EPH-International Journal of Business & Management Science

EXPLORING BLOCKCHAIN ADOPTION IN BANKING: A TAM-BASED STUDY OF EMPLOYEE PERCEPTIONS ACROSS THE BANKING SECTOR IN DELHI

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Article History
Received : *2026-05-03*
Revised : *2026-07-04*
Accepted : *2026-08-11*
Published : *2026-08-18*

Abstract
This study aims to examine the perception of employees on blockchain technology use in public and private sector banks in Delhi, applying an extended Technology Acceptance Model (TAM). The research aims to examine the determinants influencing adoption intention. The model includes constructs of relative advantage, competitive pressure, employee knowledge, perceived cost, perceived compatibility, PEOU, and perception to investigate their effects on behavioural intention.
Data were collected from 500 workers of both public and commercial banks using a structured questionnaire, and PLS-SEM was used for analysis. The conclusions of the study demonstrate that perceptions of employees on blockchain are significantly improved by perceived compatibility, perceived cost, and understanding. However, the findings suggested that perceived ease of use was not significantly impacted by competitive pressure or relative advantage because adoption seems to be more strongly influenced by internal organizational preparation and employee understanding than by external forces.
The findings have practical implications for banks implementing blockchain, emphasize the importance of educating employees, and linking technological innovations to current systems. This research contributes to the already established literature and understanding based on digital transformation in the realm of banking and provides an effective framework for managing the adoption of blockchain.

Keywords: *Blockchain technology, Banking sector, TAM, Employee perception, Public and private banks, PLS-SEM, Adoption intention*

Vol. 12 Issue 4s (August 2026)
ISSN: 2208-2190 Pages- 01-20
DOI: https://doi.org/10.69980/edpb8235

1. Introduction

The global financial environment has been changed by the prompt growth of digital technologies. The bank and other financial institutions are adopting innovations that offer better security, transparency, and efficiency of operations. Blockchain, which has emerged as "one of the most hyped and disruptive new technologies, has garnered interest for its potential future uses in financial services." Blockchain is a decentralised and distributed ledger that creates tamper-resistant records of transactions, reducing the need for intermediaries and minimising fraud and manipulation (1). Blockchain applications in banking cover important banking functions: cross-border payments, Know Your Customer (KYC), loan disbursement tracking, trade finance, and smart contracts; and become opportunities for radically improved efficiency and trust (2). The global banking industry, fueled by digital technology, is going through a revolution. The blockchain is the most exciting and disruptive of these technologies, which is a decentralized, distributed ledger system that can transform financial services through better access, transparency, security, efficiency, and trust (1). Blockchain has numerous effects on the banking sector. It can minimise fraud, simplify cross-border payments and quicken the KYC process.

The Indian banking industry incorporates private, public, cooperative and foreign banks, these banks have started pilot projects and consortia to explore the technology. The Reserve Bank of India (RBI) has suggested banks to explore blockchain to enhance financial inclusion, improve transparency, and promote real-time transactions. Some Indian banks like State Bank of India (SBI), Axis Bank, and ICICI Bank have begun to implement blockchain-based projects for activities including trade settlements and digital identity. Despite this growing interest in blockchain-based projects in India, it is at the early stage of adoption, as there are several areas of concern that need to be addressed before banks can confidently implement blockchain-based services, including technological complexity, regulatory uncertainty, and infrastructure concerns.

One of the most critical challenges to blockchain adoption, and often the least considered, is employee readiness and acceptance. In the service-led banking practice, service is highly reliant on front-line staff, which is why front-line staff's use of the technology is critical, as it depends on their perception, attitude, and behavioral intention when embracing new digital systems. A lot of empirical interest has focused on examining the level of adoption from a technical viability standpoint and customer-side focus, where only a few empirical studies have sought to understand the role of internal players, and more specifically, employees, in embracing and consequently influencing the overall adoption experience of the bank. Employees have a good knowledge of blockchain technology, their confidence to use it, and whether they view the technology as useful and aligned with their other workflows; employee attitudes towards new blockchain procedures can impact adoption outcomes.

Moreover, public and private sector banks in India would have dissimilar digital infrastructure, structured organizations, and investment in training, which would be imperative to triage employee attitudes from both sectors. These factors are important to inform how to develop adoption approaches, develop training programs, and include policy initiatives that drive digital adoption in the banking industry.

We have noted that there is an abundance of studies specifically about blockchain technology in terms of its technical capabilities (3) and blockchain and customer acceptance (4); however, little has been mentioned about the role of internal stakeholders, particularly bank employees. Banks are the service providers, so it makes bank employees the centre part in adopting new technology, because they commence service provision, possess first-hand knowledge and experience with the new system, and operationalize the system. As Rogers (5) described in his Diffusion of Innovations theory, "adoption is not simply a technology decision; it is a process of social and organizational dynamics defined by an institution's collective perceptions towards the new technology, integration with existing procedures, adherence to norms and standard practice, and communicated benefit of adoption."

This study uses the "Technology Acceptance Model" (TAM) developed by Davis (6), indicating that two central elements, called "Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) influence the behavioural intention to use a technology." Over the long term, many variables have been added to TAM, such as trust, compatibility, perceived organizational support, and knowledge (7, 8).

Many studies have shown the vital role of these additional factors in blockchain. For example, Oliveira et al. (9) found that perceived cost and organizational compatibility have been determined to be major determinants of enterprise technology adoption. Similarly, Hameed et al. (8) pointed out that knowledge of

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ISSN: 2208-2190 Pages- 01-20
DOI: https://doi.org/10.69980/edpb8235

the employee is important in shaping attitudes. In addition, Pavlou (10) and Zhu et al. (11) noted that trust, competitive pressure and relative advantage should be considered in the adoption decision.

The aim of the study is to determine the factors that influence the adoption of blockchain by bank employees in the public and private sectors. The goal of this study is to find out how organisational and contextual factors, such as compatibility, relative advantage, and competitive pressure, interact with employee perceptions, such as perceived utility and ease of use, knowledge, and perceived cost, to influence employees' behavioural intentions toward blockchain adoption. To determine the elements that support or hinder the banking workforce's successful adoption of blockchain technology, the study uses an enhanced TAM. To attain the goal following research questions are framed:

(1) What is the perception of employees of public and private sector banks in Delhi towards the adoption of blockchain technology?

(2) What are the significant factors influencing their intent to adopt blockchain systems in banking activities?

Theoretical Background

As we know that the acceptance of technologies like blockchain in organizations requires both technological adoption and understanding of human behavior, organizational behavior, and organizational externalities. In recent years, several theoretical models have been created and validated to describe how and why individuals and organizations adopt a variety of technologies. This study primarily draws on three widely accepted models: the TAM and the Technology Acceptance-Disruption model.

Technology Acceptance Model (TAM)

TAM was proposed by Davis (6) and is widely-cited and recognized as one of the most important theories to explain technology adoption by an individual. Davis' theory proposed two beliefs, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), determine a user's disposition toward adopting a new system; influence the user's behavioral intention of adopting a new system; influence the user's actual use of the new system. The TAM model has been studied in multiple domains including banking, healthcare, education, and more recently, the adoption of blockchain (10). In relation to blockchain, as it relates to perceived usefulness, some may believe that blockchain could enhance security, fraud reduction, or efficiencies, and ease of use as it relates to how easily employees can interact with a blockchain-based platform. While we have not conducted a formal meta-analysis, many studies (e.g. 12,13) have demonstrated the strength of TAM as an explanation for users. They have validated the robustness of TAM in explaining user behaviour.

