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Development and Validation of a Scale to Measure Blockchain Awareness and Financial Confidence in the Turkish Financial Sector

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ABSTRACT

This paper seeks to develop an empirically tested theoretical model that measures the block chain related awareness, confidence, and perceived relevance regarding finances among employees in the Turkish financial services sector. From the existing literature on blockchain adoption, the acceptance of fintech, and trust-based investment behavior, the authors developed an initial item pool consisting of 14 items. Content validation was done through experts followed by a pilot. Primary data was collected from 450 finance professionals working in the banking, treasury, risk, and accounting departments of different companies within Istanbul. The questionnaire was filled out by the respondents during the period March to April 2025 and was distributed online. Internal consistency was calculated using Cronbach's alpha coefficient, while the structure of the underlying scale was investigated by Principal component analysis with oblique rotation. This analysis was complemented with item analysis through corrected item-total correlations and calculation of communalities. The data quality for conducting factor analysis were validated by KMO and Bartlett's test of sphericity. From the results of the two-factor solution, the total variance explained was 85.83%. The first factor covered perceptions pertaining to blockchain awareness and informational engagement while the second predominately covered confidence in blockchains financial functionality and trustworthiness. The final structure is comprised of 14 items that have high loadings and little redundancy. The results indicate that the scale is not only clear-cut conceptually and statistically, but also provides a consistent measure for further studies regarding the perception and acceptance of technology in the finance domain.

Keywords: Blockchain Perception, Financial Confidence, Scale Development, Factor Analysis, Financial Professionals, Technology Adoption, Turkey, Likert Scale, Internal Consistency, Trust In Digital Finance.

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INTRODUCTION

Improvements in wages and additional payments, adjustments in working hours, vacation and leave periods, sickness, care and parental leave, early retirement under certain conditions are based on changes and developments in the labor market. In the event of unemployment, the guarantees provided to the individual have been included in these elements over time. However, these changes have not occurred equally in every country's economy, some labor markets have appeared to be both highly (low) flexible and security, or high (low) security and low (high) flexibility.

The implementation of the practices for flexibility and security as a whole is based on the reforms implemented in the Netherlands and Denmark in the early 1990s and later called "flexicurity" (Mandl and Celikel-Esser, 2012: 7). Regardless of development level, the very low rates of unemployment, which is a problem affecting all societies, with different social and economic dimensions, has created interest in flexible and secure labor markets in European Union countries struggling with high unemployment rates.

High unemployment rates cause many negativities such as decreasing labor force participation rates, increasing the number of dependants of employed people, additional consumption pressure on the savings and investment resources of society and individuals with unemployment benefit practices, decreasing social security income, deterioration of income distribution, decreasing tax revenues, members of unions and bargaining power (Tavakol & Dennick, 2011). While the prolongation of unemployment puts the unemployment problem into a structural appearance and makes its solution difficult, it deeply affects the young people, who are considered to be the most dynamic, sensitive, and important demographic group of societies, economically, socially and psychologically.

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Due to the different characteristics of the labor markets in the European Union (EU) countries that aim to overcome unemployment and achieve sustainable employment outcomes, a uniform policy approach has not been feasible.

Beyond labor market institutions and employment policies, recent years have also witnessed a profound transformation in the technological infrastructure that underpins modern financial and economic systems. In this context, digitalization and emerging financial technologies have become increasingly influential in shaping how labor markets, firms, and financial actors operate.

The past few years have shown a rapid development of blockchain technology as it evolved from a niche concept to a widely-used digital infrastructure with severe repercussions for numerous sectors – finance in particular. The potential uses of blockchain are transformative regarding digital payments, smart contracts, identity verification, and even asset tokenization due to the clear benefits of decentralization, transparency, and security. As the sector adopts these systems more and more, it becomes increasingly important to understand how professionals perceive, trust, and interact with the technology. These changes illustrate the need beyond technical or economic discourse attitude frameworks to evaluate the analysis of blockchain perceptions.

Regardless of the rapid development of applications relative to blockchain, there is a noticeable gap of research focused on human attitudes and intended behaviors with regards to blockchain's infrastructure. The majority of literature seems to revolve around adoption-related anything to do with technology or its market impacts to the adopters operating within deeply affected financial systems. Bankers, risk and investment managers, rely on emerging technologies to possess a strategic advantage. Unlike the other disciplines, they do not have access to trustworthy and validated frameworks measuring blockchain technology trust, awareness, functionality, and other relevant constructs.

In response to this gap, the current study aimed to create an assessment instrument appropriate for the context of financial specialists in Turkey. The country's developing interest in incorporating digital finance technologies and blockchain experimentation provides a rich setting for scale development. A number of statements were designed to capture the dimensions of awareness of blockchain innovations, accessibility, trust in system security, and blockchain's role in the future of financial systems. The item pool was written in Turkish and was subjected to several rounds of expert scrutiny to ensure relevance to the original concepts and clarity of the ideas presented.

The data was gathered via an online survey which was shared among professionals operating in finance-related units of other organizations within the city of İstanbul. In the first stage, the instrument was put through a number of steps intended to validate it, including analysis of reliability and exploratory factor analysis. They assessed the internal consistency and structural coherence of the instrument. The aim of the study was to construct a scale that offers meaningful context and sound methodology that fosters further investigation of perception and decision-making regarding blockchain in finance.

The rest of the paper is structured like this: In the methodology section, the steps taken to develop the scale are detailed, including the sample selection method and the analysis method used. The results section provides results of the reliability and factor analyses. In the final part, the discussion focuses on the findings, their theoretical and practical impacts, study limitations, and directions for further studies.

THEORETICAL BACKGROUND and CONCEPTUAL FRAMEWORK

Blockchain technology is a critical foundation in the economy for a digital world due to its ability to store data in a decentralized way, maintain transparent processes for transactions, and enable recording in a manner that is tamper-proof (Nakamoto 2008; Tapscott & Tapscott, 2016). Developed to enhance the functionality of cryptocurrencies like Bitcoin, blockchain has now transformed into a broader technology with wide-ranging impact on sectors like finance, healthcare, logistics, and even public administration (Zheng et al., 2018). In regards to finance, using blockchain allows for the execution of secure international payments, self-service agreements, and monitoring of real-time changing assets. This has made it possible to consider blockchain as a new challenger that has the ability to change the manner in which value is exchanged and recorded.

Not-observed concern is one of the gaps that exist due to lack of attention. While public and professionals exerted dominantly increasing interest, understanding this novel technology changed profoundly and thus remains selective, there is indeed no way to measure it evenly. Even in traditional finance institutions, people are expected without being provided with methods that explain how to practically capture empirical models that influence their views or beliefs in assuming blockchain-based instruments. Previous examinations largely focused capture the blame towards adoption driving technologies from a technological perspective, evidence the gap cries for is incorporating trust, cognitive awareness, and perceived systemic utility woven into uniform structure across studies (Catalini & Gans, 2016; Iansiti & Lakhani, 2017). This gap shows cry for an approach that dimensions perceptions contextual relevance framed from under individual perceptions in financial contexts.

This study's approach is integrated within the context of the behavioral theories that have previously provided explanations for the adoption and use of technology. According to Technology Acceptance Model (TAM), the intentions to adopt a new technology are strongly influenced by its perceived usefulness and perceived ease of use (Davis, 1989). Likewise, the Theory of Planned Behavior (TPB) regards attitudes, subjective norms, and perceived behavioral control as the primary factors in the decision-making process (Ajzen, 1991). More contemporary models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) have sought to expand this framework by adding benchmarks such as performance expectancy and social influence (Venkatesh et al. 2003). There is a growing agreement from these perspectives regarding the need to address emerging digital tools that are shaped by the user perception and trust to drive behaviors toward adoption and use.

