

Application of Innovative Technologies to Protect Financial Information in Accounting: Challenges of the Digital Economy Era

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Abstract

This research will be conducted between the years 2019 and 2023, and it will investigate how new financial concepts may affect account management at Ukrainian banks. The BAI-Finance Global Banking Innovation Awards provide the data that is used in this analysis, which examines how the most successful financial institutions in the world make use of new technology to safeguard the money of their consumers. This research makes use of a wide range of analytical tools in order to investigate the potential for blockchain and encryption, together with other digital technologies, to potentially alter the manner in which banks and other financial institutions manage the funds of their customers. The findings highlight the significance of utilizing cutting-edge digital accounting techniques in order to safeguard valuable financial information in the current digital era. The findings of this study demonstrate how these technologies have the potential to resolve accounting issues such as data breaches and make all financial transactions transparent.

Keywords: Financial Institutions, Financial Market, Accounting Innovations, Financial Information Protection, Digital Accounting, Accounting Challenges, Digital Security, Information Weakness, Financial Cyber security, Data Privacy, Innovative Technologies, Technological Challenges, Business Models.

Introduction

The digital revolution has led to substantial changes in accounting practices and the operations of banks. As a result of this shift, the accounting sector has been presented with both opportunities and challenges (Tsindeliani et al., 2024).

During the initial implementation of accounting, the process was arduous and depended on the use of physical paper records. However, accounting is currently seeing a substantial change due to the implementation of advanced technologies like blockchain, cloud computing, and artificial intelligence (Fedyshyn et al., 2019). Cloud-based accounting software streamlines the tasks of recordkeeping and data entry, similar to a certified financial planner (CFP). Additionally,

artificial intelligence (AI) aids in operations like identifying fraudulent activity and reconciling accounts. Blockchain technology, similar to a certified financial planner (CFP), enhances the accuracy and traceability of data by employing a secure and transparent way for capturing and documenting financial transactions (Frame & White, 2015).

Despite the numerous advantages brought about by technological advancements, the digital economy poses specific challenges for accountants. Given the increasing threat of cyberattacks targeting financial institutions, it is crucial to prioritize the protection of data (Gunin, 2024). To achieve a seamless flow of data, it is crucial to do a comprehensive review of the latest digital accounting and banking computer systems. Furthermore, accountants play a crucial role in ensuring that stakeholders have access to precise and comprehensible financial data within a constantly expanding digital ecosystem. To address these challenges and enhance accounting processes, several state-of-the-art technologies are currently being employed, including Cloud accounting solutions utilize encryption and access controls to ensure the security of confidential financial information. This is achieved by utilizing cloud accounting (Loiko & Bashkyrtseva, 2018). Detecting abnormalities has gotten much easier because to advances in artificial intelligence. Artificial intelligence systems can discover potentially fraudulent websites and suspicious patterns quickly by analyzing large amounts of data. Blockchain technology ensures the security of digital ledgers. Blockchain technology improves the capacity to verify and reduces the chances of fraudulent conduct because the transactions recorded on it cannot be changed.

In the current digital era, accounting specialists have a crucial role in maintaining the transparency and accuracy of financial information. They help protect financial data, streamline processes, and ensure the reliability of such information. This is achievable by leveraging innovative technologies.

Research Question

What are the key challenges to adopt the innovative technologies in accounting sector to ensure the security of financial data in the digital era?

Objective of the study

The objective of this research is to examine the difficulties that accounting encounters in safeguarding financial information inside the digital economy era. The main aim of this research is to examine how advanced technologies can address these challenges, propose strategies for their effective adoption, and assess their impact on the ability of accounting practices to withstand cybersecurity risks and protect privacy. This research project intends to offer a scholarly contribution to the field and help develop efficient ways for safeguarding financial data in the digitalization era.

Literature review

Numerous scholars explored the information and advance technologies, and their utilization in the functioning of financial institutions, like (Butko, Ivanova, Popelo, & Samiilenko, 2021; Butko, Popelo, & Pishenin, 2019; Lee et al., 2020; Kapetaniou, Samdanis, & Lee, 2018).

The analysis of funding data and extensive interviews conducted with banks, cluster managers, and enterprises did not indicate a direct influence of financial investors on innovation activities.

Harsono and Suprapti (2024) conducted an analysis on the impact of financial technology (Fintech) on the operational efficiency, accessibility, and new ideas inside the financial sector. By analyzing the literature, they thoroughly investigated several topics such as user experience, financial inclusion, open banking, business efficiency, and financial security. Their aim was to analyze previous studies in order to detect new patterns and challenges, as well as assess the influence of Fintech on traditional financial services. Their research not only enhanced our comprehension of Fintech development but also generated novel ideas for optimizing its benefits for the global economy and population. However, it failed to tackle the specific security issues that arise when dealing with financial data in accounting systems.

Ray et al. (2024) explored the retail business recognizes blockchain's cybersecurity potential. This study thoroughly examined how blockchain technology improves retail cybersecurity. Data security, supply chain integrity, and

transaction security were the priorities of the study. Blockchain technology allows origin verification, supply chain vendor management, tracking, and counterfeit prevention, according to the report. The paper also explored blockchain and fraud detection to secure transactions. Blockchain technology can minimize risks, increase transparency, and build retail cybersecurity trust, according to the research. Research implies that blockchain technology could improve cybersecurity, despite retail business issues like scalability and legality. While this study offered significant insights, it did not thoroughly explore the integration of blockchain technology software or its effectiveness in addressing accounting-specific cyber concerns.