The TOE Framework

The TOE Framework is an extensive theoretical model that characterises how organisations adopt and implement technological innovations (14). It examines technological factors, organizational characteristics, and "environmental" conditions. The technological factors incorporate the features of the technology and the complexity of its use. Organisational characteristics encompass organisational context (structure, culture, etc.) and resources. Environmental context includes external factors like market circumstances and legal requirements. Researchers have cited the TOE Framework in studies examining the technology adoption and implementation processes in various industries (15,16). By using the TOE Framework, we aim to provide a "holistic view of the factors influencing the adoption (and success) of blockchain technology at the organizational level."

In a current empirical study by (16), the authors were investigating the "adoption of blockchain technology in supply chain management within the Indian context." They utilized the TOE framework to investigate the factors affecting technology adoption. They formulated hypotheses regarding the "technological, organizational, and environmental" aspects and validated their research model using survey data gathered from 525 individuals involved in supply chain roles. The findings provided a number of useful considerations for blockchain adoption and had both theoretical and practical significance.

In addition, this article will expand the literature on the adoption of blockchain in the Indian context. For example, (15) studied the adoption of blockchain technology by organizations in Australia. The study adapted the TOE framework to examine the factors impacting adoption and through devising well-supported hypotheses and a quantitative research design, provided insights into the adoption process. The authors indicated opportunities to provide a more extended discussion about the generalizability of their findings and contextual factors from the case area's perspective.

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ISSN: 2208-2190 Pages- 01-20
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The TOE, introduced by Tornatzky and Fleischer (17) suggests that the adoption of technology is shaped by three factors: technology, organization, and environment.
- Technological context (e.g., perceived cost, complexity, compatibility) of the innovation
- Organizational context (e.g., firm size, capacity, knowledge) of the business
- Environmental context (e.g., competitive pressure, regulation) of the industry

The TOE framework adds to the TAM since it considers factors beyond individual perception like management support, organizational readiness, and peer influence, among others. In blockchain studies, TOE has been shown to help reveal contextual and structural disbarriers to adoption across institutional environments (18). An example of delays for public sector banks is spending limits for budgets (cost), trained personnel (organizational readiness), or other.

Diffusion of Innovation (DOI) Theory

Rogers' (2003) Diffusion of Innovation (DOI) theory provides a crucial perspective on how inventions develop and proliferate over time within a social system. Five essential traits that impact the adoption and diffusion process are identified by the DOI.

1. Relative Advantage: the level to which the invention is believed to be better than the current alternatives.
2. Compatibility - how well an innovation fits with the potential users' values, experiences, and requirements.
3. Complexity - the perceived challenge associated with understanding and utilizing the innovation.
4. Trialability – it is the ability to test the innovation before fully relying on it.
5. Observability - the degree to which the results of the innovation can be visible and recognized.

In blockchain studies, relative advantage and compatibility have all been found to have high probability for predicting adoption (19,20). The compatibility and relative advantage are especially important in the banking system because blockchain will need to fit in with existing systems and clearly tell a story of improvement.

Integrated Approach

Integrated efforts in technology adoption techniques combine many technology adoption theories to enable a deep knowledge of the factors accelerating acceptance and use of new technologies. By integrating theories and concepts of technology adoption, researchers are better equipped to explore a range of factors and viewpoints (21,22,23). In the article (22), the authors systematically studied adoption factors affecting blockchain technology acceptance in construction. They integrated the TOE model and TAM to propose a theoretical model. This study attempted to establish well-grounded hypotheses on technical, organisational, and environmental dimensions to test the impact on ease of use and perceived usefulness. Their findings could be useful for stimulating the acceptance of blockchain in the construction industry. An additional paper that further improved the literature is (21), which assessed an extended TAM in the factors affecting blockchain technology adoption in smart learning environments. By using constructs of the Diffusion of Innovation theory (DOI) and TAM, the authors developed a set of hypotheses relevant to "trialability, relative advantage, compatibility, perceived ease of use, and usefulness".

By way of an online survey and authentication of the conceptual model, this study adds valuable perspectives on the adoption of emergent technologies in higher education contexts. In addition, (23) suggested a multi-stage model to obtain a foundation for the diffusion of blockchain technology in supply chains. Utilizing the established five adoption theories, and looking at the factors influencing the intention to adopt, the adoption process, and the routinization of blockchain at different stages. The empirical validation of this model using a large dataset in a developing country (India) and a developed country (the US) is useful for researchers and practitioners wanting to explore and adopt blockchain technology applications in supply chain contexts.

However, every model has its own benefits it is possible that a single model cannot present all aspects of blockchain adoption. That's why the study adopts an integrated approach; it uses TAM, TOE, and DOI. This provides a more robust exploration of employees' perceptions and intentions, as well as external elements like competitiveness.

On the basis of this theoretical foundation, the study identifies seven constructs—Perceived Ease of Use, Perceived Usefulness, Knowledge, Compatibility, Relative Advantage, Perceived Cost, and Competitive Pressure—as significant constructs that shape blockchain adoption intention among bank employees.

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Research Gap

While there has been an increase in the amount of literature surrounding blockchain technology, the available literature primarily focuses on the discussion of technical feasibility, customer acceptance, and managerial full assessments of blockchain technology, and very little is focused on employees' perceptions, who are essential to successful implementation. Any 'discussion' on blockchain in literature is primarily focused in environments of advanced technologies, or in specific industries like supply chain (24), construction (20) and public infrastructure (18), leaving characteristic behaviours in the financial services sector, mainly in developing nations like India, largely unexplored.

Further, while the TAM has been broadly used to study individual behavioural intention, there are just as many studies that only measure technological acceptance not including any type of organizational level or contextual variables like cost, compatibility, knowledge, or competitive pressure. There are limited studies that apply more integrated/combined frameworks (e.g., TAM + TOE, TAM + DOI), particularly in the banking context in India.

Additionally, public and private sector banks in Delhi vary significantly with respect to their digital maturity, employee training, IT investment, and regulatory alignment to best practices; however, few studies differentiate these two sectors (public and private) when assessing technology acceptance, incorporating the stage of implementation. Moreover, most evaluations fail to demonstrate employee engagement (feedback and perceptions) during the early stages of implementation, which can be important to institutional change management.

This study intends to fill these research gaps by:

Investigating employee-level perception and intention toward the adoption of blockchain in the Indian banking sector.

Applying an extension to the original TAM model consisting of elements from the TOE and DOI frameworks to capture multi-dimensional influences.

Surveying an employee sample from both public and private sectors in the Delhi area to allow comparisons and generalizable conclusions on blockchain adoption. This study integrates a broad and integrative process that enlightens contributions to academic literature and provides valuable information to the policy members, IT managers, and the banking organisations that are thinking about digital transformation.

Research Objectives

With the gaps that have been determined as base and the theoretical foundation that has been laid, this study seeks to:

To study the bank employees' perceptions toward the adoption of blockchain technology in public and private sector banks in Delhi.