In the current work, this theory has been translated into blockchain awareness, perceptions, and confidence regarding their financial functionality through the construction of relevant scale dimensions. The first domain contains measures about the stakeholders' knowledge of blockchain systems, their interest in blockchain-related discussions, and opinions about rollouts of blockchain systems in society. The second dimension captures evaluations of blockchain's reliability, efficiency, security, and overwhelming relevance to the future financial infrastructure. These constructs were balanced, as they were all reviewed from the theory literature and were further tailored through expert consultations to remove contextual and conceptual ambiguities related to contextualization.

This approach, employing both theoretical and practical elements, is expected to facilitate the development of constructs which is aligned to the objective of this study and pragmatic in nature. This scale aims to enable exploratory studies on the critical analysis of cognitive and functional engagement with blockchain technology that professionals within financial institutions, where strategic technology decisions are made, undertake.

LITERATURE REVIEW

Blockchain Research in Finance: From Technical Innovation to Human-Centered Evaluation

Interest in academic and professional communities regarding blockchain technology has grown significantly over the past decade. However, blockchain-related research has focused primarily on the technical aspects, architectural cryptography, and macroscopic economics. Some of the research identified blockchain technology as a new foundational technology that has the potential to disrupt and transform the entire system of transactional relations, governance, and value systems as a whole (Zheng et al., 2018, Iansiti & Lakhani, 2017). Although these studies are important for recognizing and determining the potential disruption that blockchain technology can create, they do not provide any understanding of the perceptions, trust, and evaluations that stakeholders, and more specifically, financial market experts, have concerning blockchain-based systems.

The rapid advancement of blockchain technologies and the transition from the experimental stage to the integration of real-world financial systems have necessitated a shift toward the design and implementation of major financial systems. Most recent studies have focused on the importance of the adoption of blockchain in finance and the systems that have been designed and the implications of complex systems. The majority of academic research and professional practices, dominated by the technical design and systems efficiency perspective, have disregarded the important systemic design and efficiency from the adoption of blockchain technologies in finance and remained focused on the implementations of the blockchain technologies in financial systems. Thus, the adoption of blockchain technologies necessitates a focus on the systems designed and implemented and the perceptions and trust of key decision makers.

Behavioral Technology Acceptance Models and Blockchain-Specific Limitations

Most research focused on the adoption of new technologies has relied on behavioral models such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Theory of Planned Behavior (TPB) (Ajzen, 1991), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). These models have described the importance of perceived usefulness and perceived ease of use, social influence, and behavioral intention to explain the acceptance of new technologies. More recent adaptations of these models have included the constructs of trust and perceived risk, especially in relation to digital financial technologies.

While these models have been used in examining the adoption of blockchain technologies, recent empirical studies have shown that blockchain has attributes that, in some cases, are beyond the explanations of the general acceptance models. Unlike the traditional information systems, blockchain technologies are based on decentralization, immutability, consensus mechanism, and algorithmic governance. These technologies fundamentally transform trust and accountability relations in financial systems. Hence, more recent studies suggest that adoption of blockchain technologies cannot be explained using the traditional frameworks of use and performance expectations. These models have to include trust, adherence to regulations, and systemic reliability (Zhang et al., 2023; Kouhizadeh et al, 2022).

Trust, Risk, and Regulatory Context in Financial Blockchain Adoption (Recent Evidence)

Recent literature in finance and blockchain also trusts the literature as being more nuanced. Financial professionals need to balance their assessment of the blockchain as operationally efficient and in terms of compliance, data, governance, and systemic collapse.

Trust in blockchain as an operationalizing construct falls along the dimensions of trust in technology, trust in the regulators, and trust in the governance surrounding the technology (Allen et al., 2022; Fang et al., 2024).

For example, Allen et al. (2022) show a strong influence of regulatory and institutional trust on the integration of blockchain systems by financial institutions, as opposed to the integration of systems on an advanced technology level. In the same manner, Fang et al. (2024) show a relationship between governance confidence and perceived risk that impacts the acceptance of blockchain in financial systems and payments. These studies highlight the need for regulatory and institutional frameworks for the adoption of blockchain in finance.

Measurement Approaches and Persistent Scale-Level Gaps

While the importance of the perceptual-trust nexus has been acknowledged, at least in part, the measurement frameworks in blockchain research continue to be heterogeneous. The Technology Readiness Index (Parasuraman, 2000) and Digital Trust Scale (McKnight et al., 2002) provide a rudimentary understanding of technology readiness and trust, respectively, but do not account for blockchain-specific features of decentralization, immutability, and the execution of governance through algorithms.

The recent empirical work has relied primarily on variations of the TAM or the UTAUT, with the inclusion of trust, innovativeness, or perceived risk, using items not originally developed for the technology in question. For instance, in the case of Mohammadi et al. (2021) and Sun et al. (2020), who analyzed blockchain adoption, the authors relied on previously developed constructs, whereas Zhang et al. (2023) and Kouhizadeh et al. (2022) have noted that the lack of measurement instruments that are validated and specific to blockchain technology hinders both comparability and the ability to formulate and add to a theory. This is especially important in the financial services sector, where practitioners work under more stringent regulatory and systemic rules.

Contribution of the Present Study

The present study is designed to address the literature gaps by attempting to construct and validate a measurement scale that is contextually sensitive enough to assess the level of awareness and confidence of financial professionals regarding blockchain technology. While attempting to bridge the framework gaps between behavioral theories and technology acceptance models, the study aims to incorporate information communication technology (ICT) related to the operating environments of financial systems. The scale, therefore, seeks to enhance the theory-building process. The scale is the first of its kind and aims to assess the patterns of perceptions, evaluations, and confidence of financial professionals regarding blockchain technology in the context of organizational settings.

EXPLORATORY FACTOR ANALYSIS and SCALE DIAGNOSTICS

Dataset and Sample Structure

The dataset leveraged for this research came from a formulated survey aimed to measure people's opinions, knowledge, and confidence regarding financial blockchain systems in Turkey. The survey was electronically distributed through social media and other platforms, which helped enhance coverage.

The respondents were employed as finance professionals in different accounting and banking institutions in different parts of İstanbul. This group was limited to only those who worked in a financial decision-making capacity while intentionally excluding students to maintain the rigor of the dataset. A convenience sampling strategy was employed while data collection happened over a single month period from March 15 to April 15, 2025.

The empirical analysis is based on responses to a structured questionnaire consisting of demographic questions and multiple items measuring blockchain awareness, usage, investment behavior, and risk perceptions. All construct-related items were measured on a five-point Likert scale ranging from 1 (strongly

Table 1. Selected Recent Blockchain–Finance Studies and Measurement Focus (2022–2025)

Study	Context / Sample	Main Constructs Measured	Limitation Addressed by This Study
Allen et al. (2022)	Financial institutions, cross-country	Trust, regulation, adoption intention	No validated scale for professional perception
Kouhizadeh et al. (2022)	Blockchain supply chain finance	Trust, transparency, governance	Not finance-professional specific
Gan, Li & Qiao (2024)	Banking & finance employees (218 participants)	Trust in technology, trust between users, acceptance intention	Generic acceptance constructs but empirically tests trust relationships in finance
Norbu (2024)	Cross-sector blockchain users (systematic review)	Trust, acceptance, perceived risk	No blockchain-specific scale validated for finance professionals

disagree) to 5 (strongly agree). The complete wording of all questionnaire items used in the analysis is reported in Appendix A.

