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Adoption Intention of Financial Derivatives Using the Extended Valence Framework

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Abstract

This study examines institutional investors' intention to adopt financial derivatives by integrating valence-based factors, perceived benefit and perceived risk, while moderating the role of complexity. Data were collected from 142 directors across financial institutions in Tanzania and analysed using Partial Least Squares Structural Equation Modelling (PLS SEM) to assess direct and moderating effects. The results reveal that both perceived benefit and perceived risk significantly and positively influence the adoption of financial derivatives. Furthermore, complexity significantly moderates the relationships between perceived benefit, perceived risk, and adoption intention, weakening their positive effects under high complexity. This study enhances the financial innovation valence model by introducing complexity and empirically validating the extended framework for financial innovations. This study gives knowledge to regulators to recognise how financial institutions perceive the benefits of financial derivatives, so that the infrastructure necessary for their development can be built. Moreover, it fills the empirical gap in the literature on the adoption intention of financial derivatives. This study contributes by integrating valence theory with complexity theory, introducing complexity as a moderator. Applying valence to this unique type of innovation yielded an unexpected result that challenges traditional valence theory. Thus, this study provides a comprehensive understanding of financial derivative adoption intentions in Tanzania, a crucial context for an emerging market.

Keywords: Perceived Risks, Perceived Benefit, Valence, Complexity, Adoption Intention; Tanzania, Emerging Markets.

Introductions

Financial derivatives persistently spark discussions due to their importance and complicated attributes in the global financial markets. Their primary arguments in favour, centre on their roles in price discovery, speculation, and risk hedging. However, critiques primarily focus on their role in complexity, lack of transparency, and their connection to financial crises (Uluyol, 2024). These arguments highlight the necessity for continuous scholarly scrutiny of their benefits and possible risks. The impact of these debates led numerous non-adopters to instill fear and impose restrictions on their firms and institutions regarding the use of these instruments. Records from the Bank for International Settlement as advocated by (McGuire et al., 2024) indicate a global disparity in adoptions, with developed economies emerging as the primary adopters and

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exhibiting significant growth (Al Janabi, 2023). Most African derivative markets, including Tanzania, function solely on unregulated Over-the-Counter (OTC) platforms (Chidaushe, 2019). As the number and variety of financial derivatives grow, trading platforms are evolving from bilateral OTC to derivative exchanges (ODEs), which leads to expansions in financial markets. The adoption of financial derivatives is a complex phenomenon characterised by high knowledge and involves numerous choices and analyses (Vargo et al., 2020).

Prior research on the determinants of financial derivative adoption is varied, covering firm-specific, country-specific, and motivational factors, primarily focusing on benefits like risk hedging, portfolio diversification, and taxation. A significant gap remains in understanding the moderating influence of complexity on the valence relationship. Many used secondary data, hence missing subjective factors that offer more insights on assessing institutions' intentions in adoption (Gough, 2015). The gap arises due to context-specific factors that provide significant justifications (Sahu et al., 2020). Therefore, this study employs perceived benefit and perceived risk from the valence model, a model previously used for other innovations but not financial derivatives, and introduces complexity as a moderator from complexity theory. This study provides valuable practical contributions, as its findings hold significant relevance for innovators, users, and regulators within the financial derivatives market. These findings may enhance knowledge on financial derivative adoption models, refine product offerings, strengthen participant education, and inform the creation of strategies to enhance financial derivative adoption. The rest of the paper is structured as follows: It begins with literature review and hypotheses, followed by the research methodology, then presented the empirical findings, before discusses the key findings before concluding with practical recommendations.