Xu et al. (2020) evaluated that to promote an environmentally sustainable and fair economy, financial resources must be understood. However, low-income populations often struggle to get credit, insurance, and savings accounts. This study examined how digital technology had affected low-income people's financial access. The study used qualitative literature analysis to find that digital technology has expanded financial accessibility for low-income people. Digital banking, electronic payments, and alternative funding models have overcome distance, paperwork, and expenses in financial services (Saksonova & Kuzmina-Merlino, 2017; Vovk et al., 2021). This study explores the influence of digital technology on financial inclusion, which is distinct from particular emphasis on information security in accounting.

Domingo et al. (2021) examined the impact of a CEO's financial literacy on a company's technical innovation, employing theories of top echelons and human capital in Spain. The authors also analyzed the impact of financial constraints faced by small and medium-sized enterprises (SMEs) on the aforementioned relationship. This study discussed only theories but how to implement these theories in real banking sector was not discussed. Wang, Chen, Si, Xie, & Chevallier (2021) evaluated multilayer information spillover networks. The networks are comprised of three distinct layers: the extreme risk spillover layer, the return spillover layer, and the volatility spillover layer. The primary goal of was to perform a

comprehensive study of the information spillovers and interconnectedness among thirty Chinese financial institutions, including securities firms, insurers, and banks.

Hui An. (2021) studied that provided empirical evidence of a cyclical relationship between financial innovation and regulation, which could be described as "regulation-innovation-re-regulation-re-innovation." The objective of this study was to evaluate the relationship between regulatory activities and financial institutes by offering an evolutionary game model of Australia and China.

Lee et al. (2020) examined the relationship between bank development, financial innovation, institutional environment, and bank expansion in China. The relationships were analyzed using bank development and financial innovation measures. PK Senyo and Ellis (2020) proposed that understanding fintech before adopting technology is essential to increasing financial inclusion. The Prospect theory and the unified theory of acceptance and use of technology (UTAUT) were used to study mobile money adoption, a financial technology innovation (Perkins, 2020). The data showed a statistically significant relationship between effort expectations, performance, and mobile money use.

Ebubekir Mollaahmetolu et al. (2019) examined financial innovation, development, and economic growth in fifteen countries. Financial development includes a variety of components such as financial access, depth, efficiency, and stability. Furthermore, the study used financial innovation in the analysis to provide accurate and dependable results. The study found that breakthroughs and progress in the financial sector had a substantial impact on economic growth. Chrystalla et al. (2018) facilitated the enhancement of innovative processes in Cyprus and the United Kingdom. The writers highlighted the need of considering both a country's economic factors and its innovation system when formulating innovation policy. This development was significant as it showcased the vulnerability and susceptibility of the financial industry to external events, such as the recent global financial crisis. A comprehensive analysis of the correlation between a nation's economic condition and its innovation system demonstrates the interconnectedness of the two. The aforementioned

methodology can be utilized to assess and advance policies that encourage domestic innovation. Saliba de Oliveira, Cruz Basso, Kimura, & Sobreiro (2018) investigated the correlations between innovation programme, the effects of these innovations, and the financial results for enterprises in Brazil. The hypothesis posited that there was no association between innovation programme and financial outcomes.

Prior research has examined various methodologies, variables, and frameworks to assess the effects of emerging technologies on the banking industry. The existing literature has not examined the resilience of the findings through analyses conducted at the individual deposit product level, market level, sector level, or channel level. In addition, BAI conducts evaluations of macro-level insights that consider specific data related to significant banking advancements. Moreover, BAI experts would regularly examine the data to identify any alterations in how banks employ technology and integrate those discoveries into future study.

Research Methodology

The study employed a range of scientific approaches, both general and specific, such as historical-logical, dialectical, deductive, analysis and synthesis, grouping, abstraction and formalization, benchmarking, generalizations, and systematization. The data from the biennial BAI-Finance Global Banking Innovation Awards in Las Vegas is used for analysis.

Structure of the Study

An analytical framework will be implemented to scrutinize the progression of pioneering methodologies within the financial sector from 2019 to 2023. Thorough analysis of the evolution of noteworthy patterns and discernment of significant advancements are imperative. An analytical methodology will be utilized to comprehensively examine the interplay among various banking innovations and their ramifications on the sector environment. A more profound comprehension of the intricate correlation between innovations and their capacity to generate novel opportunities can be attained through the lens of economics.

Aggregating the necessary data

This study's principal data source is the BAI-Finance Global Banking Innovation Awards, held biennially in Las Vegas. An examination of the prestigious undertakings of leading international banks from 2019 to 2023 presents a significant opportunity to gain insight into the most recent progressions across various domains of banking.

Techniques for Data Analysis

A deductive analysis will be performed on the award-winning projects in question, utilising theoretical frameworks pertaining to banking innovation. This facilitates the acknowledgment of the practical implementation of theoretical concepts. By employing analysis and synthesis, the various components of each innovation will be dissected and reassembled in order to comprehend their overall functionality and impact.

The classification of innovations will be based on their distinct domains of concentration, which may comprise risk management, operational efficiency, and customer experience.

A comparative analysis of award-winning projects from various years and regions will be undertaken to identify trends and ascertain the leading institutions in innovation. By utilizing a systematic and generalizable approach, it is possible to derive more comprehensive conclusions regarding the present condition of innovation in the banking industry by applying the particular instances illustrated by the awards data. It is critical to identify significant trends and advancements that will have a profound impact on the industry's future.

Results and discussion

Research findings indicate that several banks have received prizes in different years as a result of their implementation of innovative financial technologies. Banks that employ updated and effective technologies can safeguard financial data and play a crucial role in enhancing the banking sector.