The analysis was conducted on the 450 responses that were complete. This number is significantly more than the optimal amounts suggested for exploratory factor analysis (EFA) set at 300 cases, and around 5-10 observations per item (MacCallum et al., 2001). This offered sufficient statistical power and reliability of the factor solution. Content validity was ensured by having field experts review the initial pool of items created by the researchers. The measurement tool was refined several times based on items' performances, analysis feedback, and psychometric insights. All procedures received approval from the Ethics Committee of Istanbul Yeni Yüzyıl University (Date of Approval: March 5, 2025; No of Approval: YYU-EK-2025/067), and as per ethical research guidelines, informed consent was collected from all participants.

METHODOLOGY

To create an accurate and credible measurement instrument evaluating the perception, trust, and awareness concerning blockchain technology in the financial industry, a quantitative research design was utilized. The methodology adhered to the procedures provided in the literature on scale development (DeVellis, 2017; Clark & Watson, 1995; Worthington & Whittaker, 2006).

The researchers created an item pool by conducting a thorough literature review: intention to adopt blockchain, trust in technology, digital finance, and behavioral finance (Ajzen, 1991; Venkatesh & Bala, 2008; Davis, 1989). The five-level Likert scale items (1 = "Strongly Disagree" and 5 = "Strongly Agree") were written in Turkish. For content validity, subject-matter experts on finance, digital technologies, and scale development were consulted who suggested to significantly alter almost all parts of the first draft.

To check the quality and structural soundness of the mesuring tool, a set of statistical analyses will be conducted. Firstly, cumulative descriptive statistics such such as mean, standard deviation, skewness and kurtosis (for distributional properties of every item) will be computed. Skewness and kurtosis would provide insight into the central tendency, variability, and normality of item responses which are meritorious for determining subsequent analyses.

Reliability will be evaluated using Cronbach's alpha coefficent. The degree of internal consistency of total scale and sub scales will be tested. Analyses will be performed to check whether items with corrected item-total correlations around .30 or those that lower alpha would be an admissible criterion for removal (Nunnally & Bernstein, 1994; Tavakol & Dennick, 2011).

In order to analyze the hyphothetic model, Exploratory Factor Analysis will be carried out using Principal Component Analysis and factor rotation would be done using Oblimin as it allows for correlation between factors (Fabrigar et al., 1999). Suitability of the data for factor analysis will be checked using Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of Sphericity (Kaiser, 1974; Bartlett, 1954).

The options available include the factors whose eigenvalues are greater than 1.00, communalities, and the scree plot to guide their decisions about how many to retain. All factors with loadings of .40 and above on one factor will be retained and all non-dominant and cross-loaders will be removed. This will be done repeatedly until Hair and colleagues in 2019, reach a solution that is simple, easy to understand, and harmonizes with theory.

TEST RESULTS

Reliability of the Scales

To determine the internal reliability of the scale, Cronbach's alpha values were computed for each dimension as well as for the total scale. These results are summarized in Table 2.

Table 2. Reliability of the Scales

Reliability Statistics		
Dimension	Cronbach's Alpha	N of Items
I	.981	10
II	.909	4
Overall	.923	14

Source: Author's own calculations

The evaluate internal consistency, we relied on Cronbach's alpha which is a coefficient developed by Cronbach (1951) to determine how closely related a set of items are as a group (measure the same latent construct). The sub-dimensions and overall scale reliability coefficients yielded showed strong internal structure and good psychometric quality.

With 10 items, the first dimension (Dimension I) yielded Cronbach's alpha of .981, which is exceptionally high. Nunnally and Bernstein (1994) note that alpha values greater than .90 reflect an esteemed level of reliability. They also note that values greater than .95, as in this case, suggest redundancy or superficial similarity among items (Streiner, 2003). This single figure affirms internal consistency to a striking degree; however, it is prudent to suspect item overlap or duplication if frugality is a design criterion for the instrument. In my analysis, the second dimension (Dimension II) consists of 4 items and produced a Cronbach's alpha of .909, which also signifies strong reliability. Given that alpha is sensitive to the number of items—where shorter scales often result in lower coefficients (Cortina, 1993)—this value suggests that the subscale is robust with a strong degree of inter-item consistency. Still, it indicates that the items are framed with a high degree of measurement accuracy even when few items are employed.

The scale's Cronbach's alpha was .923 across the 14 items, which further confirmed the internal consistency of the instrument. This figure is consistent with widely accepted criteria for high reliability and implies that the scale can provide reliable results over repeated measurements (Tavakol & Dennick, 2011). Combining the results from these analyses suggests that the instrument has adequate psychometric quality, thus making it feasible to apply more complex statistical methods such as exploratory or confirmatory factor analyses, regression analyses, or structural equation modeling. Additionally, the alignment of the hypothesized subscales with the overarching framework evidences the soundness of measurement model, especially construct validity, and in particular cross validity.

To evaluate the internal consistency at the item level, the corrected item-total correlations along with Cronbach's alpha for the remaining items were computed. The results are shown in Table 3.

The figures in Table 3 show that item-total correlations range between .225 and .886, meaning that the overwhelming majority of items demonstrated strong correlations with the total score on the scale. A few items, in particular, had very high item-total correlations (e.g., m4 = .886; m21 = .883; m9 = .874), which indicates that internal scale consistency is strong. A few items had lower item-total correlations in comparison to others (e.g., m1 = .225; m13 = .378; m19 = .357) while still maintaining values above the accepted minimum, meaning that no deficiencies in the activities were suggested. The statistics range of the 'Cronbach's alpha if item deleted' was between .909 and .935 suggesting that no item was singled to have an abnormal dominative effect on the overall reliability of the scale. The solid internal consistency across the scale was therefore taken from the item-level results rather than as parameters that would justify the removal of items from the scale.

Table 3: Item Contribution to Scale Reliability

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
m1	32.51	25.747	.225	.930
m4	34.29	22.109	.886	.910
m5	34.34	23.899	.808	.915
m6	34.29	23.557	.739	.916
m7	34.34	23.860	.832	.915
m9	34.32	23.295	.874	.912
m10	34.27	21.807	.848	.910
m11	34.30	23.092	.762	.914
m13	32.52	23.426	.378	.935
m14	32.56	23.481	.578	.921
m15	34.31	23.025	.820	.913
m19	32.63	24.368	.357	.930
m20	34.33	24.149	.698	.918
m21	34.29	21.970	.883	.909

Note: Item codes (m1–m21) refer to individual questionnaire statements reported in Appendix A.

Descriptive Statistics Analysis

Prior to conducting further statistical analyses, descriptive statistics were calculated to assess the basic characteristics of each item, such as central tendency, variability, and distributional shape. These results are summarized in Table 4.

450 respondents completed all items, resulting in full data availability (N=450). The mean scores of the items differed significantly which indicates different response strategies. m1 (M = 3.90), m13 (M = 3.89), m14 (M = 3.85), and m19 (M = 3.78) were the highest scoring items and they were tended to agree or endorse the items. On the other hand, m7 (M = 2.06), m5 (M = 2.07) and m20 (M = 2.08) were rated lower on average which suggests disagreement or less relevance.