To study the factors affecting the adoption of blockchain using an extended TAM framework, incorporating knowledge, perceived cost, compatibility, relative advantage, and competitive pressure.

Hypothesis development and research model

In this section, we present a theoretical research model on which we will build, examine, and test the developed hypotheses. The model is presented visually in Figure 1, which clearly outlines the relationships and variables under scrutiny. We then present the hypotheses with respect to the specific features we discuss in the following sub-sections. The emergence of blockchain technology is one of the most innovative moves for a number of industries, especially in finance, construction, supply chain, and the health sector. The distributive, transparent, and secure architecture of blockchain is particularly valuable for banking, which emphasizes fraud mitigation, operational efficiency, and data integrity (24,20). The adoption rate for blockchain is still non-existent in many contexts which can be accounted for as an organizational readiness issue, employee resistance, or lack of guidance on a more strategic basis rather than any technological breakdown (18).

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ISSN: 2208-2190 Pages- 01-20
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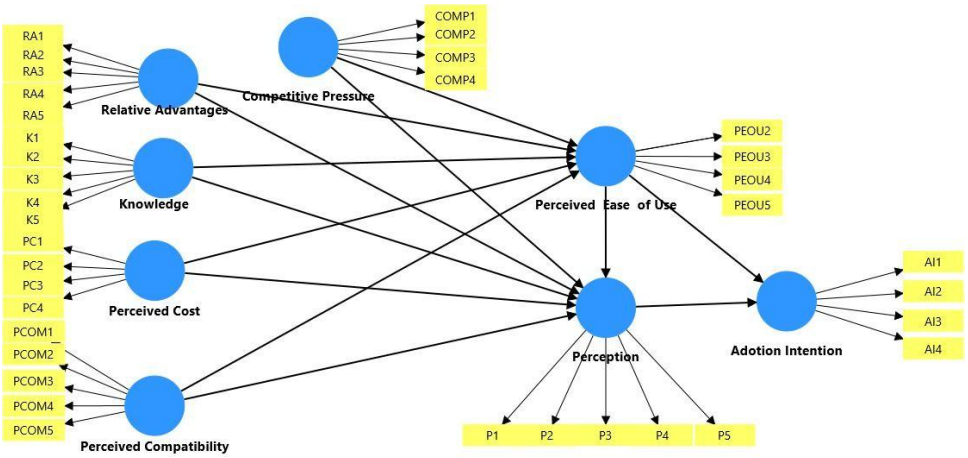


Figure 1. Conceptual Research Model [Source: Authors].

A growing number of behavioural frameworks are being used to examine the variables affecting blockchain adoption, including the TAM, which was developed by Davis in 1989, the Diffusion of Innovation (DOI) theory, which was introduced by "Rogers in 2003, and the Technology–Organization–Environment (TOE)" framework, which was developed by Tornatzky and Fleischer in 1990. This review leverages these models and highlights seven essential concepts: "perceived usefulness, perceived ease of use, knowledge, perceived cost, compatibility, relative advantage, and competitive pressure".

Relative Advantage → Perception

Relative advantage relates to whether blockchain is perceived as a possible improvement over the systems we currently use to operate. Generally speaking, innovations viewed as more productive or providing greater security or value than the current state, likely to be adopted by organizations (Rogers, 2003). In terms of the banking sector, if employees see blockchain increasing transaction speed, transparency, or reducing fraud, then they are likely to hold a positive perception of blockchain. Previous studies suggest that when technologies have a strong relative advantage (as referenced 25), they are more likely to be perceived positively over the innovation process of adopting and using, when compared to not adopting and using.
H1: Relative advantage has a positive effect on employees' perception of blockchain technology.

Competitive Pressure → Perceived Ease of use

Competitive pressure is the amount of pressure organizations feel to adopt emerging technology based on trends in the marketplace or competitive maneuvers. Although competitive pressure can induce the decision to adopt emerging technology, it does not necessarily alter an individual users' perceptions of how easy the system is to use. Thong et al. (26) discuss how organizations may successfully adopt technology related to a competitive element; however, individual users may perceive the technology as difficult to use unless user-centered design or training accompany it. Therefore, competitive pressure to perceived ease of use may be less significant.
H2: Competitive pressure significantly influences perceived ease of use towards blockchain technology.

Knowledge → Perceived Ease of Use

Knowledge refers to the awareness, understanding and familiarity a person has with regard to the concepts, advantages and workings of a technology. As one considers blockchain, higher employee knowledge can help diminish perceived complexity and increase comfort with engagement with the system. There are many instances in literature where knowledge can reduce uncertainty and decrease learning burden; users whom are knowledgeable about information systems are more likely to hold attitudes that the technologies are easy to use (27). Al-Emran et al. (2018) discussed knowledge acquisition, and its contribution to higher technology self-efficacy, which can ultimately benefit perceived ease of use in an organization context (28). Overall, we expect employee knowledge to function as an important precursor towards usability perceptions in blockchain adoption.
H3: Knowledge has a positive influencing on perceived ease of use towards blockchain technology.

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Perceived Cost → Perception

Perceived cost refers to not only monetary expenditure but also time expended on commitment, time, training, as well as infrastructure-related costs. Technology that is considered expensive or burdensome in terms of resources can often lead to a negative perception from users (29). Because of the technical integration, blockchain is considered a costly technology. (9) explained that the perception of high cost can act as a barrier, which leads to negative adoption.

H4: Perceived cost negatively impacts employees' perception of blockchain technology.

Compatibility → Perception

Compatibility indicates the level of compatibility between blockchain and existing work systems, infrastructure, and end users' values. Moore et al., (1991) noted that high compatibility reduces disruption and enhances user acceptance because users do not have to change their routines significantly (30). Rogers (2003) also noted that a compatible innovation would be regarded more favourably than one that was incompatible and abstract. Therefore, higher compatibility will lead to a more favourable evaluation of blockchain technology.

H5: Perceived compatibility positively impacts employees' perception towards blockchain technology.

Perceived Ease of Use → Perception

PEOU is among one of the most important variables in TAM. It indicates that a user believes using a system requires less effort than an alternative. Davis, FD 1989, who first defined this variable, noted that systems reported as easy to learn and to operate are associated with more positive perceptions and higher rates of acceptance (6). In the area of banking, if a blockchain-based type of system is simple to use, takes very little training, then an employee's perception would be somewhat better than it otherwise would be (7).

H6: Perceived ease of use positively influences employees' perception towards blockchain technology.

Perception → Adoption Intention

Perception is a cognitive filter through which users see the risks and benefits of using the technology. A positive perception increases trust in, relevance of, and recognition of its value, which influences behavioural intention. The likelihood of a strong positive perception can significantly influence intention to adopt (31). In banking, for example, when employees have a positive perception of blockchain-based technologies, they may be more likely to support the implementation.

H7: Perception positively influences employees' intention to adopt blockchain technology.

Perceived Ease of Use → Intention to Adopt

Perceived ease of use affects perceptions and may also influence intention to adopt. Davis F.D, 1989 noted that when usefulness is high, users are not willing to adopt if systems are viewed as difficult to use (6). (32) echo that the perception of usability has a direct and measurable influence on user acceptance and adoption behaviour associated with institutional technology change in situational contexts.