Literature Reviews and Hypothesis Development

The theoretical framework of this study is built upon two key theories: Valence Theory (Peter & Tarpey, 1975) and Complexity Theory (Manson, 2001). Valence Theory posits that decision-making is influenced by two positive and negative valences. Valence has extensive literature on non-financial derivatives, which leverage the concept of positive and negative valence on adoption or adoption intention (Chin et al., 2022; Cui et al., 2019; Hajli, 2020; Mou et al., 2017; Ozturk et al., 2017). Later, trust was incorporated in valence as its antecedent (Chin et al., 2022; Harris et al., 2023; Kim et al., 2009). However, no existing studies have used the valence framework to examine the adoption of financial derivatives. Complexity Theory by Manson (2001) classifies complexity into algorithmic, deterministic, and aggregate complexity and financial markets have algorithmic complexity (Sportelli & Mastrorillo, 2014). This complexity refers to the cognitive difficulty in describing or understanding the system; Complexity Theory has been applied to financial derivatives (Dekker, 2016), and financial markets are adaptive systems. Influenced by internal and external factors, with outcomes arising from diverse agents and interactions (Capelli, 2018).

While other competing theories, such as Technological Organisational Environmental theory and Finance theory, offer valuable insights into adoption factors, they have limitations. While Finance theory focuses on objective and rational aspects, it often fails to incorporate subjective views of benefit and risk. Therefore, Valence and Complexity theory are better suited for this research, which aims to investigate how these dual appraisals independently and interactively affect the intention to adopt financial derivatives.

Perceived benefit and relationship with adoption intention

Drawing on the work of Peter and Tarpley (1975) and Davis (1989), perceived benefit encompasses the perceived likelihood and significance of enhanced outcomes resulting from adoption. In this study, perceived benefit refers to the belief about the extent to which a financial institution stands to gain, whether in risk mitigation, speculation, or profitability, by the adoption of financial derivative instruments. The work of Géczy et al. (1997) presents early empirical evidence regarding corporate hedging behaviour, and Bartram et al. (2009) provide an international perspective by derivative use among firms in various countries. Bartram (2019) shows that firms use derivatives to manage various risks. Other benefits include liquidity (Narasimhan & Kalra, 2015), tax planning and debt management (Gamba & Triantis, 2016), and (Blanco & Garcıa, 2017). According to extensive research, perceived benefit strongly influences user adoption behaviour in different contexts. (Al-Slehat et al., 2018; Bezzina & Grima, 2015; Vu et al., 2020). Studies on non-financial derivatives have also found a significant positive relationship between perceived benefit and adoption intention (Abramova & Böhme, 2016; Cheung et al., 2024; Chin et al., 2022; Chong, 2019; Jain & Raman, 2022; Kerviler et al., 2016; Mou et al., 2020; Ozturk et al., 2017). Furthermore, this positive relationship has been observed in various contexts, including mobile shopping (Kumar et al., 2022), repurchase intention (Hubert et al., 2019), self-disclosing information (Sullivan & Kim, 2018), and group-buying behaviour (Luo & Liu, 2024; Bangkit et al., 2022). However, an exception was noted by Annisa and Nurmala (2018), who found no significant relationship between perceived benefit and the intention to consume iron (Fe) tablets. Based on the theoretical relationship between perceived benefit and adoption in the valence model, it is hypothesized that:

H_1. Perceived benefits positively influence the intention to adopt financial derivatives.

Perceived Risk and Relationship with Adoption Intention

Perceived Risk (PR), as initially defined by Bauer (1967), refers to an investor's cognitive appraisal of the potential for uncertain outcomes linked to the adoption of financial derivatives. One significant risk associated with derivatives is misuse or mismanagement by firms (Grima et al., 2017). Similarly, studies in other countries have also found that the misuse or mismanagement of derivatives is a significant risk (Vu et al., 2020; Al-Slehat et al., 2018; Liu, 2023). Other significant risks include counterparty risk and liquidity risk, particularly in over-the-counter (OTC) derivative markets (Zhang & Ding, 2018). The issue of tax avoidance is another risk, as demonstrated by studies on ASEAN countries that employ these mechanisms to evade taxes (Narasimhan & Kalra, 2015; Oktavia et al., 2019) The influence of perceived risk on adoption and adoption intention has shown inconsistent results across various studies. Previous studies show perceived risk exerts a significant, non-significant, and positive influence on adoption. Financial derivatives have highlighted numerous risks that have led to several crises, yet their adoption is increasing, as evidenced by the Bank for International Settlements (BIS)report of , 2023. Jacob (2016) shows no significant influence on the adoption of financial derivatives in India. This can be explained by the prospects of rational investors, who adopt these innovations for their future benefits, as long as they outweigh the risks (Kiong Kok et al., 2014). Andersen (2023) argues that the relationship between risk and return is inconsistent in finance, while Fama (1971) shows positive risk-return different with behavioural finance.

