and the development of standards for holding artificial intelligence accountable. Its goal is to promote responsible and transparent utilisation of AI (Berman et al., 2024).

2.5.5 User Empowerment:

Integrating user empowerment into the current UTAUT2 elements could enhance the effectiveness of the adoption framework. Studies on technology adoption suggest that consumers who perceive new technologies as empowering are more inclined to embrace them (Aswani et al., 2018; Kim & Gupta, 2024; Naranjo-Zolotov et al., 2019; Taherdoost, 2018). This topic warrants further exploration in the domain of artificial intelligence in the finance industry.

This literature review offers a comprehensive understanding of the intricate and varied methods by which artificial intelligence (AI) is being integrated into financial services. It highlights the domains in which AI shows significant potential and the particular challenges that require careful attention. The primary objective is to improve existing models like UTAUT2 by incorporating domain-specific components, such as trust, explainability, data security, algorithmic responsibility, and user empowerment. This tailored approach will offer a more targeted and comprehensive understanding of the factors and challenges associated with the implementation of AI in the financial industry.

2.6 The Integration of AI in Library Financial Management:

The integration of artificial intelligence (AI) in library financial management is an emerging area of interest, focusing on how libraries can leverage AI technologies to enhance their budgeting, resource allocation, and overall financial efficiency. Traditional library financial management often involves manual processes for budgeting, procurement, and inventory control, which can be time-consuming and prone to errors. AI offers a transformative potential by automating these processes and providing data-driven insights that can lead to more informed financial decision-making.

2.6.1 AI in Budgeting and Forecasting:

Several studies have explored the application of AI in budgeting and forecasting for libraries. AI algorithms can analyze historical financial data to predict future expenses, identify trends in resource usage, and suggest optimal budget allocations. For instance, research has shown that AI-based predictive models can help libraries anticipate demand for new materials and adjust their purchasing strategies accordingly, ensuring that funds are allocated to the most impactful resources. This predictive capability not only streamlines the budgeting process but also enhances financial planning accuracy.

2.6.2 Resource Allocation Optimization:

AI's ability to analyze large datasets and user behavior enables libraries to optimize resource allocation. Studies have demonstrated how AI can assist in understanding user preferences and identifying high-demand resources, allowing libraries to allocate funds more effectively. By using AI to analyze patterns in resource usage, libraries can prioritize investments in materials and services that align with user needs, thereby maximizing the impact of

their financial resources. This targeted approach to resource allocation helps libraries to operate more efficiently and improve user satisfaction.

2.6.3 Cost Reduction and Operational Efficiency:

Research has also focused on how AI can reduce operational costs and improve efficiency in library management. By automating routine tasks such as inventory management, invoice processing, and procurement, AI can significantly reduce the manual workload for library staff. This automation not only cuts down on labor costs but also minimizes the risk of human error, leading to more accurate financial record-keeping. Studies have shown that libraries adopting AI for these functions can achieve cost savings, which can then be reinvested into enhancing user services and expanding collections.

2.6.4 Challenges in AI Adoption:

While the benefits of AI in library financial management are clear, several studies highlight challenges that libraries face in adopting these technologies. Issues such as data privacy, the need for explainable AI (XAI) to build trust among stakeholders, and the ethical implications of automated decision-making are prominent concerns. Researchers argue that libraries need to develop governance frameworks and establish algorithmic accountability to ensure the responsible use of AI. Additionally, there is a need for training library staff to effectively use AI tools, emphasizing the importance of user empowerment in the adoption process.

Overall, the literature indicates that AI has the potential to significantly enhance financial management in libraries by improving budgeting accuracy, optimizing resource allocation, and reducing operational costs. However, successful adoption requires addressing challenges related to trust, transparency, and ethical considerations. This study aims to build on these findings by applying an extended UTAUT2 framework to better understand and facilitate the integration of AI into library financial management.

3. 3.RESEARCH METHODOLOGY:

This study employs a qualitative methodology and systematically evaluates existing literature to develop an enhanced UTAUT2 framework tailored for the implementation of artificial intelligence in financial services. This process ensures a comprehensive and lucid examination of existing research, facilitating the identification of significant findings and the development of a comprehensive theoretical framework.