Table 4. Descriptive Statistics Results

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
m1	450	4	1	5	1754	3.90	.456	.208	-3.659	.115	19.185	.230
m4	450	3	2	5	952	2.12	.550	.303	4.726	.115	21.001	.230
m5	450	4	1	5	931	2.07	.374	.140	5.118	.115	26.707	.230
m6	450	4	1	5	951	2.11	.451	.203	3.697	.115	13.894	.230
m7	450	4	1	5	929	2.06	.369	.136	5.302	.115	28.490	.230
m9	450	3	2	5	940	2.09	.418	.175	4.619	.115	20.099	.230
m10	450	3	2	5	960	2.13	.608	.370	4.464	.115	18.198	.230
m11	450	3	2	5	949	2.11	.499	.249	4.653	.115	20.943	.230
m13	450	3	2	5	1751	3.89	.800	.641	-1.293	.115	1.529	.230
m14	450	3	2	5	1732	3.85	.570	.325	-2.255	.115	5.447	.230
m15	450	3	2	5	944	2.10	.476	.226	4.893	.115	23.199	.230
m19	450	3	2	5	1701	3.78	.632	.399	-2.448	.115	4.135	.230
m20	450	2	2	4	936	2.08	.392	.154	4.711	.115	20.280	.230
m21	450	3	2	5	953	2.12	.568	.322	4.706	.115	20.550	.230
Valid N (listwise)	450											

Source: Author's own calculations

To examine the distributional traits and central tendencies data computed descriptive statistics, including central tendency (mean), dispersion (standard deviation and variance), and shape (skewness and kurtosis). These results listed in Table 4 are vital for evaluating the scale's psychometric adequacy and the upper bound of multivariate analysis (Tabachnick & Fidell, 2019; Field, 2018).

The standard deviations (SD) ranged from .369 (m7) to .800 (m13), suggesting different levels of response divergence. Items with relatively low SDs like m5, m7, and m20 tend to show greater agreement among the respondents while higher SDs e.g. m13 and m14 may suggest greater lack of agreement in perceptions or interpretations (DeVellis, 2017). With regards to symmetry of distribution, skewness and kurtosis values were associated with notable asymmetries and peakedness in many items. Responses to items like m5 (Skewnes = 5.118), m7 (5.302), and m15 (4.893) suggest the presence of high positive skewness which means that respondents tend to give less than average high endorsements, while ailing to give high endorsements. Austerity tends to be mildly subdued in m1 (-3.659), m13 (-1.293), and m19 (-2.448) suggesting that these respondents concentrate their responses towards the higher end of the scale. These features of the distributions should be taken into account when selecting relevant statistical methods since dependance on non- normality might compromise the strength of the results from parametric testing (Kline, 2015).

The kurtosis values support the case of non-normality and is in fact more pronounced than bias. Extreme sharpness, which denotes heavy-tailed responses around the mean, was seen on m7 (Kurtosis = 28.49), m5 (26.71), and m15 (23.20) indicating strong leptokurtic tendencies. It is likely that the responses for these items were homogeneously clustered and therefore, perceptions were homogeneous across respondents. Moderated levels of kurtosis were observed on m13 (Kurtosis= 1.53) and m19 (4.13) which implies more balanced response distributions when compared to the former items.

The descriptive results highlight both the asymmetry and heterogeneity of responses to the items illustrating how items differ within the scale. For instance, items were tested for their readiness to undergo exploratory or confirmatory factor analysis which greatly relies on normality, homogenous variance, and item discrimination (Fabrigar et al, 1999; Worthington & Whittaker, 2006).

Correlation Matrix

The correlation structure among the items was examined using a Pearson correlation matrix, which offers insights into the internal coherence and potential redundancy within the scale. Results are shown in Table 5 as follows:

To measure the level of linear relationship between the variables, a bivariate Pearson correlation analysis was performed. Based on the correlation matrix included in Table 5, one can appreciate the internal architecture of the scale alongside how its diverse elements are integrated conceptually (Field, 2018; Tabachnick & Fidell, 2019).

Almost all inter-item correlations were verified statistically to be meaningful at the 0.01 level (1-tailed). This suggests that a marked level of shared variance exists among the items. Moreover, the highest positive correlations were noted for the following pairs: m4–m9 (r = .982), m4–m21 (r = .990), m9–m10 (r = .987), m10–m21 (r = .980). These results indicate that these items are possibly measuring an underlying construct with high inter-item conceptual overlap. Of course, such high positive correlations can provide evidence of strong internal consistency (Nunnally & Bernstein, 1994); however, they may suggest redundancy in the event that the values approach or exceed .90 (Streiner, 2003). This argument becomes particularly important when considering scale efficiency and possible multicollinearity in multivariate analyses. Moderate to high correlations (around r = .70… .89) were registered between m5 and m6, m7, m11, and m14 and m19, implying that there might be developed coherent subdimensions or item clusters within the over scale. On the contrary, a few item pairs exhibited weak or even negative correlations, such as m1 and m6 (r = –.149) and m1 and m10 (r = –.063). Importantly, m1 showed low or inverse correlations with the majority of other items, which raises the question of whether this item integrates adequately into the overall structure and the hypothesized composite constructs (DeVellis, 2017).

The determinant of the reported 1.040 * 10^-15 correlational matrix value within the limit of .00001 indicates the possibility of multicollinearity or near-singularity (Kaiser, 1974; Hair et al., 2019). This suggests that some items are likely to be very linearly dependent and their inclusion together in most analyses, specifically EFA or SEM, may lead to unstable outcomes in factor extraction or estimation processes. Apart from psychometric considerations, a high degree of inter-item correlation affirms reliability; however, too much linear dependence can inflate error variance and impede construct differentiation (Fabrigar et al. 1999; Worthington & Whittaker, 2006). Thus, prior to additional modeling work, a more refined strategy of item reduction or regularization methods like ridge regression or principal axis factoring should be considered.

Factor Analysis

A factor analytic approach was employed to determine whether the observed variables could be grouped into interpretable constructs reflecting the scale's theoretical framework.

The KMO measure of sampling adequacy combined with Bartlett's Test of Sphericity have been used to determine the appropriateness of the dataset for conducting factor analysis. The outcome of tests is important when determining if factor analysis techniques can be used for a certain correlation matrix. (Kaiser, 1974; Tabachnick & Fidell, 2019).

According to Kaiser (1974), the KMO value should lie between 0 and 1, with those closer to 0 indicating partial correlation and those closer to 1 indicating significant correlation. Kaiser's classification suggests that the KM0 value ranging from .70 to .80 is meritorious, which is supported by the KM0 value result of .792. This indicates that the ratio of common variance is high enough to warrant factor extraction. To simplify, according to (Field, 2018) the KMO value of .792 suggests that the interrelations amongst the items exhibit patterns that validate the existence of constructs which have shared dimensions and factors.