Descriptions and structures of financial innovations

Financial innovations have been present since the inception of technological advancements. Therefore, they do not

qualify as a novel or innovative creation. The close correlation between financial and technological advancements, and their concurrent evolution over time, is widely acknowledged. Financial innovations offer a viable solution for financing technologically advanced projects when conventional funding sources are insufficient due to the substantial investment risk involved. However, it is important to note that technological and economic advancements give rise to novel forms of risks and increasingly intricate business operations. The updating of the financial system and markets is necessary to align with the evolving requirements of companies and the complexities of the contemporary world. The aforementioned insight suggests that in the absence of financial progress, the rate of technological and economic development would decelerate, resulting in a decline in the overall wealth of a nation. The deployment of financial innovations would be limited without the necessity driven by technical developments.

Financial innovations suffer from a lack of clearly defined definitions, much like advancements in technology. In order to ensure a comprehensive comprehension of this concept, it is imperative to establish a systematic understanding. The term "financial innovations" is typically defined in the context of product innovations. The limited interpretation mentioned is commonly present in the majority of practical definitions (Javaid et al., 2022; Wachira, 2023). Following are the key characteristics of the outcome of financial innovation analysis, as identified by these definitions:

- 1) The financial instruments mentioned can be categorized as either innovative solutions or modified versions of existing ones. They incorporate contemporary construction elements to enhance their liquidity and expand their potential applications in accordance with present circumstances.
- 2) These instruments can serve as alternatives to conventional financial instruments, thereby enhancing

the financial standing of the businesses that adopt them.

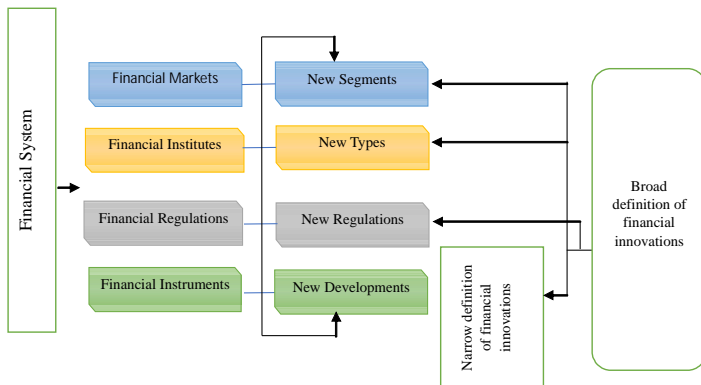
- 3) These instruments do not have a clear association with a specific entity or purpose.

Financial innovations can be defined in two distinct manners. The initial approach centers around advancements in financial instruments, encompassing novel instruments, combinations of conventional instruments, adaptations to traditional instruments, or innovative applications of existing instruments. The core concept of financial innovations is illustrated in Figure 1.

There exist multiple methodologies for categorizing financial innovations. The commonly used classification criteria for financial innovations include the sources of innovations, motivations for utilizing financial innovations, types of innovations, impact of financial innovation application, factors influencing the process of innovation creation and implementation, moment of innovation creation, and components of the financial system where innovations occur (Figure 1). A collaborative initiative is currently in progress involving seven esteemed banking laboratories and organizations with the aim of developing advanced financial technologies (Loiko & Bashkyrtseva, 2018). The PlayRoom Innovation Center of Standard Bank (South Africa) was established in January 2015 with the objective of fostering the advancement of contemporary banking technologies.

The Capital One Bank (USA) Laboratories comprise three distinct sites situated in Washington, New York, and San Francisco. The primary objective of these laboratories is to expedite the progress of all digital operations within the bank and to develop innovative banking products through experimentation. The Innovation Laboratory of the Commonwealth Bank in Australia actively participates in collaborative initiatives with industry experts, partners, customers, entrepreneurs, and partners to develop innovative products, services, and solutions.

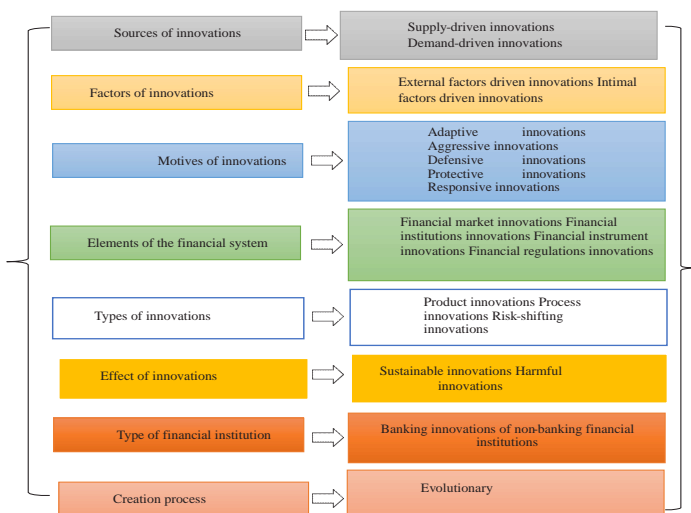
Figure 1. Explanation of the core of financial innovations



Source: Sketched by the authors

The Visa Innovation Center, located in the United States of America, is focused on the development of advanced financial software solutions. The Chase Bank Development and Innovation Center in the USA is dedicated to enhancing ATM technology and exploring novel approaches to consumer engagement. The BBVA Innovation Center in Spain is responsible for the design and implementation of various technical solutions. The modifications to the terms and conditions of deposit and loan agreements, as well as adjustments to interest rates on loans and deposits, are not considered banking innovations if they do not affect the core characteristics and functionalities of a banking product or operation (Loiko & Bashkyrtseva, 2018).