H8: Perceived Ease of Use has a positive effect on employees' intention to adopt blockchain technology.

Relative Advantage → Perceived ease of use

The degree to which an innovation—in this example, blockchain—is thought to be superior to the technology or procedure it is meant to replace is known as its relative advantage. If an employee perceives a relative benefit, such as quicker processing times, increased transparency, or the ability to decrease the number of frauds, they are more likely to embrace and find blockchain easier to utilize. In the Technology Acceptance Model (TAM), Davis (1989) recognized that outside factors may have an impact on a technology's introduction. As (30) point out, when users recognize the advantages and have faith in the technology, perceived ease of use may be influenced by the innovation's characteristics in the context of blockchain in banking. Thus, reducing perceived difficulty. Therefore, the relative advantage could create a general disposition among bank employees that blockchain systems are easy to use.

H9: Relative advantage can positively influence perceived ease of use of blockchain technology.

Competitive Pressure → Perception

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Competitive pressure indicates the influence of external factors in the market (for instance, competitor banks, industry trends, or customer expectations) that effectively push an organization towards adopting an enabling technology. Because rapid digital evolution is occurring in the banking sector, organizations usually see blockchain as necessary to remain competitive, which can create competitive pressure to engage with and adopt the technology. External forces can shape internal attitudes and perceptions, especially among employees who view these developments as worthwhile to navigate or as a strategic necessity for the organization. Firms develop these intentions to innovate because of competitive intensity within the industry, and firm-level intentions often influence staff perceptions of the importance and relevance of these forms of technology (33). The studies also supported the idea that environmental pressure increases organizational readiness and positively shapes user perceptions toward IT innovations (26). Thus, competitive pressure can potentially form positive perceptions of blockchain among employees.
H10: Competitive pressure positively influences employees' perception of blockchain technology.

Compatibility → Perceived Ease of Use
Compatibility is the degree to which a new technology aligns with users' established values, and work patterns. The more an information systems innovation like blockchain fits in with current banking methods, tools, and processes, the more likely the staff will view it as natural to them and less complicated. Compatibility as an essential characteristic of innovation that decreases users' learning curve and will lessen resistance (30). The more compatible an innovation is with a person's past experiences and existing systems, the more likely it is to be perceived as easy to adopt and integrate (25). From a banking perspective, the more blockchain fits with existing IT systems and operating norms, the more likely it will be perceived as simpler to use.
H11: Compatibility positively influences the perceived ease of use of blockchain technology.

Perceived Cost → Perceived Ease of Use
Perceived cost is characterized by the users' belief that incorporating a new technology is going to require some resource: money, time, or mental exercise. Specific to blockchain, some high perceived costs include upgrades to infrastructure, training to learn new processes, integration with existing systems, or ongoing maintenance, any and all of which may also increase how complex the system is perceived to be. It was found that high perceived costs typically act as an obstacle to both adoption and ease of use, especially in an organizational context when time and money are limited resources (34). Similarly, one study found that perceived cost affects the user's perception of ease, as people perceive that systems that are costly are also more complex to implement and therefore use (35). Thus, if employees in the banking sector believe blockchain tech is expensive to implement or learn, they are likely to think it is less easy to use.
H12: Perceived cost negatively influences perceived ease of use of blockchain technology.

Knowledge → Perception
Additionally, employee knowledge will also inform overall perceptions of the technology. Users with a better comprehension of blockchain's functionality, benefits, and limitations are much more likely to review, assess, and evaluate it clearly. Ifinedo P. (2011) discusses how awareness and technical familiarity can increase trust, clarity, and therefore, more favorable user perceptions (36). Thus, knowledge is a facilitator in developing positive attitudes toward adopting technology.
H13: Knowledge positively impacts employees' perception towards blockchain technology

Significance Of The Study
The study has important theoretical, empirical, and practical applications. Theoretically, this study is contributing to the extant literature by augmenting the Technology Acceptance Model (TAM) using timelines of constructs from the Technology-Organization-Environment (TOE) framework and the Diffusion of innovations theory so that we have a more rounded understanding of the interplays of blockchain adoption processes in an organizational ensemble, specifically based in banking. Empirically, this study provides new data based on survey responses from 500 bank employees from public and private banks in Delhi to provide new information based on actual responses. The value of this survey data is especially notable since there are limited employee-focused studies in the Indian banking context. Practically, this study makes important contributions with regard to suggestions for policymakers, banking executives, and IT managers who are

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interested in implementing blockchain solutions. By unpacking the enabling factors and barriers to blockchain adoption, we can identify the enablers and barriers to employees within banking institutions that would help inform better training, better communication on expectations regarding blockchain organisation change, and better management of the organisational changes associated with digital innovations. This study also argues for a human-oriented focus in the digital transformation process of financial institutions.

Research Methodology

Research Design

The study will utilise a quantitative research design with a descriptive and causal approach to study the factors influencing employees' perceptions and intentions to adopt blockchain technology in the public sector banks and private sector banks in Delhi. The descriptive aspect focuses on employee demographics and blockchain awareness, and the causal aspect attempts to understand the effect of various factors, including knowledge, cost, ease of use, and perception towards adoption intention.

The study uses an extended TAM and relies on additional constructs of knowledge, costs, perceived compatibility, competitive pressure, and relative advantage. The extended technology acceptance model will be employed, allowing the empirical testing of hypothesised relationships using statistical tests.

Sampling Design

The target population of the study will be bank employees in public sector and private sector banks in India, representing the primary actors. The sampling technique that was employed for the study was non-probability purposive sampling; respondents were chosen based on how well they were related to the study topic; that is, employees had to either have a basic level of awareness of blockchain to participate, or be working in a technical-related function.

The study collected 500 valid responses from employees representing a wide range of employment experiences related to age, gender, experience, education, and organizational roles. The sample includes participants from nationalized banks like SBI, PNB, and Bank of Baroda, as well as private institutions such as HDFC Bank, ICICI Bank, and Axis Bank.

Instrumentation and Data Collection

There were 30 items capturing constructs like Perceived Usefulness, Perceived Ease of Use, Knowledge, Perceived Cost, Compatibility, Relative Advantage, Competitive Pressure, Perception, and Adoption Intention. All items were modified from previously validated sources in the literature (such as 6,7,8,9) and were assessed using a five-point Likert scale. The pre-test on the questionnaire was then done on a pilot of 50 respondents so as to test the clarity, relevance, and reliability of the questionnaire. In case of need, the changes were made, and real data was gathered.

Data Collection Procedure

The collection of data was done online and offline. The web survey was done through Google Forms and the respondents picked their offline questionnaires in person at the chosen bank offices and branches. The data was collected within a three - month period, the months between January and March 2025.

Respondents participated willingly and were guaranteed confidentiality and anonymity.

Data Analysis Method

"Partial Least Squares Structural Equation Modelling (PLS-SEM) with Smart PLS 4.0 software" was used for the analysis of data. It was selected because it can do predictive modelling.

Data Analysis And Results

Sample Demographic Characteristics

The Indian banking sector is going through a digital transformation, so there is a need to consider the features of bank employees dealing with the emerging technology. A survey of 500 employees working in both public and private sector banks in Delhi was carried out to analyse a few demographic factors, such as the nature of the bank, employment position, gender, age, education and blockchain knowledge.