This study employs a qualitative methodology and systematically evaluates existing literature to develop an enhanced UTAUT2 framework tailored for the implementation of artificial intelligence in financial services within library management. This process ensures a comprehensive and lucid examination of existing research, facilitating the identification of significant findings and the development of a theoretical framework that addresses the unique challenges faced by libraries in adopting AI for financial management. By focusing on both financial services and library management literature, this study aims to bridge the gap between these fields, offering a nuanced understanding of how AI can optimize financial operations in libraries.

3.1 3.1 Formulating Research Inquiries and Developing a Methodical Approach to Information Retrieval:

Research Questions: The literature review will be guided by specific research questions that will investigate the following topics: the impact of artificial intelligence (AI) on finance in library management, the shortcomings of the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) in relation to AI adoption, the influence of trust, explainability, data privacy, and algorithmic accountability, and the importance of user empowerment in the context of AI adoption.

3.2 Search Strategy: A thorough search strategy will be created, including the following:

The target databases will consist of academic databases and business-focused platforms. The search will utilize keywords derived from the research questions, including AI adoption, financial services,library management, UTAUT2, trust in AI, explainability, data privacy, algorithmic accountability, economic regulation, and user empowerment. The review will refine these keywords as it progresses. Accurate searches will be conducted using Boolean operators (AND, OR, NOT) and customisation options specific to the database.

3.3 Criteria for selecting and including/excluding sources:

Inclusion Criteria: The study will include peer-reviewed journal articles, conference proceedings, foundational works on technology adoption, industry reports, and studies that specifically examine trust, explainability, data privacy, and algorithmic accountability. Research focused on the finance sector will be given preference.

Exclusion Criteria: Sources will be excluded if they do not specifically address AI, financial services, or technology adoption, focus on unrelated industries, are significantly outdated (preferably within the past 5-10

years, with exceptions for influential works).

3.4 Data extraction and analysis:

Data Extraction: A data extraction method was beutilised to record essential information from each source, including bibliographic details, study objectives, methodologies, results, and relevant insights related to the research questions.

Methodology: Thematic analysis will be employed to consolidate and elucidate the literature, with a specific emphasis on identifying recurring themes, connections between concepts, and points of consensus or divergence. This study will primarily examine the implementation of artificial intelligence (AI) in the finance industry aspects of library management, with a specific focus on understanding the advantages and limitations of the UTAUT2 model. Additionally, it will analyse the key factors related to AI that influence its acceptance.

Developing the Extended Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) Framework: The UTAUT2 framework will be developed incrementally, incorporating AI-specific elements and investigating the potential incorporation of user empowerment. We will propose correlations between these factors and the elements of UTAUT2.

3.5 Assessment of Validity, Reliability, and Limitations:

The validity of the suggested framework is improved by its systematic approach, which prioritises transparency and the integration of diverse sources.

The application of clearly defined standards for determining which data to include or exclude, systematic methods for extracting information, and systematic approaches to analysing the data improve the consistency and ability to reproduce the results.

The framework's theoretical nature necessitates empirical validation in future research. Moreover, the dynamic nature of artificial intelligence in the field of finance necessitates ongoing modifications to the model.

This research technique provides a solid foundation for developing the extended UTAUT2 model tailored to the adoption of AI in financial services, particularly in library management. By conducting a systematic literature study, this research ensures a comprehensive examination of existing frameworks, like UTAUT2, and their applicability in the context of AI adoption. It allows for a nuanced understanding of AI's impact on finance, focusing on aspects such as trust, data privacy, explainability, and algorithmic accountability—key factors crucial for user acceptance and effective implementation.

Furthermore, this methodology facilitates a deeper insight into how AI can enhance financial decision-making in libraries, improving operational efficiency through automation and data-driven insights. The proposed framework not only addresses the theoretical understanding of technology adoption models but also serves as a guide for practical implementation. This approach aids financial institutions in integrating AI-powered solutions, navigating the unique challenges of implementation, and ultimately optimizing financial operations and user services.

4.Analysis:

The study incorporates a methodical examination of published works to provide a thorough comprehension of the advancement of artificial intelligence (AI) in the field of finance. It explores the complexities of models for adopting AI technology and identifies the specific challenges related to effectively implementing AI in the financial services industry. This chapter will analyse significant findings, integrate recurring patterns, and emphasise areas of limited comprehension. This will establish the basis for developing a comprehensive and extended UTAUT2 framework.