Figure 2. Explanation of financial innovations



Source: Sketched by the authors

Novel approaches to the advancement of the banking industry in Ukraine

Mobile phones are utilized as a payment method for receiving funds and facilitating payments for goods and services, as provided by Ukrainian institutions. Privatbank (iPay) and Raiffeisen Bank Aval (Pay-Me Ukraine) are two Ukrainian financial institutions that provide mobile applications specifically designed for corporate use. The compatibility between card readers produced by financial institutions and smartphones is achieved through the use of the smartphone's headphone port. The aforementioned devices, which are outfitted with a specialized application, streamline the process of accepting payments made with plastic cards for small retailers, taxi drivers, and couriers. The collaboration between Poster, a startup, and Privatbank's mini terminals has resulted in the integration of a fully functional currency register into smartphones and tablets. The storage of all business transaction data is centralized in the cloud, while the utilization of mobile point-of-sale terminals facilitates the processing of non-cash payments. Ekkert, Nestorenko, and Szynek (2019) propose that the cash register can serve as a viable substitute for conventional accounting systems in the restaurant and business industries. The national-level establishment of the OschadBankID platform was initiated by PJSC "State Savings Bank of Ukraine" as a strategic measure to enhance the management of banking services. The platform serves as a mechanism for government agencies to identify and authenticate bank card users. In addition, this system enables the submission of digital signatures for permit registration, including permits necessary for business establishment and operation. The implementation of this measure will enhance the investment climate in the nation and reduce the occurrence of corruption in interactions between government entities, corporations, and citizens (Kosach et al., 2019).

During the times of financial instability and market volatility, financial institutions must emphasize cost reduction, speed transactions, and mitigate credit risks to stay competitive. Thus, financial institutions must create a new framework to overcome present challenges. Several Ukrainian banks are implementing blockchain technology

into their core banking and customer activities. Blockchain is a revolutionary distributed ledger that validates and records transactions. Network users are split between miners and non-miners in this environment. Daily users create records, while miners generate blocks. Internet users enthusiastically create and distribute publications daily. These documents involve financial transactions and ownership transfers. Ukrainian institutions are also preparing to use Ripple technology. This financial institution-focused technology is used by three Western banks.

The system operates as a network for conducting monetary transactions, facilitating currency exchange, and functioning as a payment system. The implementation of this technology will enable financial institutions to transfer funds worldwide with efficiency and ease. The advancements in payment systems have the potential to significantly accelerate the transactions associated with making purchases and transferring funds. In addition, the implementation of modern technologies has a positive impact on the reputation of the financial institution and the satisfaction of its customers.

There is significant potential for the implementation of financial innovations within the national banking system. However, in order to fully realize this potential, it is necessary to accelerate the process of digitalization (Ekkert, Nestorenko, & Szynek, 2019).

Financial innovations of the leading institutions in the world

The potential of radical innovations lies in their ability to disrupt existing business models or technologies, thereby creating new markets. An examination of the progressive advancements implemented by banks globally from 2019 to 2023 indicates that financial innovations have undergone a transformation to incorporate the most recent digital technologies.

The BAI-Finance Global Banking Innovation Awards is an annual event held in Las Vegas. The platform serves as a means for prominent banks globally to showcase their advancements in various industries.

The BAI Global Innovation Awards (2023) recognized the

most innovative financial services organizations, specifically: The Bank of East Asia, Limited (based in Hong Kong, China), Deniz Bank (based in Turkey), Emirates NBD Bank (based in the United Arab Emirates), USAA (based in San Antonio, TX, USA), and City Ventures (based in the United States) (Table 1).

Deniz Bank is committed to enhancing its open innovation network through ongoing collaboration with strategic business partners and the pursuit of innovative business models.

Emirates NBD is renowned for its position as a leading global innovator, consistently developing innovative and user-friendly products on an annual basis. Emirates NBD places a high priority on innovation as a fundamental value in its mission to streamline the lives of its clients and assist them in attaining their financial objectives. This commitment is applicable to all staff at all levels of the organization. Emirates NBD, a highly successful bank, has made a firm commitment to invest 500 million AED (equivalent to approximately USD 140 million) in digital innovation over the course of the next three years. The continuous growth of the bank serves as evidence of the exceptional dedication that, collectively, fosters ENBD as a center of innovation.

The motivation for innovation at USAA is driven by purpose. Their primary goal is to ensure the economic stability of the military community while providing excellent service. The primary objective of USAA is to prioritize the maintenance of exceptional service for its members and safeguard the long-standing reputation of the organization for the next century. Their ideas contribute to the improvement of the quality of life for their members and strengthen their financial stability. Their objective is to deliver tangible advantages for USAA members, staff, and themselves by leveraging innovation. USAA achieved cost savings of \$5.3 million and generated a value return of \$1.7 billion through their innovations in 2017, as verified by their business partners. The innovation process actively involves 92% of their personnel.

Citi Ventures is responsible for identifying untapped sources of value and accelerating the adoption of innovative business models.