Table 5. Correlation Matrix

		m1	m4	m5	m6	m7	m9	m10	m11	m13	m14	m15	m19	m20	m21
Correlation	m1	1.000	-.015	.041	-.149	.066	-.034	-.063	-.059	.623	.549	-.046	.664	.170	-.031
	m4	-.015	1.000	.891	.899	.906	.982	.979	.895	.145	.319	.935	.080	.741	.990
	m5	.041	.891	1.000	.799	.984	.844	.821	.712	.211	.300	.725	.055	.751	.874
	m6	-.149	.899	.799	1.000	.800	.916	.896	.886	-.034	.180	.893	-.076	.603	.896
	m7	.066	.906	.984	.800	1.000	.858	.825	.712	.243	.322	.738	.090	.764	.889
	m9	-.034	.982	.844	.916	.858	1.000	.987	.936	.102	.290	.975	.083	.663	.979
	m10	-.063	.979	.821	.896	.825	.987	1.000	.936	.085	.290	.971	.059	.683	.980
	m11	-.059	.895	.712	.886	.712	.936	.936	1.000	.002	.199	.950	.027	.547	.898
	m13	.623	.145	.211	-.034	.243	.102	.085	.002	1.000	.819	.057	.838	.283	.146
	m14	.549	.319	.300	.180	.322	.290	.290	.199	.819	1.000	.268	.910	.313	.324
	m15	-.046	.935	.725	.893	.738	.975	.971	.950	.057	.268	1.000	.094	.578	.946
	m19	.664	.080	.055	-.076	.090	.083	.059	.027	.838	.910	.094	1.000	.071	.091
	m20	.170	.741	.751	.603	.764	.663	.683	.547	.283	.313	.578	.071	1.000	.737
	m21	-.031	.990	.874	.896	.889	.979	.980	.898	.146	.324	.946	.091	.737	1.000
Sig. (1-tailed)	m1		.376	.191	.001	.082	.236	.090	.107	.000	.000	.164	.000	.000	.257
	m4	.376		.000	.000	.000	.000	.000	.000	.001	.000	.000	.046	.000	.000
	m5	.191	.000		.000	.000	.000	.000	.000	.000	.000	.000	.123	.000	.000
	m6	.001	.000	.000		.000	.000	.000	.000	.238	.000	.000	.053	.000	.000
	m7	.082	.000	.000	.000		.000	.000	.000	.000	.000	.000	.029	.000	.000
	m9	.236	.000	.000	.000	.000		.000	.000	.015	.000	.000	.040	.000	.000
	m10	.090	.000	.000	.000	.000	.000		.000	.036	.000	.000	.105	.000	.000
	m11	.107	.000	.000	.000	.000	.000	.000		.484	.000	.000	.286	.000	.000
	m13	.000	.001	.000	.238	.000	.015	.036	.484		.000	.113	.000	.000	.001
	m14	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000
	m15	.164	.000	.000	.000	.000	.000	.000	.000	.113	.000		.023	.000	.000
	m19	.000	.046	.123	.053	.029	.040	.105	.286	.000	.000	.023		.066	.027
	m20	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.066		.000
	m21	.257	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.027	.000	

a. Determinant = 1,040E-15

Source: Author's own calculations

Table 6. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.792
Bartlett's Test of Sphericity	Approx. Chi-Square	15300.600
	Df	91
	Sig.	.000

Source: Author's own calculations

Bartlett's Test of Sphericity resulted in test statistics of chi-square 15,300.600 with 91 degrees of freedom (p-value less than point zero zero one), indicating a high level of statistical significance. This result also indicated that at least some of the variables were correlated. When taken into context with factor analysis, it partly supports the hypothesis that the correlation between variables is strong and suggests no identity matrix exists. All of this data leads to the conclusion that the formulated hypothesis of sphericity that was tested was proven false. A hypothesis which states that the correlation amongst the variables tested is non-existent has been validated and proven false (Hair et al, 2019, Bartlett 1954).

Adding to this, the combination of the KMO value along with the KMO test used suggest there is a spatially compact correlation structure present, while the Bartlett test provides the opposite explanation, supporting hypothesis testing matrix decomposition.

Kurlon's value estimate was said to provide bounding information for average value a set of constraints. The amount of variance that each explained component was calculated through estimating average values and the results are depicted in table 7.

Table 7. Communalities

	Initial	Extraction
m1	1.000	.631
m4	1.000	.986
m5	1.000	.814
m6	1.000	.885
m7	1.000	.834
m9	1.000	.973
m10	1.000	.961
m11	1.000	.848
m13	1.000	.860
m14	1.000	.872
m15	1.000	.889
m19	1.000	.897
m20	1.000	.587
m21	1.000	.981

Source: Author's own calculations

The communalities for the extracted components were analyzed through Principal Component Analysis (PCA) to assess how much each variable contributed to them. Each communality or communalities is a value which over the term variance in each observed variable that is measured using the components that have been selected (Fabrigar et al, 1999; Field, 2018). Initially in this analysis, it is standard that all initial communalities be set at 1.000 which in PCA represents total variance of each variable before extraction. In this analysis, post extraction communalities were found to range between .587 and .986 which indicates that indeed this set of components along with the factors has developed as much variance as possible across all items, meaning a bulk of the variance is still remaining unaccounted in the components post extraction. Items m4(.986), m9(.973), m21(.981), and m10(.961) showed highly explanatory communalities meaning that a bulk of the variance across these items is posited to develop because of the factors that have been extracted, therefore almost all the variance is suggestively explainable. It can therefore be stated that these items strongly represent the significantly bearing factors and thereby credibly justify the suggestive model (Hair et al, 2019). However, m20(.587) and m1(.631) did demonstrate lower communalities indeed indicating poor construction thus lower value of explainable variance.

Even though their values are still above the generally accepted threshold of .50 (MacCallum et al., 2001), these values signify that a considerable portion of the variance is still unaccounted for within the retained components. This could possibly indicate multidimensionality or weaker fit with the alignment of the extracted latent structure. These items may require further analysis in later confirming or validation stages.

The general pattern of communalities suggests that the underlying factor structure is strong, with the majority of items surpassing .80, which is desirable in psychometric scale construction (DeVellis, 2017). The results indicate that the factor model has, indeed, captured the core dimensions underlying the dataset and that most of the items pointer meaningfully to the level of those constructs.

As it has been outlined in Table 8 and Figure 1 both, the amount of variance accounted for by each extracted component was assessed in order to evaluate the explanatory power of the factor solution.

Table 8. Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.824	63.030	63.030	8.824	63.030	63.030	8.794
2	3.192	22.800	85.830	3.192	22.800	85.830	3.395
3	.785	5.610	91.440				
4	.479	3.422	94.863				
5	.289	2.061	96.924				
6	.158	1.129	98.053				
7	.128	.912	98.965				
8	.062	.445	99.409				
9	.040	.288	99.697				
10	.018	.126	99.823				
11	.013	.091	99.914				
12	.007	.049	99.963				
13	.004	.029	99.992				
14	.001	.008	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: Author's own calculations

The underlying dimensionality of the scale was determined by evaluating the eigenvalues and their respective variances from a Principal Component Analysis (PCA) performed within the scale. This is important for determining the number of components that adequately capture the meaningful structure of the data, and that should be retained, expressed, and interpreted in lower dimensions (Fabrigar et al., 1999; Field, 2018).

According to the Initial Eigenvalues, the first component explained 63.03% of the total variance, while the second component accounted for an additional 22.80%. The total variance explained by both components is approximately 85.83%, indicating that there is a significant concentration structure where a great deal of item variance is captured by only a few dimensions. This is higher than the accepted threshold of 60% (Hair et al., 2019) suggesting the factor solution is efficient.

The third component explained only 5.61%, with successively smaller contributions from the subsequent components. Only the first two components are deemed to surpass the widely accepted eigenvalue > 1.0 threshold (Kaiser, 1960), hence the other components will not be kept. This is supportive of a two-factor solution, which was further supported by both the Extraction Sums of Squared Loadings and the Rotation Sums of Squared Loadings.

Following the rotation, the first rotated component captured approximately 62.81% and the second 24.25% (rounded figures estimated from aggregate values) maintaining the total explanatory value while improving interpretability through factor simplicity (Costello & Osborne, 2005). The rotation method most certainly helped clarify item-factor relationships, turned the variance, and improved the factor structure clarity.

Of particular note is the rotation done with the components assumed to be correlated as highlighted in the Footnote which suggests an oblique rotation method was used. Therefore, it is impossible to directly add the sums of squared loadings across components without shared variance infringing the orthogonality assumption (Tabachnick & Fidell, 2019). The variance accounted for by the two components strongly argues for a well articulated and economized factor system. The results substantiate that the variables in question are not just related but clustered based on a set of powerful underlying ideas, proving the scale is indeed valid in structure.