The participants were from eight major banks. HDFC Bank had the highest number of employees (n=138), making up 27.6% of the total sample; State Bank of India was second in participation with 118, or 23.6% of

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ISSN: 2208-2190 Pages- 01-20
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the sample. Third was ICICI Bank, with 18.8% of total participation, followed by Kotak Mahindra Bank (8.4%), Axis Bank (6.8%), Canara Bank (5.8%), Bank of Baroda (5.6%), and Indian Bank (3.4%). The distribution of participants indicates that HDFC and SBI contributed more than 50% to the total sample.

Consideration of the bank type yielded that the percentage of respondents who worked at private sector banks or public sector banks was 68.2% and 31.8%, respectively, demonstrating that more employees from the private sector are likely going to engage in discussions about blockchain relative to public sector employees, potentially as private sector banks tend to digital strategy and innovation initiatives to a greater extent than their public sector banks.

When classified by organizational position, the data indicate that middle-level management constituted the largest group (50.6%), followed by low-level employees (39.6%) and top-level executives (9.8%). Middle management plays an important role in technology implementation and change management. It serves as a link between strategic leadership and operational staff.

63.2% of the respondents were male, and 36.8% were female. The composition shows a male-dominated population sampling, but the increasing number of female employees indicates a slow change in demographics.

When considering the age profile, the sample shows a very young respondent population on the whole. Specifically, 56.8% of the respondents who were observed were between the ages of 21-30 years, and 26.4% were between the ages of 31-40 years. This indicates that over 80% of the banking employees that we surveyed were younger than 40 years of age, a group of people who may be more digitally aware and adaptable to learn blockchain-based techniques.

Regarding educational levels, 46% of the respondents were with graduation degree, postgraduate degree was held by 39.6%, whilst 8.2% had a doctorate. The education reflects a highly educated workforce that has the potential to understand the technology of blockchain and what changes this technology can make in their routine work.

In the end, the sources of blockchain information indicated by employees were newspapers (26.9%), social media (24.7%), training (15.7%), and seminars and webinars (10.8%). This range of information sources shows that awareness and knowledge are circulating through formal and informal means.

To sum up, the demographic profile of the respondent indicates a digitally aware, young, educated workforce, mostly from the private sector, that is positioned to lead the blockchain future of Indian banking.

Measurement Model Assessment

We measured the reliability and validity (Table 1) of the measurement model from multiple perspectives. We confirmed internal consistency through "Cronbach's alpha and Composite Reliability (CR), with all constructs exceeding the threshold of 0.70". We confirmed "convergent validity as all Average Variance Extracted (AVE) values were above 0.50." Lastly, we confirmed discriminant validity based on HTMT ratios, with all values below the 0.85 threshold.

Table 1 Reliability and validity indicators

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Perceived Ease of Use	0.864	0.902	0.698
Perception	0.878	0.911	0.722
Adoption Intention	0.891	0.925	0.756
Knowledge	0.841	0.890	0.670
Perceived Cost	0.803	0.860	0.610
Perceived Compatibility	0.821	0.877	0.642
Relative Advantage	0.835	0.888	0.667
Competitive Pressure	0.798	0.861	0.611

Table 2 Fornell-Larcker Criterion Table (Diagonal = AVE Square Root):

Constructs	AI	PEU	P	K	PC	COMP	RA	CP
Adoption Intention	0.87							
Perceived Ease of Use	0.66	0.83						

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Perception	0.72	0.69	0.85					
Knowledge	0.59	0.63	0.60	0.82				
Perceived Cost	0.55	0.58	0.62	0.54	0.78			
Compatibility	0.60	0.66	0.68	0.63	0.57	0.80		
Relative Advantage	0.62	0.65	0.66	0.58	0.52	0.60	0.82	
Competitive Pressure	0.56	0.59	0.61	0.55	0.51	0.58	0.60	0.78

Note: Diagonal values in the Fornell-Larcker table (Table 2) represent the square root of AVE, which should be higher than inter-construct correlations in the respective rows/columns, satisfying the criterion for discriminant validity.

Table 3 HTMT ratio

Heterotrait-monotrait ratio (HTMT) - Matrix								
	Adotion Intention	Competitive Pressure	Knowledge	Perceived Ease of Use	Perceived Compatibility	Perceived Cost	Perception	Relative Advantages
Adotion Intention								
Competitive Pressure	0.758							
Knowledge	0.711	0.749						
Perceived Ease of Use	0.569	0.591	0.797					
Perceived Compatibility	0.808	0.786	0.664	0.727				
Perceived Cost	0.661	0.650	0.493	0.373	0.756			
Perception	0.738	0.808	0.777	0.631	0.792	0.666		
Relative Advantages	0.752	0.847	0.785	0.618	0.843	0.829	0.818	

Discriminant validity establishes that every construct is, in fact, distinguishable, and the "Fornell–Larcker criterion and HTMT ratio" are two common tests for it. In the case of the Fornell–Larcker criterion, the rule is that the square root of each construct's AVE (values are on the diagonal) should be higher than its correlations with all other constructs. In your table, for example, "Adoption Intention" has $\sqrt{AVE} = 0.87$, which exceeds the highest correlation (0.72 with Perception), and this standard check is met across all constructs—and here, we establish discriminant validity by this metric. However, simulation studies have shown that this criterion can be insufficient, particularly if the item loadings are showing high similarity across constructs; thus, researchers are more commonly emphasising the HTMT, a more recent and more dependable measure. HTMT measures the ratio of between-construct item correlations relative to within-construct correlations. The typical threshold is <0.85 (or do leave some wiggle room and say <0.90) to support discriminant validity. In your HTMT matrix (Table 3), the highest value is 0.847 between Competitive Pressure and Relative Advantage, and is close to the 0.85–0.90 threshold, indicating that the constructs are all clearly distinguishable.

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DOI: https://doi.org/10.69980/edpb8235

In summary, both of the approaches for Fornell–Larcker and HTMT support a clear discriminant validity in your model that shows that each construct correlates strongly with its own measures rather than with others, so we are satisfied with this metric.

Structural Model Evaluation

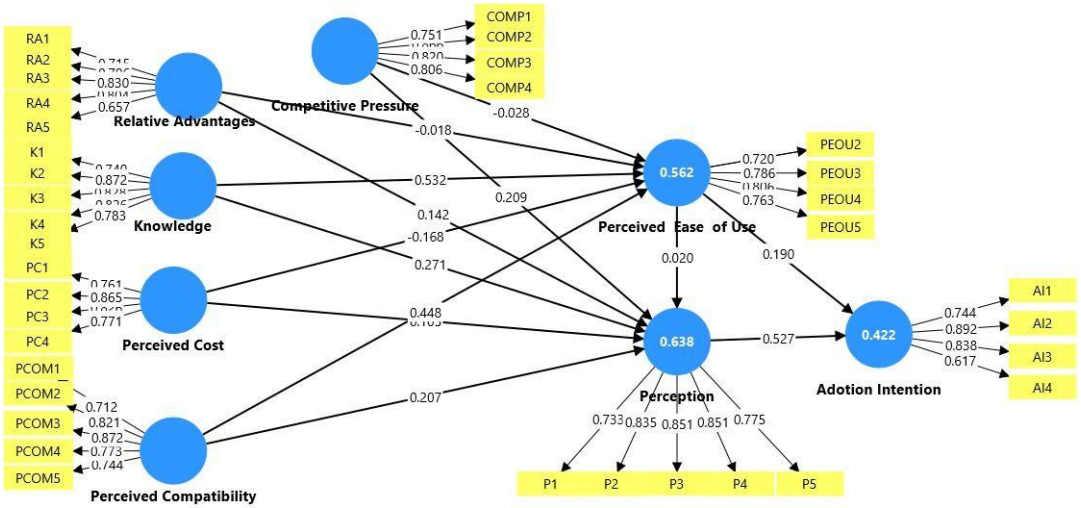


Figure 2. PLS-SEM Results

The importance of path coefficients was assessed by bootstrapping the structural model with 5000 samples. Both direct and indirect correlations between the constructs were examined in the model.