Table 1. Most innovative financial services organization of the year

Year	Innovator	Innovation
2019	Deniz Bank (Turkey)	Deniz Bank places great emphasis on strategic organizational positioning and fosters a culture of innovation that promotes collaboration and knowledge sharing among its employees. In a world where customers are highly connected, every Deniz Bank employee is committed to promoting innovative principles and nurturing fresh ideas. Furthermore, Deniz Bank has embraced an ecosystem banking approach and is dedicating substantial resources to constructing a digital ecosystem that includes all essential participants.
2020	Emirates NBD Bank (United Arab Emirates)	The bank often arranges unique events, internal innovation programs, open banking initiatives from the outside world, regular training programs, and FinTech hangouts in an effort to foster an innovative culture. The 'Future Lab' is the hub for innovation management in the banking industry. Here, a team of professionals known as the "Innovation Champions" assess concepts and provide cutting-edge fixes.
2021	USAA (San Antonio, TX, USA)	USAA allows everyone to innovate. Our mission and culture define our organization, and our staff is dedicated to servicing our members. Promoting staff innovation is crucial to foster creativity and find new solutions that meet our members' needs and prepare USAA for future challenges. We engage our employees in strategic challenges through education and training, challenge-based innovation, hackathons, and coding competitions.
2022	City Ventures (USA)	Citi Ventures actively explores, mentors, and finances new concepts in collaboration with Citi colleagues, clients, and the innovation ecosystem to identify new value streams and accelerate the adoption of innovative business models.
2023	mooPay (India)	The emerging financial services company mooPay leverages data to create embedded services. They aim to help smallholder dairy producers access financial services and better their economic status. mooPay and Equifax have created mooScore™, a new creditworthiness assessment. MooPay analyzes prior 'flow' data with AI-powered credit risk models to help its banking partner underwrite credit risk. This helps the bank lend more by enticing new customers.

Source: Drafted by the authors on the source of (The BAI Global Innovation Awards, 2023)

Table 2. Product and service financial innovation

Year	Innovator	Innovation
2019	Wells Fargo	Wells Fargo has recently introduced CEO Mobile® biometrics as their latest security enhancement. The implementation of mobile biometrics by the CEO has raised the bar for security in the world of mobile banking. It has also made the banking process more efficient by providing customers with a secure and convenient way to access their mobile banking services, eliminating the need for tokens or passwords.
2020	Metromile	Auto insurance whose rates are determined on the number of miles driven. Metromile is revolutionising the auto insurance industry with technology by introducing a pay-per-mile insurance concept. Our organisation offers competitively cost auto insurance to customers based on the actual distance they drive. Moreover, we offer data analysis to help customers maximise their use of their cars, and our driving app offers immediate access to full car diagnostics.

Year	Innovator	Innovation
2021	NovoPayment, Inc. (Miami, USA)	Integrating Financial Services into the Value Chain of the Gig Economy. NovoPayment ensures an exceptional experience for their end users by effortlessly delivering in-context services to clients through the utilization of cutting-edge technologies. By utilizing NovoPayment's API-driven solution, Banco Pichincha Colombia is able to offer its contract economy clients financial services and a streamlined user experience without requiring modifications to their core systems or jeopardizing security and compliance. This innovation facilitates the access and utilization of expedited issuance and bulk payment services by the platform-driven business of the client, while also offering the essential scalability.
2022	OneConnect Financial Technology Co., Ltd (China)	FiMAX is a specialized financial service that caters to activities associated with commerce. The Blockchain Network is a decentralized system that facilitates uninterrupted connections among participants in the field of trade financing. Diverse trading partners are able to fund and exchange data on this dependable network in a secure and efficient manner, with the assurance that their information remains confidential. This is made possible through the implementation of cryptography and blockchain protocols.
2023	Yapı ve Kredi Bankası A.Ş. (Turkey)	Yapı ve Kredi Bankası A.Ş. prioritizes innovation in its corporate culture. This is done by addressing internal and external client needs to prepare the bank for future changes. The project fosters open innovation and partnerships to speed up and innovate product development.

Source: Drafted by the authors on the source of (The BAI Global Innovation Awards, 2023)

The information presented in Table 2 provides a systematically organized compilation of data pertaining to the champions and their contributions in the "Product and Service Financial Innovation" category, as recognized by the BAI Global Innovation Awards.

Perform a thorough examination of their creative achievements. The concept of a financial open ecosystem entails the operation of numerous financial entities and stakeholders in a manner that is both transparent and interconnected. The Fidor Smart Current Account allows app partners to expand the variety of services and products available to consumers. The expanding assortment of products offers a contemporary banking experience that fosters customer loyalty and entices new clients. Twitter, social lending, and social trading facilitate the transfer of credit in virtual currencies, providing innovative features that surpass those of conventional banking services.

The CEO Mobile service offers users a range of sign-on methods, which is a notable characteristic. Users have the option to log in by entering their ID and password or by utilizing the CEO Mobile Eye print feature. The Mobile Eye print function, developed by the CEO, eliminates the need for users to possess tokens or remember passwords. It

achieves this by generating a template of the user's ocular vasculature on their mobile device. The provided functionality facilitates faster and more secure user authentication, eliminating the need for users to remember passwords.

The pay-per-mile insurance concept developed by Metro mile represents a significant innovation within the auto insurance market. This groundbreaking approach is made feasible through the utilization of advanced technology. Metro mile is a company that is transforming the auto insurance and car ownership industry by introducing innovations that improve intelligence, efficiency, and accessibility.

By leveraging NoVo Payment's API-driven technology, Banco Pichincha Colombia can effortlessly provide user experiences and financial services to its contract economy customers, eliminating any potential obstacles or challenges. The aforementioned objective is achieved without requiring any modifications to the underlying systems or compromising the integrity of security and compliance protocols. The innovation addresses multiple specific pain points, as well as two overarching challenges. One significant challenge arises from the financial

institutions and banks' inability to cater to the requirements of contemporary platform-based businesses. In regions where cash transactions are heavily relied upon, such as Latin America, the issue is further intensified due to a notable portion of the population lacking access to formal banking services or electronic payment devices. In the digital economy, accounting professionals should receive continual training and use contemporary technologies to protect financial data. This would necessitate providing them with updated cybersecurity policies and technologies to better protect financial data in a quickly evolving digital environment (Radieva & Kolomiets, 2019).

The FiMAX Trade Finance Blockchain Network functions

as a blockchain-based solution that establishes a robust and self-contained data flow within its ecosystem. It achieves this by accepting data from various participants. Businesses have the ability to improve the credibility of their transactions and enhance their effectiveness in seeking financial assistance. Financial institutions have the ability to improve the precision of credit assessments, resulting in a reduction in financial risk.