Through the pattern matrix obtained after oblique rotation, the distinctiveness and structure of the components were defined along with the respective factor loadings. They were obtained in Table 9 as displayed below:

Table 9. Pattern Matrixa

	Component	
	1	2
m4	.991	
m21	.988	
m9	.988	
m10	.984	
m15	.947	
m6	.946	
m11	.927	
m7	.896	
m5	.892	
m20	.728	
m19		,951
m13		,924
m14		,888
m1		,799

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Source: Author's own calculations

The pattern matrix presents the results obtained from an oblique rotation using the Oblimin method with Kaiser normalization, which was selected to allow for correlations among the extracted components. Such methods of rotation yield loadings that take into account the unique contribution of each variable to a given factor while controlling for overlaps with other pieces (Fabrigar et al., 1999; Tabachnick & Fidell, 2019). It was possible to clearly identify two factors from the analysis. The following items m4, m21, m9, m10, m15, m6, m11, m7, m5, and m20 appeared to have very strong loadings for Component 1 with coefficient values between .728 and .991. Given the high values of these coefficients, it can be concluded that the items are capturing some latent trait which is internally homogeneous. Also, the loadings of m4 (.991), m21 (.988), m9 (.988) are so close to one that it indicates that they dominate the underlying factor and therefore helps in its better understanding (Costello & Osborne, 2005).

On the other hand, items m19, m13, m14, and m1 loaded solely on Component 2 with values between .799 and .951. These values also surpass the widely accepted significance level of .40 for meaningful item retention (Hair et al. 2019), demonstrating a strong and unambiguous latent construct apart from Component 1. The sharp divergence in loading patterns confirms that the scale captures two distinguishable dimensions, each with well-defined internal structure.

As stated in Field (2018), the rotation converged in three iterations, demonstrating the solution's stability and adequacy. The solution is corroborated by the lack of significant cross-loadings because items tend to load only on one component, which increases construct validity.

When employing oblique rotation, the assumption is that the two components are indeed correlated, which is more likely true in many psychological and social science constructs where latent variables are often non-orthogonal to one another (Worthington & Whittaker, 2006). Thus, the pattern matrix provides a deeper level of interpretation than orthogonal approaches and more accurately captures the intended rationale of the scale.

Through the correlation matrix of the components, the relationships among the extracted elements processes and how they interconnected were further investigated which gave knowledge into the extent of fusion among the dimensions that were identified. The results are provided in Table 10 below:

Relationships among the components were evaluated through the Component Correlation Matrix using Principal Component Analysis (PCA) with oblique rotation (Oblimin with Kaiser Normalization). Unlike orthogonal rotations which do not allow for interrelated components, oblique rotations take into consideration that some latent variables may be correlated. This difference is more aligned with the reality of complex

Table 10. Component Correlation Matrix

Matrix

Component	1	2
1	1.000	.117
2	.117	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Source: Author's own calculations

psychological and social factors (Costello & Osborne, 2005; Tabachnick & Fidell, 2019).

In the current matrix, the correlation coefficient between Component 1 and Component 2 was .117 which indicates a slight positive correlation between the two extracted factors. Even though the components are relatively distinct, this slight correlation implies that the components may not be completely independent and may instead suggest some degree of interdependence that, while conceptually distinct, is nevertheless intertwined within the construct being measured (Fabrigar et al., 1999).

The strength of this correlation is not considered problematic regarding multicollinearity or factor overlap; concerns about these issues usually begin at .32 or above when evaluating factor discriminability (Worthington & Whittaker, 2006). Therefore, the correlation presented in this case justifies support for an oblique rotation approach that, in this case, appears to provide a useful and meaningful structure without excessive redundancy among components.

Moreover, the existence of even the weakest positive correlation strengthens the choice of using an oblique rotation over orthogonal options like Varimax, which could have masked intricate relationships between components (Hair et al., 2019). The structure is both reasonably sound and conceptually intact, which suggests the factor solution is also preserved and corresponds correctly to the given theory.

Table 11: Final Set of Items Retained in the Scale after Item Elimination

Item No	Item Statement
m1	Blockchain technology reduces costs in financial transactions.
m4	Blockchain-based financial applications are easily accessible to everyone.
m5	Understanding the fundamental functioning of blockchain technology is straightforward.
m6	I have a high level of trust in transactions based on blockchain technology.
m7	Blockchain-based financial systems ensure data security.
m9	Blockchain applications reduce risks during financial transactions.
m10	Blockchain technology is expected to play a significant role in the future of Turkey's financial system.
m11	Blockchain is anticipated to support the development of innovative financial products in Turkey.
m13	I regularly follow news related to blockchain.
m14	Blockchain is expected to have a prominent place in the future of the financial system.
m15	Blockchain infrastructure is perceived as a reliable system.
m19	Comments on social media influence my decisions when investing in blockchain.
m20	I use technical or fundamental analysis methods when making blockchain-related investment decisions.
m21	I believe blockchain technology will create a major transformation in the financial sector.

After the deletion of items with low face values or poor psychometric traits, the last iteration of the scale consisted of the remaining items presented below.

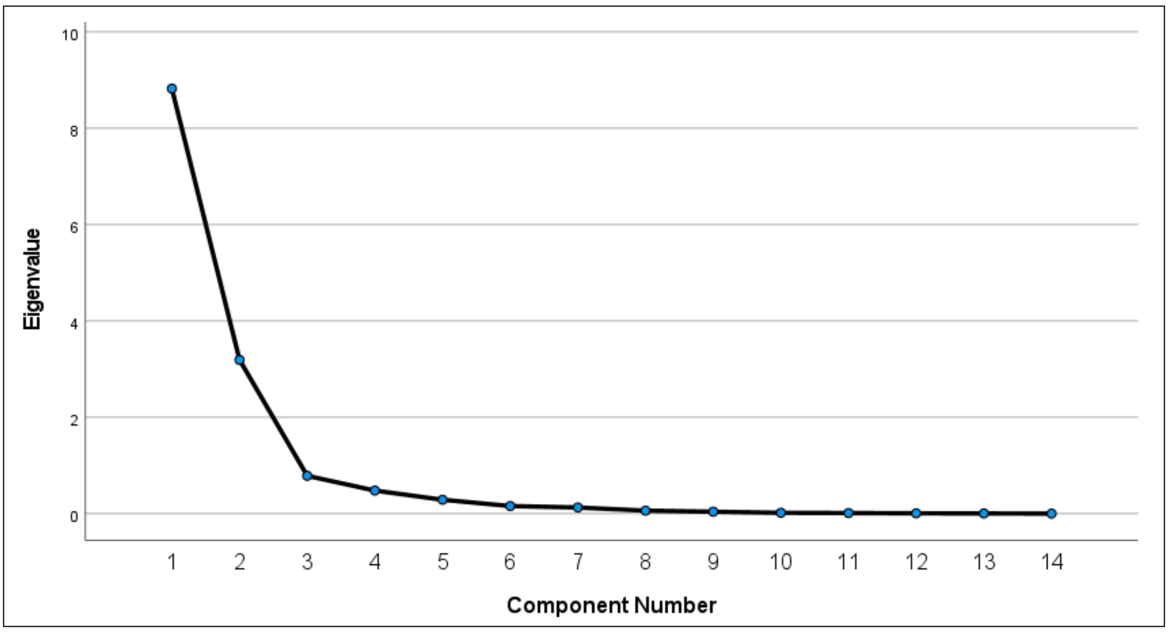
Based on the findings from exploratory factor analysis, the selected items were placed into two separate dimensions relative to their factor loadings and theoretical rationale. The first dimension encompasses items m19, m13, m14, and m1, all commenting on participants' levels of observing and perceptual engagement with blockchain technology. The second dimension consists of items m4, m21, m9, m10, m15, m6, m7, m11, m5, m20, which are largely related to perceptions of the functional, trust, and systemic financial features of blockchain technology.