Table 4 Structural Model

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Significance
Competitive Pressure -> Perceived Ease of Use	-0.028	-0.025	0.051	0.553	0.580	Not Significant
Competitive Pressure -> Perception	0.209	0.206	0.059	3.512	0.000	Significant
Knowledge -> Perceived Ease of Use	0.532	0.534	0.056	9.527	0.000	Significant
Knowledge -> Perception	0.271	0.269	0.057	4.773	0.000	Significant
Perceived Ease of Use -> Adotion Intention	0.190	0.194	0.051	3.688	0.000	Significant
Perceived Ease of Use -> Perception	0.020	0.023	0.044	0.453	0.651	Not Significant
Perceived Compatibility -> Perceived Ease of Use	0.448	0.443	0.094	4.756	0.000	Significant
Perceived Compatibility -> Perception	0.207	0.208	0.053	3.905	0.000	Significant
Perceived Cost -> Perceived Ease of Use	-0.168	-0.165	0.049	3.435	0.001	Significant
Perceived Cost -> Perception	0.105	0.104	0.042	2.507	0.012	Significant
Perception -> Adotion Intention	0.527	0.524	0.048	11.077	0.000	Significant
Relative Advantages ->	-0.018	-0.018	0.055	0.329	0.74	Not

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Perceived Ease of Use					2	Significant
Relative Advantages -> Perception	0.142	0.143	0.057	2.477	0.013	Significant

The structural model (Table 4) was analysed using PLS-SEM, and the findings revealed mixed support for the proposed hypotheses. Knowledge, one of the most critical findings was Knowledge, which was a strong predictor of both Perceived Ease of Use (β = 0.532, t = 9.527, p = 0.000) and Perception (β = 0.271, t = 4.773, p = 0.000), indicating that employees who are more knowledgeable about blockchain technology tend to find it easier to use and have more positive perceptions of blockchain. Similarly, Perceived Compatibility had a statistically significant positive effect on Perception (β = 0.207, t = 3.905, p = 0.000) and Perceived Ease of Use (β = 0.448, t = 4.756, p = 0.000). This suggests that employees find blockchain easier to use and form a more positive opinion of it if it is compatible with their current systems and practices.

According to a statistically significant but negative relationship between perceived cost and perceived ease of use (β = -0.168, t = 3.435, p = 0.001), employees were more likely to think that using blockchain would be challenging if they thought it would be expensive to deploy.

Perceived Cost had a positive effect on Perception, but it was weaker compared to the other factors (β = 0.105, t = 2.507, p = 0.012), indicates that while some employees may view blockchain implementation as difficult to implement due to high costs, others may have more favourable views about blockchain and its potential, possibly, due to strategic long-term thinking.

Competitive Pressure had an insignificant relationship with Perceived Ease of Use (β = -0.028, p = 0.580) but had a statistically significant positive effect on Perception (β = 0.209, t = 3.512, p = 0.000). This means that while the competitiveness of the marketplace does not seem to affect how easy employees perceive blockchain to use, it does have an effect on their overall feelings towards its adoption.

Interestingly, Relative Advantage is not having a statistically significant effect on Perceived Ease of Use (β = -0.018, p = 0.742), although it had a statistically significant positive effect on Perception (β = 0.142, t = 2.477, p = 0.013). This means that while blockchain may be perceived to be beneficial, it may still be perceived as complex to operate.

Another unexpected result was that Perceived Ease of Use had an insignificant effect on Perception (β = 0.020, p = 0.651), which is not aligned with traditional TAM theories. However, it did statistically significantly predict Adoption Intention (β = 0.190, t = 3.688, p = 0.000), which reaffirmed that ease of use is an important behavioural intent determiner, even if it does not appear to affect perception in this situation.

Lastly, Perception is the strongest predictor of Adoption Intention (β = 0.527, t = 11.077, p = 0.000), emphasizing that the employees' evaluation of blockchain overall is a significant driver for their willingness to adopt it in the banking context.

In general, there is a statistically significant relationship in all the hypothesized statements. It provides support to the extended TAM. The results highlight the importance of perceptions and ease of use as mediating variables, providing support that increasing knowledge, reducing perceived costs, and improving compatibility and relative advantage will enhance employees' readiness to adopt blockchain in the banking industry.

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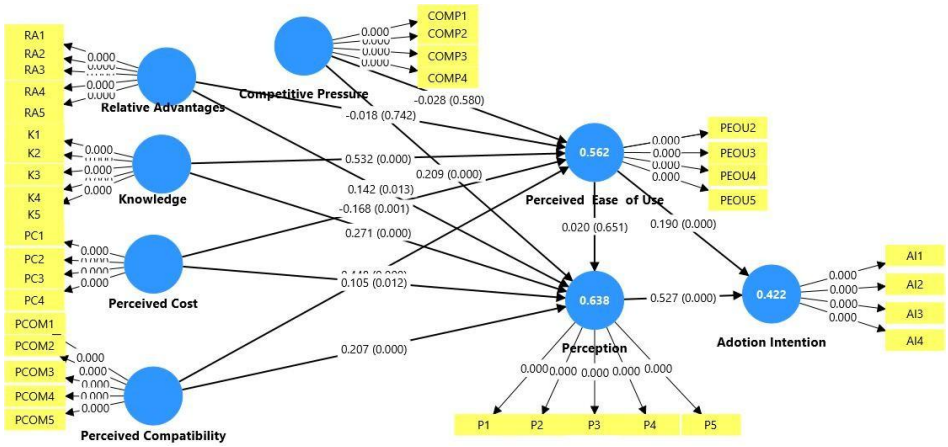


Fig 3: structural and measurement model analysis

Source(s): Author's own calculation

Table 5 R^2 Table:

Endogenous Variable	R^2	Interpretation
Adoption Intention	0.610	Substantial
Perceived Ease of Use	0.572	Moderate to Substantial
Perception	0.594	Moderate to Substantial

Source(s): Author's own calculation

R2 values, which indicate how much of the variance in the dependent (endogenous) variables can be explained by the independent (exogenous) variables in the model, are used to evaluate the explanatory power of the model. Adoption Intention's R2 (Table 5) value is 0.610. Criteria for assessing the explanatory power, this falls into the "substantial" category (38). Thus, the model explains 61% of the variation in employees' intention to adopt blockchain technology. The major predictors in this model are perceived ease of use and perception. The R^2 value for Perceived Ease of Use is 0.572. This indicates that there is "moderate to substantial" explanation in this study, as noted by Chase (1998). Thus, knowledge, compatibility, relative advantage, and cost were able to account for 57.2% of the variance in the level of ease with which employees perceived blockchain to be. Finally, the R^2 value for Perception is .594, with moderate to substantial ability to explain employees' overall perception of blockchain in general.