The presence of different market players, hedgers, and speculators leads to varied views on risks (Derman, 2002). Speculators take calculated risks by investing in high-risk financial derivatives to profit from market volatility (Sanghvi et al., 2024) (CFA, 2009). The financial derivatives market's increased speculative activity reflects this risk-seeking behaviour. Financial theory states that investors tolerate increased risk for higher profits (Fama, 1971). According to Sridharan et al. (2023), risk tolerance and attitude vary across investor types, hence affecting adoption. Financial institutions work in risk-driven contexts, and they are more inclined to use risky financial derivatives when risk is handled (van Winsen et al., 2016). Counterparty risk, for instance, can be mitigated by using interest rates or demanding collateral (Scott et al., 2024). This inconsistency also extends to non-financial derivatives; for example, studies have found an insignificant relationship between perceived risk and adoption for fintech (Meyliana & Fernando, 2019), cryptocurrency (Sridharan et al., 2023), and mobile payments. Conversely, studies have shown a negative relationship with the adoption of m-payment (Park et al., 2019), internet banking (Meyliana & Fernando, 2019), fintech (Xie et al., 2021), mobile banking (Alalwan et al., 2016), online banking (Kaur & Arora, 2021), and online purchasing behaviour (Bhatti & Rehman, 2019). However, a positive relationship exists for cryptocurrency due to its high-risk-return nature (Dabbous et al., 2022; Dewi & Diwya, 2024; Dunbar & Owusu-Amoako, 2022; Field & Inci, 2023; Sridharan et al., 2023). Therefore, in line with the valence framework, this study postulates that:

H2: Perceived risk has a negative influence on the adoption intention of financial derivatives.

Complexity of Financial Derivatives as Moderators

Complexity is the difficulty of comprehending an innovation (Rogers, 2010), and for financial derivatives, it arises from their multifaceted nature, diverse applications, and intricate regulatory requirements (Banks, 2016). For example, Hairston and Brooks (2019) have proven this negative relation in the reporting of financial derivative transactions. They were supported by other literature (Gope, 2017; Gope & Mitra, 2018; Hairston et al., 2023; Malaquias & Zambra, 2020; Tunze, 2025). Moreover, this complexity in reporting leads to an increase in auditing fees (Hairston et al., 2023), influences financial accuracy (Chang et al., 2016), and increases perceptions of risk (Durney et al., 2023). In the context of non-financial innovations, the influence of complexity has also shown inconsistent results. Al-Okaily et al. (2024) demonstrated that task complexity does not influence adoption. However, complexity hinders adoption by heightening uncertainty in cloud computing (Gutierrez et al., 2015), smart contracts (Badi et al., 2021), and SMEs' blockchain systems (Sun et al., 2021). Other studies have shown complexity acting as a moderator in contexts such as fairness (Sun et al., 2021) and a firm's stakeholder integration (Rueda-Manzanares et al., 2008). These studies collectively reinforce the argument that derivative complexity often has a significant negative influence as an independent or moderator. Therefore, Consistent with complexity theory, this study hypothesizes that:

H3: Complexity has a negative influence on the intention to adopt financial derivatives.
H4 Complexity moderates the relationship between perceived benefit and adoption intention.
H5: Complexity moderates the relationship between perceived risk and adoption intention