The winners of the "Channel Financial Innovation" nomination from 2019 to 2023, as indicated in Table 3, were The Royal Bank of Canada, The Bank of East Asia, Limited (China), Mizuho Financial Group, Inc., HDFC Bank Limited, and Ping And Technology (Shanghai, China).

Table 3. Channel of financial innovations

Year	Innovator	Innovation
2019	Mizuho Financial Group, Inc.	Mizuho Financial Group, Inc. has introduced "Pepper" emotive humanoid robots as concierges in their traditional formal Japanese bank branches, as part of an innovative branch solution. The main expected results of this revolutionary innovation are to offer a distinct user experience through Digital Omotenashi and to enhance customer service through the implementation of AI and Big Data.
2020	HDFC Bank Limited	HDFC Bank on chat is a Facebook Messenger chat -based platform that offers a range of e-commerce services, such as event and utility payment arrangements. With the help of a sophisticated Artificial Intelligence system powered by Natural Language Processing (NLP), HDFC Bank on chat can understand the user's intentions from unstructured text input. Users must engage in a conversation with HDFC Bank via Facebook Messenger to complete any transaction.
2021	Ping And Technology (Shanghai, China)	A System for Financial Risk Management that incorporates Emotion Recognition technology. This system combines the domains of artificial intelligence and psychology to assist credit analysts in the credit evaluation process. The proposed solution combines findings from psychological research with artificial intelligence techniques to identify behavioral deviations that may indicate dishonesty. The data mentioned above is then used to help evaluate loan applications. This measure enhances the efficiency of credit evaluation and contributes to the decrease in delinquent debts as a percentage by reducing the required level of expertise for credit analysts.
2022	Royal Bank of Canada (Canada)	DRIVE is an application for smartphones and the web that helps Canadian motorists efficiently manage essential services and vehicle maintenance. Users can schedule service appointments, stay updated on safety recalls, and keep track of ownership documents and information, among other features.
2023	The Bank of East Asia, Limited (China)	Consumers are increasingly drawn to efficient, customized, and advance digital banking solutions. BEAST was established with the goal of streamlining the adoption of financial technology (fintech) to meet client needs and generate advantages for all parties involved, including technology, processes, and personnel. In order to achieve mutual success, the bank's fintech strategy aims to bring together BEA, industry partners, and entrepreneurs to establish a vibrant ecosystem for fintech.

Source: Drafted by the authors on the source of (The BAI Global Innovation Awards, 2023)

The nomination for the "Human Capital Innovation" category holds significant significance and relevance. The Citizens Financial Group is a financial institution. The Jamie Virtual Career Assistant (United States) streamlines the hiring process and introduces new features and enhancements to ensure that all candidates enjoy a meaningful, personalized, and contemporary experience. Jamie employs colloquial and intuitive language and possesses the capability to comprehend the user's vernacular. Furthermore, she employs emoticons as a means of expressing her emotions in her responses. External job seekers have initiated contact with Jamie to initiate the application process and inquire about employment opportunities. Jamie has successfully handled over 60,000 inquiries from candidates regarding various topics including perks, business culture, the interview process, and current issues.

The study, entitled "Hidden Power of Communication," was conducted in Turkey and aimed to investigate the

utilization of analytics by Ziraat Bank in identifying different factors that contribute to the rise in employee dissatisfaction and communication barriers. The bank has developed an innovative solution aimed at enhancing the communication network among employees. This solution also proactively detects and addresses communication issues by utilizing the data collected. The primary objective of the innovation is to facilitate internal connections within the workplace, foster a culture that is in line with employee expectations, and enhance communication standards.

The nominees for the "Financial Innovation in Social and Community Impact" category from 2019 to 2023 have been selected as follows: TEB Women Banking (Turkey), Taqanu, RUKULA (PVT) LIMITED (Colombo, Sri Lanka), USAA (San Antonio, TX, USA), JUMO (South Africa) and Standard Bank (South Africa).

Table 4 provides a systematic overview of the primary innovative concepts of the recipients who were awarded.

Table 4. Impact of financial innovation on society

Year	Innovator	Innovation
2019	TEB Women Banking (Turkey)	TEB has recently introduced a dedicated division devoted to Women's Banking, which aims to tackle the distinct challenges encountered by women in the corporate sphere. A prominent bank in Turkey, TEB, has initiated the provision of specialized banking services for women by establishing a dedicated department.
2020	Taqanu	Taqanu promotes financial inclusion and equal opportunity through the utilization of a digital ID based on the blockchain, which grants access to the financial environment to all individuals. The principal aim is to furnish users with uncomplicated banking capabilities on their smartphones, unencumbered by regional regulatory obligations, while efficiently managing Anti-Money Laundering (AML) risks.
2021	RUKULA (PVT) LIMITED (Colombo, Sri Lanka)	By utilizing microcredit, individuals in Sri Lanka who face economic challenges can acquire affordable consumer durables. Rukula aims to help economically disadvantaged individuals in Sri Lanka by implementing the country's first algorithm that considers non-financial attributes. This algorithm will assist them in obtaining minor consumer products. Nevertheless, it is important to recognize that these communities may encounter significant and diverse financial challenges during the duration of their credit agreement, even though we strongly advise our customers to stay up to date with their payments. As a result, no extra charges or fines are applied to payments made after their due date.