The profound influence of artificial intelligence on the financial services industry AI is often portrayed in literature as a potent force capable of fundamentally revolutionising established financial processes across various domains. AI has demonstrated superior efficacy compared to traditional rule-based approaches in identifying and thwarting fraudulent activities. A number of studies (Anantharaman et al., 2023; Choi & Lee, 2018; Dunsin et al., 2024; Hajipour et al., 2023; Sinayobye et al., 2023) have demonstrated the superiority of AI in detecting fraudulent behaviour by emphasising its ability to identify subtle patterns indicative of such conduct. AI models employ advanced algorithms to analyse vast and intricate datasets that surpass the cognitive capabilities of humans. Through this process, they detect abnormalities that might otherwise be missed, thereby significantly enhancing security within the financial industry (Anantharaman et al., 2023; Bassi, 2023; Gencer, 2021; Ferreria, 2023;

Hacker, 2023; Hajipour et al., 2023; Mallesha, 2019; Nicholls et al., 2021; Stojanovic et al., 2021).

The study incorporates a methodical examination of published works to provide a thorough comprehension of the advancement of artificial intelligence (AI) in the field of finance, specifically focusing on its integration within library management. By exploring the complexities of models for adopting AI technology, it identifies the challenges that are unique to the financial services industry, including those that affect libraries. This chapter will analyze significant findings related to AI adoption, integrate recurring patterns, such as trust and data privacy concerns, and emphasize areas of limited comprehension like the need for explainability and algorithmic accountability.

The profound influence of AI on the financial services industry is well-documented, with the technology often depicted as a transformative force capable of revolutionizing financial processes, including library financial management. AI's superiority over traditional rule-based methods is evident in its ability to identify and thwart fraudulent activities with greater accuracy. It employs advanced algorithms to analyze large and complex datasets, uncovering subtle patterns of fraudulent behavior that might elude human detection. This capability significantly enhances security and operational efficiency within the financial sector and can be extended to improve financial decision-making and resource allocation in libraries.

3.2 4.1 Creditworthiness, analyse market risks and identify potential investment opportunities:

Financial institutions are increasingly utilising AI models to enhance their capacity in evaluating creditworthiness, analysing market risks, and identifying potential investment opportunities (Ahmed et al., 2023; Cao et al., 2021; Deshpande, 2020; Hajipour et al., 2023; Li et al., 2021; Truby et al., 2020; Zhan et al., 2024). The ability of artificial intelligence to analyse diverse types of data, including unstructured sources like news or social media sentiment, leads to more precise predictions and risk assessments (Aziz & Dowling, 2018; Biecek et al., 2021; Jain &Vanzara, 2023; Ma & Yu, 2010). This leads to enhanced financial decision-making, which has the potential to impact the profitability and mitigation of risk for institutions. For libraries, evaluating creditworthiness can translate into assessing the financial viability of funding sources or evaluating potential partnerships. Similarly, analyzing market risks and investment opportunities can assist libraries in managing endowments or funds allocated for future resource acquisition.

4.2 AI Revolution:

Artificial intelligence (AI) plays a pivotal role in the robo-advisor revolution, enabling a broader demographic to access personalised financial planning and investment management services that were previously unattainable. Research underscores the importance of acknowledging potential biases and fostering inclusivity. Nevertheless, the overall trend suggests that the capabilities of artificial intelligence are increasing financial accessibility. This is corroborated by prior research conducted by Babina et al. (2024), Konigstorfer and Thalmann (2020), Madanguli et al. (2024), and Townson (2020). The AI revolution in financial services, including the rise of robo-advisors, can inspire similar innovations in library management. Libraries can utilize AI to offer personalized financial planning for resource management, enhancing overall operational efficiency and user satisfaction

4.3Analysing Adoption: The UTAUT2 Model and its Possible Limitations:

The UTAUT2, a comprehensive theory on technology adoption, has been widely employed to investigate the acceptance and utilisation of technology. It has provided valuable understanding into the motivations of users. Studies exploring its use in financial and other settings emphasise the significance of factors such as the system's effectiveness (performance expectancy), ease of use (effort expectancy), adoption by others (social influence), and availability of resources to support its use (facilitating conditions) (Alghatrifi& Khalid, 2019; Huang & Kao, 2015; Indrawati&Primasari, 2016; Venkatesh et al., 2022). However, the investigation reveals certain aspects where the original version of UTAUT2 may not fully address the complexities of AI implementation in the heavily regulated financial sector.