Conceptual Framework

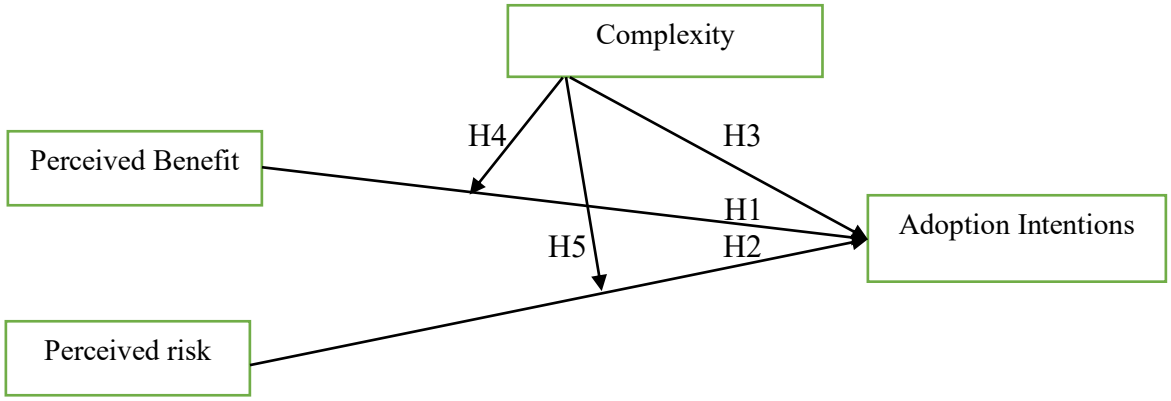


Figure 1: Conceptual Framework

Research Methodology

Population, Sample, and Data Collection Strategy

This study analysed financial institutions in Tanzania, focusing on those headquartered in Dar es Salaam and Dodoma. The regions were selected because it is where the headquarters are located where the directors who are respondents were found. The research sample included both banking and non-banking institutions, including insurance companies, mutual funds, and pension funds headquartered in Dar es Salaam and Dodoma, that is, 79 out of 90 of them. From these institutions, two directors, the heads of risk and heads of finance or Treasury, were targeted as respondents, yielding a total sample of 158 individuals. The responses returned were 142, which were completed and deemed suitable for analysis, resulting in a high response rate of 89%. The study used a dual-respondent strategy to reflect the strategic nature of financial derivative adoption, which typically falls under the authority of the Management, often including the heads of risk and finance. A Power analysis using G-power software determined a minimum required sample size of 77; this study, however, used 142 respondents, which exceeded the minimum requirement.

Measurement of variables

The primary constructs in this study are perceived risk and perceived benefit, which influence adoption intention, with complexity acting as a moderator. These variables are measured using established scales from the literature. Perceived benefit is measured by the likelihood and importance of specific benefits, including: hedging risk, portfolio management, liquidity benefit, debt management benefit, and tax planning benefit. This measurement approach is adopted from the work of Peter and Tarpey (1975), Bodnar et al. (2008), and Jacoby and Kaplan (1972). Perceived risk is measured by likelihood and concern over market risk, counterparty risk, liquidity risk, tax avoidance risk, and financial loss. This is adopted from Featherman and Pavlou (2003), Peter and Tarpey (1975), and Bodnar et al. (2013). Complexity is measured by the perceived difficulty in reporting, adopting, and operating financial derivatives. It also assessed the flexibility of interactions and the significant effort required to use them. These measures were adopted from Davis (1989) and Rogers (2010). Adoption intention is measured by an institution's plan to use and recommend financial derivatives, as well as whether the benefits outweigh the risks. This is based on the work of (Ryu, 2018) and (Lee, 2018)

Pre-testing and Data Analysis Method

A pilot study was conducted prior to the main data collection to evaluate the clarity, relevance, and reliability of the questionnaire items. The pre-test included 15 senior financial professionals and three academic experts in financial innovation and risk management. Participants provided feedback on the clarity of the language, ambiguity of items, the suitability of the response scale, and overall comprehensiveness of the constructs. Minor modifications were implemented to improve wording and eliminate redundancy based on their feedback. The analysis was conducted using variance-based Structural Equation Modelling (SEM) and SmartPLS 4 software. This software helps in model estimation by providing graphical representations of theoretical constructs and their interrelations (Hair et al., 2021)

Research Findings

Analysis of Respondents

The analysis of respondents by institution categories involved examining the roles and characteristics of four types of financial institutions: banks, mutual funds, insurance companies, and pension funds, to determine market and ownership representation. The sample was representative of the target population, covering 87.7% of its composition.