The developed structure of the scale captures two distinct yet interconnected concepts within the results of exploratory factor analysis. Each factor captures one of the components regarding people's attitudes and perceptions about the integration of technology and finance on blockchain.

BLOCKCHAIN FINANCIAL FUNCTIONALITY and CONFIDENCE

This dimension captures the participants' evaluation of blockchain's financial functionality, fiscal security and sensitivity, its holistic scope, and financial system implications. Participant evaluations reflect the trust placed in the financial technology ecosystem and the belief towards risk, innovation, and innovation on-blade-guard financial technologies. Most significant, they participate in active analysis – either technical or fundamental – over the market. The factor represents a confidence-relating approach and pragmatic point of view towards the value blockchain delivers operationally in finance.

These dimensions address the gaps between the awareness and trust, providing an explanation of information and perception dichotomy toward behavioral interpretation and attitude measurement of the blockchain adoption.



Factor 1: The Awareness and Perception of Blockchain Technology

This captures respondents' self-reported levels of in-depth knowledge and generalized levels of awareness about blockchain technology. The activities encapsulated in this construct serve to evaluate whether people monitor the changes happening in blockchain and what role—according to various media platforms—they expect it to play in the future economy as a guiding industry. It captures a type of orientation within informational engagements associated with blockchain on a perceived relevance primary basis grounded in information.

DISCUSSION

The results of this study add to a new trend that seeks to quantify the human aspects of blockchain technology by developing a measurement scale specifically for finance professionals. Unlike previous works that applied the generic models of technology adoption, this study based its scale development on the behavioral theory and contextual rationale of the particular industry involved. The recognition of two subdivisions of dimensions which are conceptually distinct but interrelated: Blockchain Awareness and Perception, and Blockchain Financial Functionality and Confidence, adds more value to the literature by bridging the gap between understanding and evaluative trust concerning the applications of blockchain technology in finance.

In comparison to existing literature, the findings in question are consistent with previous observations that within emerging technologies, awareness and trust function separately, but are interdependent constructs (McKnight et al., 2002; Venkatesh et al., 2003). On the other hand, the two-factor solution from this study accounts for 85.83% of variance, which is higher than many prior models using similar constructs that tend to report less than 70% cumulative explanatory power (e.g., Mohammadi et al., 2021; Sun et al., 2020). This may indicate the specificity and practical relevance of the financial professional's role with blockchain, who interacts with the technology at an organizational or corporate strategy level.

It is interesting that prior instruments focused on a technological side or ease of use, while this study focused on Informational Engagement and Perception of Systemic Impacts Over Attitude towards Blockchain as a system which forms a complex within a technology. The findings bolster the case made by Iansiti and Lakhani (2017) in which they argue blockchains capacity for disruption is not just technological but also institutional. The strong internal consistency across the two dimensions still adds to the scale's coherence and its usefulness as a reliable measure in future studies.

These findings propose that there is practically and methodologically reasoned need to approach perception of blockchain technology within an outlined logic of differentiates. The blurred line between Awareness-based Cognition (ABC) and Confidence in Financial Applicability (CFA) shifts the narrative towards understanding how decision makers perceive the importance of blockchain technology in their businesses. Hence, the provided framework in this research enables exploring the institutional hurdles related to changing behaviors aimed at overcoming these barriers.

CONCLUSION

In the past ten years, blockchain technology had transformed from a cryptography wonder to a core framework supporting the digital economy. It was the most valued in the financial sector that is driven by trust, innovation and efficiency because of it's potential for providing secure, decentralized, and transparent systems. Now that institutions are trying to explore the potential of utilizing blockchain technology, grasping how professionals think about this technology is important.

While blockchain is making it's way into the systems of finances, banks often have pre-fabricated hypotheses regarding the systems that lacks depth. Alongside these hypotheses, there is an absence of empirically based research which makes it challenging to analyze financial institutions professionally. Most existing attempts used either basic technology acceptance frameworks or integrated tools from unrelated contexts that were never meant for adjustment. Without this domain-specific inadequacy, informed choices regarding adopting, implementing, and becoming ready with blockchain cannot be made within financial institutions.

This study worked to fill this void by developing and validating a scale capturing perceptions as well as confidence regarding blockchain from finance experts in Turkey. Evaluation of the scale comprised 14 items across two dimensions measuring blockchain perception showed empirical accuracy in internal consistency and coherence but was abundant on construct overlap between trust and utility and financial awareness. Implementing factor analysis showed support for all twelve core hypotheses in terms of achieving the supposed structure by delivering clear factor loadings with minimal overlapping guarantees of theoretical separateness.

Also, the study showed that financial experts differentiate between being informed about blockchain and possessing faith in its actual use. That difference is important in the design of communication policies and adoption policies that practitioners really care about and their actual problems.

The labeling of the extracted factors was guided by both the empirical loading patterns and their conceptual coherence. The first factor was termed 'Blockchain Awareness and Informational Engagement' as it predominantly comprised items reflecting respondents' knowledge of blockchain technology, their familiarity with its fundamental mechanisms, and their active engagement with blockchain-related information (e.g., following news, understanding system functionality, and anticipating future applications). These items collectively capture a cognitive–informational dimension that reflects awareness-building and ongoing informational involvement with blockchain systems.

The second factor was labeled 'Financial Functionality and Trustworthiness' because it included items emphasizing the perceived operational usefulness of blockchain in financial contexts, such as transaction efficiency, data security, risk reduction, and trust in blockchain-based financial systems. Conceptually, these items converge on an evaluative dimension that links functional performance with institutional and technological trust, which is particularly salient in high-stakes financial decision-making environments.

Accordingly, the factor labels were not assigned arbitrarily but were grounded in the shared thematic content of the items and their alignment with established perspectives in scale development and financial technology research (DeVellis, 2017).

To sum up, the objective of this research was to propose a methodology with strong conceptual foundations for assessing perceptions of blockchain within the financial domain. Their interest in this instrument goes beyond academic endeavors as it enables fulfilling the prerequisites of engaged scholarship, fostering organizational assessment studies, as well as informing policy design on data integration decision-making frameworks.

IMPLICATIONS

The ready-to-use scale can also be utilized by organizations who wish to measure readiness for blockchain and detect some internal barriers for its adoption or design appropriate training programs. As capturing both dimensions of awareness and confidence, practitioners can appreciate these elements as perception and evaluation in the context of finance.

LIMITATIONS

The research was based on a single country and professional context which is only Turkish finance professionals in Istanbul. Despite the robust sample size, culturally and politically defined institutional elements may restrict the scope of results to be considered outside different countries or sectors.

FUTURE INNOVATIONS

Future investigations might attempt to evaluate the scale's use in additional contexts that are both geographically and sectorally distinct, and assess its predictive accuracy regarding real adoption actions. Other research could also look into longitudinal use of the scale to analyze the changes in perceptions of blockchain technology over time within changing financial systems.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Allen, F., Gu, X., & Jagtiani, J. A. (2021). A survey of fintech research and policy discussion. Review of Corporate Finance, 1, 259–339. https://doi.org/10.21799/frbp.wp.2020.21

Bartlett, M. S. (1954). A note on the multiplying factors for various χ^2 approximations. Journal of the Royal Statistical Society: Series B (Methodological), 16(2), 296–298.