Multiple studies (Ameen et al., 2021; Berman et al., 2024; Diaz-Rodriguez et al., 2023; Morgenthal et al., 2021) have highlighted the significance of trust in the finance industry when it comes to utilising AI technology. Trust, within this specific context, is a multifaceted concept that encompasses numerous facets. It encompasses the reliability and uniformity of the system, the assurance that it operates impartially and without any prejudiced algorithms, and the ability to offer transparent justifications for AI decisions, especially when significant financial risks are involved.

Explainable AI (XAI) is a discipline that seeks to improve the understandability of intricate AI judgements for human comprehension. The primary objective of this research is to devise methodologies that facilitate human

comprehension and confidence in AI systems, thereby encouraging the ethical and judicious utilisation of AI.
Data privacy and security are intricately linked to the utilisation of artificial intelligence in the financial sector, particularly in the handling of confidential client information. Studies highlight the strong connection between effective data protection technologies and how users perceive security. These factors significantly influence trust and ultimately affect decisions regarding adoption (Anantharaman et al., 2023; Cao, 2020; Chauncey & McKenna, 2023; Gupta et al., 2024; Lin, 2020).
Algorithmic accountability is a widely discussed subject in academic literature, highlighting the importance of establishing clear governance frameworks, monitoring techniques, and the ability to audit artificial intelligence systems. Multiple studies investigate the ethical issues related to the utilisation of artificial intelligence (AI) and demonstrate ongoing efforts to establish guidelines and systems that promote transparency and responsible use (Avin et al.,
2021; Berman et al., 2024; Diaz-Rodriguez et al., 2023; Dignum, 2023).

3.3 4.4 Empowerment Theory: A Possible Augmentation:

Although the concept of user empowerment has not been extensively examined in the literature on technology adoption, it has the potential to be a valuable addition to the overall framework. Studies suggest that when people feel empowered by technology and witness an enhancement in their abilities, they are more inclined to embrace its use (Aswani et al., 2018; Blok et al., 2020; NaranjoZolotov et al., 2019). While additional research is necessary, examining the correlation between user empowerment and the integration of artificial intelligence in the field of finance could yield valuable insights.

4.5 AI in Financial Decision-Making for Library Management:

AI plays a pivotal role in enhancing financial decision-making within libraries by offering advanced tools for optimizing budget allocation, forecasting future financial needs, and evaluating the return on investment (ROI) for technological infrastructure. By analyzing usage data and user behavior, AI enables libraries to make data-driven decisions, ensuring funds are directed toward high-demand resources and services. Additionally, AI can streamline financial operations by automating tasks such as invoice processing and expenditure tracking, reducing administrative burdens and minimizing errors. However, the implementation of AI in this context requires careful consideration of transparency, ethical use, and building trust in AI-generated recommendations.

3.4 4.6 Synthesis and framework development:

This investigation emphasizes the necessity of surpassing the traditional UTAUT2 model to effectively address the particular challenges related to understanding the complexities of AI adoption in the regulated financial services sector, especially within the context of library management. The proposed extended UTAUT2 framework would incorporate essential AI-related attributes, namely trust, explainability, data privacy, algorithmic responsibility, and user empowerment. By adapting these elements to the specific needs of libraries, this model aims to provide a nuanced understanding of how AI can be strategically implemented to enhance financial operations in library settings. This enhanced model seeks to examine the correlation between the fundamental UTAUT2 attributes more effectively, ultimately offering more pragmatic insights for financial institutions and libraries involved in AI implementation strategies.

4. 5.CONCLUSION:

The objective of this study was to comprehensively examine the intersection of artificial intelligence, patterns of technological adoption, and the specific barriers and benefits that impact the implementation of AI in the financial services industry, with a focus on library management. An advanced UTAUT2 framework was developed to understand the specific factors that promote or impede the adoption of AI in this context, taking into account the unique financial management challenges faced by libraries. This framework was created based on an extensive review of the literature, incorporating insights from both financial services and library management domains. This final chapter will present a brief summary of significant findings, highlight the accomplishments of the research, acknowledge its limitations, and suggest potential avenues for future investigation.