Table 1: Response based on the type of institutions

Respondents Institutions	Frequency	Percent
Banks	88	62
Insurance	48	34
Pension funds	4	3
Mutual fund	2	1
Total	**142**	**100**

Source: Field Data (2024)

In this study, data were collected from 142 respondents, categorised by the type of financial institution to uncover each player's role, as shown in Table 2. Banks comprised 62%, representing over half of the respondents. Given their central role, banks likely have a more decisive influence on market developments related to financial derivatives, as outlined by Kidwell et al. (2016). A second category is Insurance Companies, which comprise 34% of the sample, indicating that they are also significant players in the financial sector. The considerable presence of insurance companies highlights their role as key stakeholders in adopting financial derivatives for their risk management strategies. Others are Pension funds and mutual funds.

Non-response Bias and Common Method Bias

To mitigate non-response bias and standard method bias, anonymity was assured, ensuring that participants' identities and answers remained confidential. On questionnaires, no leading questions and a 5-point Likert scale were used to reduce respondent fatigue. Clear and simple phrasing reduced ambiguity and misinterpretation-related measurement error in the study. Statistically, Harman's single-factor test was conducted, and the results showed that less than 50% of the overall variation could be attributed to a single factor, indicating that common method bias was not a problem. Additionally, Variance Inflation Factors (VIFs) were examined as per Kock et al. (2021), and all values were below the conservative criterion of 3.3. Cross-sectional

endogeneity is a concern when theoretical constructs are mutually reinforcing or reciprocally causative. This study examined reverse causation, where adoption intention affects perceived benefit/ risk/complexity. Financial derivative users may rationalise their actions by seeing benefits. Supported by other theories on adoption, such as innovation attribute (Rogers, 2010) and behaviour reasoning theories (Ajzen et al., 2018). Additionally, a prediction-oriented and endogeneity-resistant PLS-SEM technique estimated the model.

Descriptive analysis of constructs using SPSS

The study performed descriptive statistical analysis of the study constructs, examining their means, standard deviations, skewness, and kurtosis. The results for all constructs are presented in Table 2, and the mean of each construct reflects the level of respondents' perceptions. The findings of the study suggest that both perceived risk and perceived benefit had higher mean scores than other constructs. This implies that while respondents are aware of the risk involved, they are also willing to adopt these instruments due to the potential benefits. The overall sentiment toward financial derivatives was positive, with an average score of 3.82. However, complexity was identified as a significant barrier.

Table 2: Descriptive analysis of constructs using SPSS

Constructs	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Perceived benefit	1.57	4.86	3.91	0.54	-0.524	1.047
Perceived risk	2.29	4.86	4.13	0.46	-0.521	0.546
Complexity	2.00	5.00	3.23	0.74	0.185	-0.982
Adoption Intention	2.80	5.00	3.99	0.59	0.159	-1.315

Source: Extracted from SPSS

Measurement model using Smart PLS 4

Data analysis with Smart PLS was guided by the work of Hair et al. (2021b), and the indicators were reflective. In the measurement model, Hair et al., (2021) indicated the measure of reliability, indicator loading, Cronbach's Alpha(CR α), intermittent reliability (Rho_a), and Composite Reliability (CR) Rho_c. All of which demonstrated high internal consistency across constructs, above the recommended threshold of 0.70 (Hair et al., 2021b). All constructs meet criteria as per Table 3. Validity assessment of the constructs was done through convergent and discriminant validity tests(Hair et al., 2019). Convergent validity was determined using Average variance Extracted (AVE); the criterion is AVE > 0.5 (Hair et al., 2021).. Table 4. Discriminant validity was evaluated using Heterotrait-Monotrait Raitio (HTMT). The HTMT < 0.85 (Hair et al., 2021a). The summary is shown in the table 3.