Year	Innovator	Innovation
2021	USAA (San Antonio, TX, USA)	A tool for capturing and analyzing aerial images. The aerial photography application evaluates the extent of damage by using photographs taken before and after the event. Users can input an address and view images that depict the location before and during the hurricane. People have the opportunity to remotely search and observe property damage, regardless of their ability to physically return home and assess the damage.
2022	JUMO (South Africa)	JUMO utilizes mobile phones to offer a range of fast, cost-effective, and top-notch borrowing options to clients who are usually hard to reach. With the use of personalized data, JUMO can customize products to meet the unique needs of every customer. JUMO efficiently reduces expensive operational and risk expenses by using advanced credit scoring and data prediction methods.
2023	Standard Bank (South Africa)	Given the growing importance of environmental, social, and governance (ESG) goals, commercial clients need tools and solutions to understand the project. People should also be able to recognize, measure, and monitor their company's ESG progress using these tools. Standard Bank introduced Africa's first digital marketplace with sustainable solutions. These solutions assist our continental clients achieve their ESG goals.

Source: Drafted by the authors on the source of (The BAI Global Innovation Awards, 2023)

The next nomination on the list that deserves consideration is titled "Financial Innovation in Internal Process Improvement." During the period from 2019 to 2023, several financial institutions demonstrated notable innovation in this particular domain. These institutions

include Citi Ventures (USA), Deniz Bank (Turkey), Alior Bank S.A., Live Oak Bank (Wilmington, NC, USA) and NPL Markets (UK) (as shown in Table 5).

Table 5. Innovative financial strategies for enhancing internal processes

Year	Innovator	Innovation
2019	Alior Bank S.A.	Smart Collect is an automated debt collecting method that utilizes specific scenarios and intelligent algorithms. Alior Bank has successfully implemented a cutting-edge debt collection strategy with the help of Smart Collect. This strategy is further strengthened by the utilization of data analysis tools, automated campaign generation and management based on client information, and the incorporation of multiple customer-specific contact channels. These channels involve the utilization of AI agents in contact-center campaigns.
2020	Deniz Bank (Turkey)	Optimizing workforce allocation. Intelligent Workforce Management utilizes CRM approaches to effectively prioritize tasks, rather than relying on isolated centralization of processes. The system generates automated task assignments based on competencies, conducts calculations using comprehensive mathematical models, and forecasts workload balances using data from various sources.
2021	Live Oak Bank (Wilmington, NC, USA)	Enabling cloud services to provide employees with the freedom to work from any location and at any time, unrestricted. During a span of eighteen months, Live Oak Bank successfully transitioned its internal IT infrastructure and all applications to a Microsoft Azure cloud environment. This action enabled all employees to effectively address client needs from a distance using secure and user-friendly cloud applications. Employees have the ability to attract new clients and assist existing ones from any location and at any time. In addition to handling deposits, registering new customers, and providing a range of banking products and services, they heavily rely on computers, mobile devices, and the cloud.

Year	Innovator	Innovation
2022	Citi Ventures (USA)	ProxymitySM is a newly created digital platform that allows business shareholders to vote through a proxy. The platform facilitates a direct connection and ensures the verification of stock issuers and investors, thereby improving the efficiency, accuracy, and transparency of the voting process. ProxymitySM provides a quick and efficient way to track the voting process, allowing for timely adjustments to instructions and ensuring that votes are properly recorded during the annual general meeting.
2023	NPL Markets (UK)	NPL Markets provides a complete solution to improve illiquid loan market transparency and efficiency. Integrating data preparation, valuation, reporting, marketplace operations, and data hub software does this. This global system can handle performing and non-performing loans. The app provides practical data and insights that boost profits, decrease risks, and improve efficiency.

Source: Organized by the authors on the basis of (The BAI Global Innovation Awards, 2023).

The BAI Global Innovation Awards finals recognized the finalists in the category of "Financial Innovation in Internal Process Improvement." The following five institutions have been acknowledged for their innovative progress:

Caixa Bank S.A. (Spain) has successfully developed an innovative solution aimed at providing clients with efficient mobility by leveraging the diverse range of products offered on Caixa Bank. The Mobility project has a significant impact on the environment and the purchasing of products exclusively through digital channels, both of which are currently of utmost importance.

Deniz Bank, a financial institution based in Turkey, utilizes the Digital Scorecard, an extensive monitoring system, to assess the effectiveness of employees in encouraging the adoption of digital channels by consumers. The Digital Scorecard is a tool designed to assist employees in analyzing the daily, weekly, and monthly transactions of their customers. Its purpose is to provide guidance in directing customers to the appropriate digital channel, rather than relying on physical branches. This feature not only enhances time and cost efficiency for consumers, but also increases branch profitability by leveraging low-cost digital channels.

The OPTIMUS platform, developed by ICICI Bank, is a web-based solution available in India. It enables users to conveniently submit e-signed invoices, NDC submissions, and online invoices for the purpose of payment disbursement. The system also enables online profile

updating, submission, and collection of Know Your Customer (KYC) documents and declarations from vendors. The online distribution of ID cards is a novel and sustainable practice in the industry.

The bank is named Shenzhen Bank. OneConnect Smart Technology Co., Ltd. is a Chinese-based company. The Smart Contract Cloud platform leverages the contract risk concern identifier to generate a predictive model for real-time risk assessment. The purpose of this model is to assess the risk level associated with each clause in the contract and provide a prediction of the probability of a contract clause default. The system is responsible for creating a comprehensive representation of the contract subject. It establishes a set of rules for mapping and generates notifications to alert users about potential risks. Additionally, the system provides warnings regarding these risks and maintains communication with external data sources.