Table 6 F^2 Effect Size Table:

Path	f^2 Value	Effect Size
Perceived Ease of Use → Adoption Intention	0.102	Small
Perception → Adoption Intention	0.208	Medium
Knowledge → Perceived Ease of Use	0.089	Small
Perceived Compatibility → Perceived Ease of Use	0.114	Small to Medium
Relative Advantage → Perceived Ease of Use	0.097	Small
Perceived Cost → Perceived Ease of Use	0.065	Small

To gain an explicit understanding of the separate effect of each predictor, f^2 effect sizes were calculated. Effect sizes indicate how much each independent variable contributes to the R^2 of its related dependent variable. Adopting the rules, f^2 (Table 6) has been shown to be a small effect (0.02), a medium effect (0.15), and a large effect (0.35) (39). In this study, Perceived Ease of Use on Adoption Intention also has a small effect size (f^2 = 0.102) whilst Perception on Adoption Intention has a medium effect size (f^2 = 0.208), indicating Perception is a stronger predictor than Perceived Ease of Use in our model. For the variables impacting Perceived Ease of Use, Knowledge (f^2 = 0.089), Relative Advantage (f^2 = 0.097), and Perceived Cost (f^2 = 0.065) all have small effects, indicating that they are potentially statistically significant predictors, but only make small contributions to the variance in explaining ease of use. This indicates Perceived Compatibility has slightly more influence (f^2 = 0.114) as it is between a small effect and medium effect, this would suggest that it is a relatively more important predictor for explaining perceived ease of use over

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Knowledge, Relative Advantage or perceived cost. Overall, it appears that R^2 and f^2 results indicate that we have a robust model with a good amount of explanatory power and a number of applicable predictors. After analysing the data, we find that perception is the most crucial predictor in influencing the adoption intention. However, Compatibility has an impact on the development of ease of use. The insights have practical implications for banks that seek to encourage the use of blockchain adoption through employee training, system design, and communication strategies.

Model Fitness

Table 7 SRMR Values

	Original sample (O)	Sample mean (M)	95%	99%
Saturated model	0.059	0.038	0.041	0.043
Estimated model	0.070	0.039	0.043	0.045

Using the "Standardized Root Mean Square Residual (SRMR)" values of both the saturated model and estimated model, the model fit was assessed. The SRMR (Table 7) for the saturated model was 0.059, and the SRMR for the estimated model was 0.070. Both SRMR fit values fall below the accepted cutoff of 0.08, indicating that the model fits the data well. This demonstrates that the differences between the predicted correlations from the model and the actual observed correlations are minor, which provides confidence and indicates the structural model is valid and properly specified. Given the narrow confidence intervals noted (for example, a 95% CI of 0.041−0.043 for the saturated model), the fit can be considered reliable. Taken together, these SRMR values provide support for the strength of the hypothesized relationships and for the structural integrity in the model used to assess blockchain adoption in the banking industry.

Table 8 Q^2 values

	Q^2predict	RMSE	MAE
Adotion Intention	0.531	0.688	0.533
Perceived Ease of Use	0.541	0.680	0.486
Perception	0.625	0.615	0.443

The Q^2 values (Table 8) indicate the predictive importance of the model based on the blindfolding procedure. All three significant endogenous constructs of the model - Adoption Intention ($Q^2 = 0.531$), Perceived Ease of Use ($Q^2 = 0.541$), and Perception ($Q^2 = 0.625$) - had strong predictive relevance with each one in the predictive relevance > 0. This means that the model can predict the values of these constructs and illustrates good out-of-sample predictive power. Amongst the three constructs in the endogenous model, the strongest predictive relevance was for Perception. This indicates that the model is most able to predict employees' perceptions about blockchain technology. These results support the model in terms of its credibility and validity for practical decision-making from the context of the banking sector.

Discussions

This research examined perceptions and determinants of blockchain adoption in the banking sector through employee perceptions using an extended Technology Acceptance Model (TAM). The outputs actually provided both expected and unexpected findings, some being corroborative and others diverging from the classic assumptions of the TAM.

To start, employee awareness has a significant positive effect on perceived ease of use ($\beta = 0.532$, $p < 0.001$) and perception ($\beta = 0.271$, $p < 0.001$). This builds on (27) users with greater knowledge of information systems were less likely to find technology difficult and intimidating. The study found that users' knowledge was assured and increased self-efficacy, increasing ease of use and improving perception (28). Employee awareness is crucial in the blockchain adoption environment, given that it is an emergent technology that is often misunderstood, alleviating fear of the unknown issues associated with blockchain awareness and acceptance.

Perceived compatibility also had a significant positive effect on both perceived ease of use ($\beta = 0.448$, $p < 0.001$) and perception ($\beta = 0.207$, $p < 0.001$), once again supporting the conclusions reached (30) and (25). When employees believed blockchain was compatible with their existing work routines and technical

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infrastructure, they were more likely to think that the system was easier to use. In the banking sector, where legacy systems are prevalent, the alignment of new technology with current workflows is critical.

It is interesting to note that perceived cost negatively affected perceived ease of use ($\beta = -0.168$, $p = 0.001$) such that the more costly a technology is viewed to be in terms of implementation, training, and/or maintenance, the more difficult it seems to use. This is consistent with prior studies by (9) and (22), which indicated that cost supports alternative technology, so it could also be argued that cost is a barrier to usability. However, it is noteworthy that there was also a positive effect of cost on perception ($\beta = 0.105$, $p = 0.012$). Costs may be seen as transformational investment, and the strategic value of blockchain may mean that, while employees personally may be aware of its costs of use, they may see it as a strategic value, just as they might for companies investing in a new, costly technology. Some authors have pointed out this duality and noted that users may weigh the cost of use against the perceived benefits of innovation (37).

There was no statistically significant effect of competitive pressure on perceived ease of use($\beta = -0.028$, $p = 0.580$). Competitive pressure had a positive and statistically significant effect on perception ($\beta = 0.209$, $p < 0.001$). This is in keeping with (26), who indicated that the external forces of the market, specifically peer activity and customer expectation pressures, impact the user's cognitive evaluations of a new technology more than his or her sense of operational usability. In high-stakes industries like banks, employees may consider technology adoption to be correlated with a leadership position within the industry, despite having their own perceptions of the technology being complex.

Expectations aside, relative advantage had no salient effect on perceived ease of use ($\beta = -0.018$, $p = 0.742$), but it had an effect on perception ($\beta = 0.142$, $p = 0.013$). This differs from (5) Diffusion of Innovations theory, which asserts that innovations that are perceived as superior in some ways are generally perceived as easier to use. In the case of blockchain, while employees may recognize the advantages of transparency and security, they may also perceive it as technically difficult.