Table 3: **Validity and Reliability Testing**

Constructs	Indicators	Reliability				Validity		
		IR	ICR			CV	DV	
		Indicators Loadings	CR α	Rho_a	Rho_c	AVE	HTMT	Fornell - Larcker
		Criteria						
		> 0.5	> 0.7	> 0.7	<CR but >α	> 0.5	< 0.85	row/column
	PR1	0.73	0.779					

Perceived risk	PR2	0.73		0.789	0.848	0.527	0.701	0.726
	PR3	0.73						
	PR4	0.68						
	PR5	0.76						
Perceived benefit	PB1	0.86	0.858	0.868	0.893	0.584	0.435	0.764
	PB2	0.73						
	PB3	0.79						
	PB4	0.78						
	PB5	0.69						
	PB6	0.74						
Complexity	CO1	0.84	0.918	0.920	0.939	0.754	0.658	0.868
	CO3	0.86						
	CO4	0.91						
	CO5	0.88						
	CO6	0.85						
Adoption Intention	AI1	0.84	0.857	0.870	0.897	0.638		0.728
	AI2	0.72						
	AI3	0.71						
	AI4	0.87						
	AI5	0.83						

Source: Extracted from smart PLS4 **Note**: IR=Internal Reliability; ICR= Internal Consistent Reliability; VR=Convergent Validity; DV=Divergent Validity

Structural model:

To test the study's hypotheses and related structural tests, the bootstrapping method was used with SMART PLS 4. Hair et al., (2021) recommend bootstrapping with 5,000 subsamples for robust PLS-SEM inference, and a one-tailed test at a significance level of 0.05 was used to support the study's directional hypotheses.

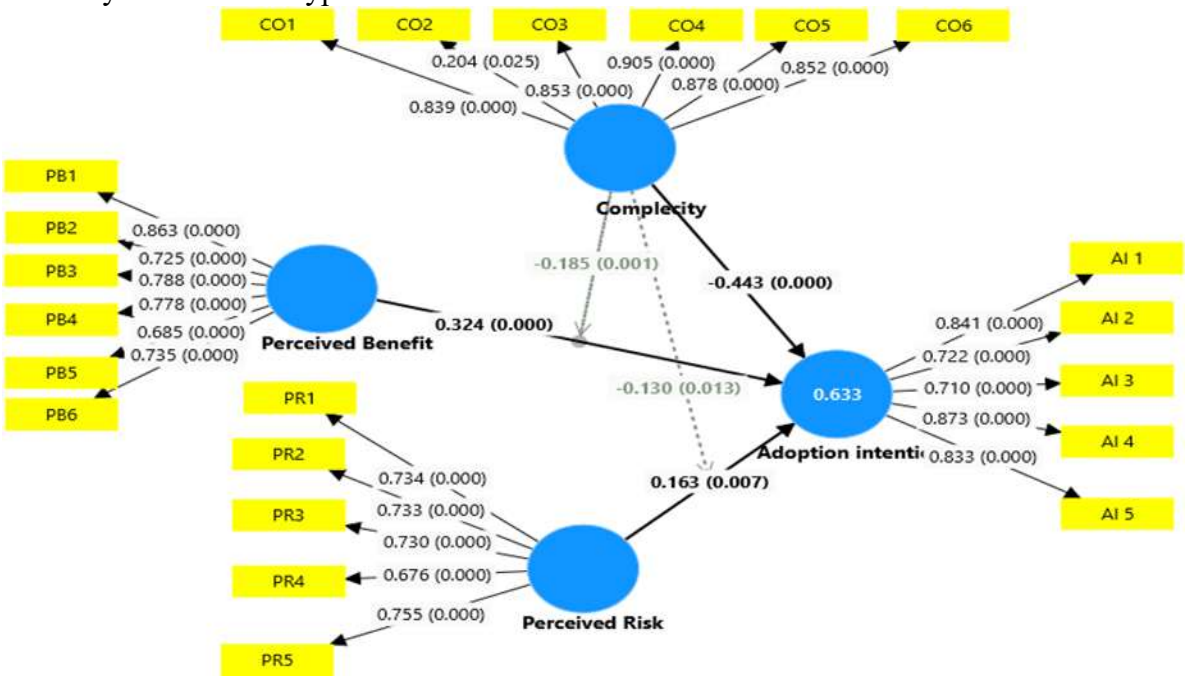


Figure 2 Bootstrapping results

The first step in the analysis, the Variance Inflation Factor (VIF), assesses the level of multicollinearity within a regression model (Hair et al., 2021). Multicollinearity arises when independent variables are highly correlated, which can distort coefficient estimates and reduce the model's interpretability. The VIF values for the predictors of adoption intention are presented in Table 4. All VIF values are less than 3.3, indicating no substantial multicollinearity among the independent variables ((Hair et al., 2021). This suggests that complexity, perceived benefit, and perceived risk are not too strongly associated, making the model suitable for further regression analysis.