Catalini, C., & Gans, J. S. (2016). Some simple economics of the blockchain. MIT Sloan Research Paper No. 5191-16. https://doi.org/10.2139/ssrn.2874598

Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. Psychological Assessment, 7(3), 309–319. https://doi.org/10.1037/1040-3590.7.3.309

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment, Research & Evaluation, 10(1), Article 7. https://doi.org/10.7275/jyj1-4868

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. Journal of Applied Psychology, 78(1), 98–104. https://doi.org/10.1037/0021-9010.78.1.98

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16(3), 297–334. https://doi.org/10.1007/BF02310555

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

DeVellis, R. F. (2017). Scale development: Theory and applications (4th ed.). Sage Publications.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. Psychological Methods, 4(3), 272–299. https://doi.org/10.1037/1082-989X.4.3.272

Field, A. (2018). Discovering statistics using IBM SPSS statistics (5th ed.). Sage Publications.

Gan, Q., & Lau, R. Y. K. (2024). Trust in a "trust-free" system: Blockchain acceptance in the banking and finance sector. Technological Forecasting and Social Change, 199, Article 123064. https://doi.org/10.1016/j.techfore.2023.123064

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. Educational and Psychological Measurement, 20(1), 141–151. https://doi.org/10.1177/001316446002000116

Kaiser, H. F. (1974). An index of factorial simplicity. Psychometrika, 39(1), 31–36. https://doi.org/10.1007/BF02291575

Kouhizadeh, M., Saberi, S., & Sarkis, J. (2021). Blockchain technology and the sustainable supply chain: Theoretically exploring adoption barriers. International Journal of Production Economics, 231, 107831. https://doi.org/10.1016/j.ijpe.2020.107831

Iansiti, M., & Lakhani, K. R. (2017). The truth about blockchain. Harvard Business Review, 95(1), 118–127.

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (2001). Sample size in factor analysis. Psychological Methods, 6(1), 84–99. https://doi.org/10.1037/1082-989X.6.1.84

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. Information Systems Research, 13(3), 334–359. https://doi.org/10.1287/isre.13.3.334.81

Mohammadi, H., Rezaei, M., & Mohammadi, A. (2021). An investigation of trust-based adoption model for blockchain in supply chain finance. Technological Forecasting and Social Change, 166, 120642. https://doi.org/10.1016/j.techfore.2021.120642

Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. https://bitcoin.org/bitcoin.pdf

Norbu, T., Park, J. Y., Wong, K. W., & Cui, H. (2024). Factors Affecting Trust and Acceptance for Blockchain Adoption in Digital Payment Systems: A Systematic Review. Future Internet, 16(3), 106. https://doi.org/10.3390/fi16030106

Nunnally, J. C., & Bernstein, I. H. (1994). Psychometric theory (3rd ed.). McGraw-Hill.

Parasuraman, A. (2000). Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies. Journal of Service Research, 2(4), 307–320. https://doi.org/10.1177/109467050024001

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). Free Press.

Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. Journal of Personality Assessment, 80(1), 99–103. https://doi.org/10.1207/S15327752JPA8001_18

Sun, Y., Zhang, Y., Wang, H., & Zeng, Q. (2020). Understanding the adoption of blockchain-based smart contracts in supply chain finance: Empirical evidence from China. International Journal of Information Management, 52, 101972. https://doi.org/10.1016/j.ijinfomgt.2019.05.003

Tabachnick, B. G., & Fidell, L. S. (2019). Using multivariate statistics (7th ed.). Pearson.

Tapscott, D., & Tapscott, A. (2016). Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world. Penguin.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. Decision Sciences, 39(2), 273–315. https://doi.org/10.1111/j.1540-5915.2008.00192.x

Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. The Counseling Psychologist, 34(6), 806–838. https://doi.org/10.1177/0011000006288127

Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2018). An overview of blockchain technology: Architecture, consensus, and future trends. IEEE International Congress on Big Data, 557–564. https://doi.org/10.1109/BigDataCongress.2017.85

Appendix A. Original Questionnaire Items Used in the Empirical Analysis

QUESTIONNAIRE	
You are kindly invited to take part in the study entitled "Perceptions, Trust, and Perceived Ease of Use of Blockchain Technology: A Study on the Turkish Financial Sector." Participation in this study is entirely voluntary. For the validity and reliability of the research, it is important that all questions are answered. Please indicate the option that best reflects your opinion for each statement by selecting one of the following response categories: (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree Thank you for your valuable contribution to this study.	
Do you agree to participate in this study?	
	Yes
	No
1.	Gender
	Female
	Male
2	Age
	20-29
	30-39
	40-49
	50-59
	60 and above
3	Marital Status
	Married
	Single
4	Educational Level
	Bachelor's Degree
	Master's Degree
	Doctoral Degree (PhD)
5	Occupation
	……….
6	Monthly Income Level
	25.000-30.000
	31.000-35.000
	36.000-45.000
	46.000-50.000
	51.000-60.000
	61.000 and above
7	Have you heard of blockchain technology before?
	Yes
	No
8	I know what a smart contract is.
	Yes
	No
9	Level of knowledge regarding blockchain technology
	Very Poor
	Poor
	Good
	Very Good
	Excellent
10	Have you or your organization ever explored or implemented blockchain-based solutions?
	Yes
	No
11	If you do not use blockchain-based solutions, what is the main reason for not using them?
	Lack of awareness
	Security concerns
	Lack of access to technology
	Other
12	Which measures could encourage greater adoption of this technology?
	Awareness
	Appropriate training
	User-friendly interfaces
	Regulatory frameworks
	Other

	Blockchain	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
m1	Blockchain technology reduces costs in financial transactions					
m2	Blockchain-based applications increase the speed of financial transactions.					
m3	Blockchain technology ensures transparency in financial transactions.					
m4	Blockchain-based financial applications are easily accessible to everyone.					
m5	Understanding the fundamental functioning of blockchain technology is straightforward.					
m6	I have a high level of trust in transactions based on blockchain technology.					
m7	Blockchain-based financial systems ensure data security.					
m8	Blockchain technology provides an effective alternative to traditional financial systems.					
m9	Blockchain applications reduce risks during financial transactions.					
m10	Blockchain technology is expected to play a significant role in the future of Turkey's financial system.					
m11	Blockchain is anticipated to support the development of innovative financial products in Turkey.					
	BLOCKCHAIN AWARENESS AND PERCEPTIONS	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
m12	I know what blockchain technology is.					
m13	I regularly follow news related to blockchain.					
m14	Blockchain is expected to have a prominent place in the future of the financial system.					
m15	Blockchain infrastructure is perceived as a reliable system.					
m16	The absence of oversight by a central authority in blockchain transactions is concerning.					
	BLOCKCHAIN USE AND INVESTMENT BEHAVIOR	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
m17	I use blockchain-based cryptocurrencies as an investment instrument.					
m18	I have used blockchain-based payment systems (e.g., Bitcoin, Ethereum).					
m19	Comments on social media influence my decisions when investing in blockchain.					
m20	I use technical or fundamental analysis methods when making blockchain-related investment decisions.					
m21	I believe blockchain technology will create a major transformation in the financial sector.					
	BLOCKCHAIN RISK PERCEPTIONS	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
m22	Blockchain investments involve a high level of risk.					
m23	The high volatility of blockchain-based assets is concerning.					
m24	Blockchain systems are not reliable because they are vulnerable to cyberattacks.					
m25	Blockchain technology is vulnerable to financial fraud.					
m26	I believe that blockchain should be more heavily regulated by governments in the coming years.					