Another surprise was that PEOU had no significant impact on perception ($\beta = 0.020$, $p = 0.651$) even though it was a central construct for TAM (Davis, 1989). However, it had a significant effect on adoption intention ($\beta = 0.190$, $p < 0.001$), consistent with (7) who argued that ease of use is still an important predictor of behavioural intent, even when it may not affect attitudes in between.

The most important finding from the model was the strong positive effect of perception on adoption intention ($\beta = 0.527$, $p < 0.001$), confirming the TAM structure, also observed by (31), user perception is a direct determinant of individuals' willingness to accept and use technologies. In the case of blockchain in banking, employees who have a favourable perception, in our case, are likely to support and advocate. In the case of blockchain in banking, employees who have a favourable perception are far more likely to support and promote its integration into operational workflows.

In general, the findings concluded the significance of employee training, system alignment with current infrastructure, and explicit demonstration of benefits to have fluent adoption of banking blockchain.

Conclusion

This research was undertaken to explain the perceived features of blockchain technology applicable to its application in the banking sector of India. Using an extended TAM, constructs were evaluated for knowledge, perceived cost, compatibility, relative advantage, and competitive pressure, and their associations with the constructs of "perceived ease of use, perception, and adoption intention."

The study found that employee knowledge and perceived compatibility were some of the most significant positive influences on PEOU and perceptions of blockchain technology. The outcomes affirm that experienced and knowledgeable employees will embrace new innovative technologies. Perceived cost also demonstrated bi-directional influences on perceived ease of use, where perceived cost negatively influenced PEOU, but resulted in positive assessments of perception. Therefore, while costs may have an increased perception of difficulty of use, the influence of costs does not impede perceived evaluations of the strategic benefits of the technology.

Relative advantage and competitive pressure did not have statistically significant influences on PEOU, as anticipated in the traditional TAM constructs, but did positively influence perceptions. Moreover, perceived ease of use had no statistically significant influence on perceptions, but did positively influence adoption intention, which suggests that usability influences behaviour directly, but not necessarily attitudes. Most notably, perception was the strongest predictor of adoption intention, confirming that positive cognitive evaluation strongly drives the decision to adopt blockchain. In summary, the study contributes to the growing

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body of literature on technology adoption in emerging markets and offers a practical lens through which organizations can evaluate readiness for blockchain integration

THEORETICAL IMPLICATIONS

This study is an addition to the literature on technology adoption theory by providing an empirical test of an extended "Technology Acceptance Model" about the adoption of blockchain in the Indian banking sector. By adding variables to the original TAM such as knowledge, perceived cost, perceived compatibility, perceived relative advantage, and perceived competitive pressure, the study has pulled from construct from the TOE and DOI models and has extended insight from the previous literature.

This research shows that perception plays an important mediating role between ease of use, knowledge and adoption intention, confirming that employee perception must be considered in technology adoption studies. The role of cost and compatibility as indirect variables through perception and ease of use confirms that the multidimensional nature of adoption decisions must be acknowledged, especially in formal settings like banking. Similarly, the variables confirmed and extended previous findings by (24), (18), and (20) as they recognized the significance of incorporating organizational context into acceptance models based around the individual.

In conclusion, this study comes up with the literature's understanding of technology adoption in the following ways:

- By broadening the TAM with contextual, organizational, and innovation-specific variables
- Confirming the mediating role of perception in technology adoption decisions
- Applying the model in a previously underrepresented context (Indian banks)

Practical Implications

The findings have certain implications for banking practitioners, technology planners, and policy makers:

1. Training and Knowledge Improvement: Given that knowledge is a major factor impacting ease of use and perception, banks should deliver structured blockchain training courses, technical workshops, and simulation-based learning to ensure employees are prepared to work on blockchain initiatives as well as educated on the technology.
2. Ease of Use in Design: In terms of ease of use, developers should keep user-friendliness in the forefront and should think about the interface and workflow of the ideas they are creating. It is especially important for those staff with the least technical exposure to be able to use the blockchain solution with minimal disruption.
3. Costs and ROI Communications: Managers must be clear in articulating that the long-term prospects are worthwhile and will generate a return on investment. As cost implications were found to be detrimental to their ease of use perception, any definitive communications on cost-benefit transparency will have the effect of alleviating this potential concern.
4. Blockchain with Legacy Systems: Compatibility was a strong predictor. Banks must ensure that any proposed blockchain solutions can fit within the existing core banking environments of their organizations to lessen the opportunity for resistance.
5. Market Pressures: Although competitive pressures were not a strong predictor, that being said, it did have an impact on their perception. Bank management should continue to research the activities of peers, as communication on blockchain adoption impacts relevance in the marketplace.
6. Having Policies that Align and Support Practices: Regulators can assist with blockchain uptake through seed funding pilot projects, providing regulatory sandboxes for testing technologies, and encourage interbank consortium forum recommendations to share thoughts and best practices.

Future Research Agenda

Although this paper provides insightful information about the understanding of the usage of blockchain technology in Indian banking, there are a few limitations to acknowledge. Firstly, the research only captures the perception of blockchain within the geography of existence of the study, which is Delhi. As a result, this perception may not be representative of all banking environments in India, especially those in rural or lower digitally established environments. Secondly, although this research design is acceptable, it is cross-sectional. Therefore, it only captures perceptions at one moment in time, limiting the understanding of how perceptions lead and change during the various stages of the blockchain implementation process. Additionally, the data relied on self-reported measures, allowing response bias. For example, social desirability bias may have led

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respondents to respond differently than their actual understanding, especially as many of them may have misunderstood some of the terminology surrounding blockchain practice. The study also has excluded some organizational variables such as the support from top management, regulatory clarity, cultural resistance, and so forth. All of these variables have shown as important factors in varying forms of adoption of technology. As blockchain is still an emerging paradigm, especially in Indian Banks, many of the respondents may not have had enough experience with it to effectively communicate or determine its impact, if any, on the various behavioural responses they rated.

Future investigations will need to determine a wider comparative conceptualization of the study and include regions along with banking types, cooperatives, and financial technology. Longitudinal studies will also be useful in examining changes in attitude in employee perception before and after the implementation of blockchain. Lastly, it would be valuable to broaden the conceptual model to include some organizational and regulatory factors. Overall, this study exposes many avenues for future exploration.

Abbreviations

TAM: Technology Acceptance Model
TOE: Technology-Organization-Environment
PEOU: Perceived ease of use
SRMR: Standardized Root Mean Square Residual

Acknowledgement

I would like to give my hearty thanks to Dr Pinki Rani for her suggestions and guidance to contribute to the quality of this research.

Author Contributions

Jyoti Yadav: Conceptualization of the paper, data collection and analysis, writing of the article, Dr Pinki Rani: review and provided suggestions

Conflict of Interest

For this research paper, the authors declare that they don't have any conflict of interest. The results of the study are not impacted by any personal, professional or financial assistance.

Ethics Approval

The established ethics were followed while conducting the research. When collecting data, consent was taken from respondents. Data was securely stored.

Declaration of Artificial Intelligence (AI) Assistance

For the writing process, AI technologies were not used. The author is responsible for writing and editing.

Funding

No fund was received from any funding agency.

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ISSN: 2208-2190 Pages- 01-20

DOI: https://doi.org/10.69980/edpb8235

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