5.1 Analysis of important findings and creation of a structured framework:

The literature study emphasizes the transformative capacity of AI in revolutionizing various aspects of financial services, including the financial management of libraries. Advancements in fraud detection, risk assessment, personalised financial services can provide significant benefits to financial institutions and their clients (Babina et al., 2024; Ferreira et al., 2021; Konigstorfer & Thalmann, 2020; Mariani et al., 2023). However, the successful

integration of these technologies relies on effectively addressing a specific range of issues pertaining to adoption.

5.1.1 The Constraints of UTAUT2:

While the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) provides valuable insights into technology adoption, it is not entirely applicable when specifically applied to artificial intelligence in the financial services sector. The complex nuances of AI technologies, coupled with the heavily regulated nature of the financial sector, necessitate the inclusion of supplementary elements to enhance the depth and predictive understanding of adoption.

The extensive literature review identified crucial components necessary for the implementation of artificial intelligence in the field of finance. Trust emerged as the foundational cornerstone, encompassing considerations pertaining to reliability, fairness, and comprehensibility. The necessity for Explainable AI (XAI) has been recognised, particularly in situations where complex AI models are employed for crucial financial decisions. The importance of data privacy and security was underscored, highlighting the necessity for strict adherence to legislation and the establishment of user trust. Emphasising the importance of holding algorithms responsible, it is necessary to establish clear governance structures and ensure appropriateness to promote responsible and ethical utilisation of AI.

The Extended UTAUT2 Framework was developed to address the identified limitations. It includes significant elements related to AI, such as trust, explainability, data privacy, and algorithmic responsibility, in addition to the fundamental UTAUT2 structures. Furthermore, the study examined the potential importance of user empowerment theory as a determinant that could influence the probability of adopting artificial intelligence in the context of library financial management, offering insights that are applicable beyond the traditional banking sector.

5.2 Contributions to Research:

This study provides contributions in both theoretical and practical aspects:

5.2.1Theoretical Advancement:

This study enhances the well-established technology adoption model (UTAUT2) by incorporating domain-specific factors to better explain the adoption of artificial intelligence in financial services, particularly within library management. By doing so, it improves our understanding of how users and institutions evaluate and decide to implement complex, and sometimes difficult-to-understand, AI technology in a highly regulated and risk-conscious environment.

5.2.2Practical Implications:

The proposed comprehensive framework could serve as a valuable asset for financial institutions, including libraries, as they investigate strategies for leveraging artificial intelligence. Libraries and other institutions can prioritize projects that enhance trust, address concerns regarding explainability and bias, establish strong data protection measures, and ensure a responsible approach to algorithmic decision-making by identifying the crucial factors that influence AI adoption.

5.2.3 Constraints and Prospects for Future Research:

5.2.3.1 Theoretical Nature:

The suggested expanded UTAUT2 framework is founded on theoretical principles, and it is crucial to acknowledge this foundation. To evaluate the predictive abilities and efficacy of the framework in real-world situations, performing empirical validation through surveys, case studies, or similar techniques is essential. This validation will help determine how well the framework can guide AI adoption in financial services, particularly within librarymanagement.

5.2.3.2 The Dynamic Environment:

The fields of artificial intelligence and finance, including library financial management, are perpetually dynamic and progressing. Future studies should closely monitor the latest developments and refine the framework to ensure its relevance and adaptability in response to evolving technologies and regulatory changes.

Exploring the concept of user empowerment within the context of AI adoption in library financial management could yield additional insights and further enhance the predictive capabilities of the framework. Measuring the influence of AI-specific attributes on adoption outcomes would provide valuable guidance to libraries and other financial institutions.

This study contributes to the growing body of knowledge on the secure and effective utilization of artificial intelligence in the financial services sector, specifically within the domain of library management. The extended

UTAUT2 framework integrates insights from technology adoption theories, the literature on trust in artificial intelligence, and an understanding of the distinct regulatory environment, both in traditional finance and in libraries.

The objective of this study is to deepen our understanding of the complex factors that impact the adoption of artificial intelligence (AI) in this specific context. By doing so, libraries and financial institutions can gain valuable insights to inform their strategic decision-making processes, promote responsible innovation, and build trust with users and regulators when integrating these revolutionary technologies.

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