This research aimed to explore how innovative technologies can protect financial information in the digital world. The study analyzed data from the BAI Global Innovation Awards reports spanning 2019 to 2023. It has identified several new technological patterns that could innovate the finance sector, including digital identities, mobile payments, data analytics, and open ecosystems. These findings suggest that embracing these technologies could significantly enhance the security and efficiency of financial operations. The same findings were explored by Ekkert et al. (2019) and Teslenko & Zadoia (2021), García-

Pérez-de-Lema et al. (2021). Even when they are recognizing remarkable accomplishments in advance technology, award ceremonies may simply concentrate on a few aspects of the subject matter. When considering technological advancements, it is vital to study both widely recognized and lesser-known innovations. By exploring both breakthroughs, more exploration can be found that how technology innovations influence operational productivity, risk mitigation, and customer satisfaction (Shkarlet et al., 2020). After conducting an inclusive analysis, it become easy to evaluate the function and role of these technologies along with their practical properties like reduced risk, faster processes, and increased customer satisfaction (Shkarlet et al., 2019). While many discussions tend to focus exclusively on the advantages of progressive technology, it is crucial to also consider the potential disadvantages, such as increased costs and the risks associated with data holes and legal problems. Efficient risk-reduction policies should be applied by policy makers from the beginning to the end of the project to address these problems. This scenario establishes the efficiency of employing theoretical frameworks in simplifying procedure assessment and recognizing issues. Innovations in the financial sector are a key feature in the hasty digitization of this world and a major driver of nationwide economic growth (Mollaahmeto lu & Akçali, 2019). Financial institutes should prioritize participating in digital and inventive enterprises, considering the challenges and hazards involved (Kholiavko, 2017). It is necessary to know that how specialized financial loans work and consider the pros and cons carefully to get the most out of them (Hahn, 2019). A cross-functional strategy is necessary for the effective distribution of financial innovations (An, Yang, Ma, Zhang, & Islam, 2021). Flexibility is encouraged and the overview of small variations is made easier using this method. As seen from the experiences of well-known banking institutes that have keenly involved new progresses, the ability of financial innovations to produce assistances and problems for all parties concerned is what makes them substantial (Yao et al., 2018; Vovk et al., 2019). When innovative developments take over from long-standing business models or technology, they can seriously disrupt the market. This paper provides a detailed analysis

of the noteworthy developments made by banks worldwide between 2019 and 2023. City Ventures (USA) win the prestigious BAI Global Innovation Awards for "Most Innovative Financial Services Organization" in 2019. The organization aggressively contributed to the uprising network as a business proprietor in order to proactively find, back, and finance new concepts. This, together with a critical sense of detail, speeds up the acceptance of novel business models and highlights special prospects to generate value. The entrance of the FiMAX Trade Finance Blockchain Network by Chinese startup OneConnect Financial Technology Co., Ltd. The method tries to make it easy for all the people involved in trade financing to talk to each other by using blockchain technology. The protected and consistent funding and data exchange among participants is simplified by the network's encryption and blockchain architecture, which guarantees the security of their information. The social and civic implications of modern financial breakthroughs are substantial. JUMO, a South African company, expanded its borrowing options through mobile phones in 2019 to target an untapped customer segment. The achievement of JUMO is facilitated through the utilization of sophisticated data prediction and credit scoring techniques. These techniques play a crucial role in minimizing operational and risk costs. In the past, financial innovations have predominantly concentrated on improving internal procedures. An exemplification of this methodology can be seen in Citi Ventures (USA), the entity responsible for the creation of the digital proxy voting platform known as ProximitySM. The present invention provides corporate shareholders with a number of benefits, such as a voting mechanism that is characterized by enhanced transparency, efficiency, accuracy, and real-time functionality. The platform facilitates a direct connection and verification process between equity issuers and investors.

Conclusions

Recent research suggests a significant shift in financial innovation, with the growing utilization of advanced digital technologies to bolster the security of accounting data. This study investigates the feasibility of using blockchain and encryption technologies to improve the security of

accounting data in banks, with the goal of reducing the impact of financial crises. Financial organizations can utilize these technologies to improve the clarity and safety of financial transactions. To effectively integrate this new technology into accounting operations, additional research is required to comprehensively grasp the complexities of accounting in the digital era. Ensuring the efficiency and security of accounting processes is vital in today's fast-paced digital environment.

Policy Recommendations

Financial institutions may improve crisis resilience and public trust in the digital economy by taking a strategic approach (Rybalchenko et al., 2022). With the rise of Fintech solutions like digital payment systems and mobile banking apps, scholars can help understand how they affect regional economic development, capital accessibility, and financial inclusivity in EU regions. Evaluate the quality and availability of digital infrastructure, such as efforts that improve digital skills and fast internet connectivity, to understand the differences in digital economy readiness between regions (Ladonko et al., 2022). Consider how blockchain, artificial intelligent can be merged into a future information paradigm. Researchers can assess the implications of these technologies on information sharing, data privacy, and social connections to determine their possible effects on society, government, and individual rights. Studying how media literacy and education affect navigating the ever-changing information landscape could improve critical thinking and promote responsible information intake in the digital age (Maraieva, 2022). Big data analytics, artificial intelligence, and blockchain may be used in academic research on global financial markets. By studying how these innovations are altering risk management, trading, and regulatory frameworks, academics may demonstrate their impact on global financial system stability, efficacy, and interconnectedness. A thorough investigation of how developing financial technologies affect international trade, financial inclusion, and systemic vulnerabilities can reveal future global financial market opportunities and challenges (Kolinets, 2023).

Limitations and Future Recommendations

Future research should address the limitations of this study, adding more number of years and some other variables like fintech, interest rate, government effectiveness and institutional quality, which limits its generalizability. To circumvent these limitations, researchers should employ time series and cross-sectional panel data and regression methodologies. Survey based analysis can be more effective by interviewing the bankers and detailed report on the usage of technology in banks can be generated.

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