Table 4: Collinearity test with VIF

VIF	Adoption intention
Adoption Intention	
Complexity	1.660
Perceived benefit	1.560
Perceived risk	2.079

Source: Extracted from Smart PLS 4

Coefficient of determination (r^2)

The coefficient of determination (r^2) statistic explains the variance in the endogenous variable that is explained by the exogenous variables ((Hair et al., 2021). The dependent variable, adoption intention, is influenced by perceived risk, perceived benefit, and complexity, with an r^2 value of 0.587 (as shown in Table 5). This means that 58.7% of the change in adoption intention can be explained by these three variables, a result that is considered moderate (Cohen, 2016). By adding complexity as a moderator, the model's explanatory capacity is enhanced. The r^2 value for adoption intention increases from 0.587 to 0.628, which means the model explains an additional 4.1% of the variance. This increase confirms the relevance of complexity, influences how perceived benefits and risk influence adoption intention, and ultimately improves the model's predictive accuracy.

Table 5; Coefficient for determination r^2

	r^2
Before moderation	0.587
After moderation	0.628

Source Smart PLS 4

Hypothesis Testing:

Before introducing the moderating variable, all three hypothesised relationships were found to be statistically significant, as shown in Table 6.

Table 6: Hypothesis testing of the relationships Before Moderation

Relationships	Path coef (β)	F square	T statistic	P values	5%	95%	Significant?
H1: Perceived Benefit -> Adoption intention	0.346	0.19	4.923	0.001	-0.532	-0.32	Yes; Positive
H2: Perceived Risk -> Adoption intention	0.153	0.028	2.13	0.017	0.226	0.451	Yes; Positive
H3; Complexity -> Adoption intention	-0.428	0.277	6.668	0.001	0.047	0.282	Yes; Negative

Source: Extracted from Smart PLS4

The p-values for both constructs were below the 0.05 threshold (Hair et al., 2019). Perceived benefit significantly influenced adoption intention ($\beta = 0.346$, $p < 0.001$), with a medium effect size ($f^2 = 0.190$) as per Cohen's (1988). This suggests that users are more inclined to adopt financial derivatives when they recognise distinct advantages. Perceived risk had a positive, but weaker, impact on adoption intention ($\beta = 0.153$, $p = 0.017$), with a small effect size ($f^2 = 0.028$). This indicates that, in this context, risk may not act as a deterrent, possibly due to users' familiarity with or risk tolerance. The analysis indicates that complexity exerted a significant negative influence on adoption intention ($\beta = -0.428$, $p < 0.001$), with a substantial effect size ($f^2 = 0.277$), confirming that increased perceived complexity serves as a notable barrier to adoption. These findings underscore the significance of perceived value and usability in shaping adoption behaviour, even before considering moderating effects.

Moderation Effects of Complexity

Introducing complexity as a moderator reveals significant adverse effects for both interaction terms, as shown in Table 7. Complexity negatively moderates the relationship between perceived benefit and adoption intention ($\beta = -0.185$, $p = 0.001$), as well as the relationship between perceived risk and adoption intention ($\beta = -0.130$, $p = 0.013$).

Table 7: Hypothesis testing of the relationships after the Moderations

Relationships	Path coef (β).	F square	T statistic	P value	5%	95%	Significant?
H4; Complexity x Perceived benefit -> Adoption Intention	-0.185	0.053	3.058	0.001	-0.279	-0.081	Yes Negative
H5: Complexity x Perceived risk -> Adoption Intention	-0.13	0.021	2.225	0.013	-0.226	-0.036	Yes Negative

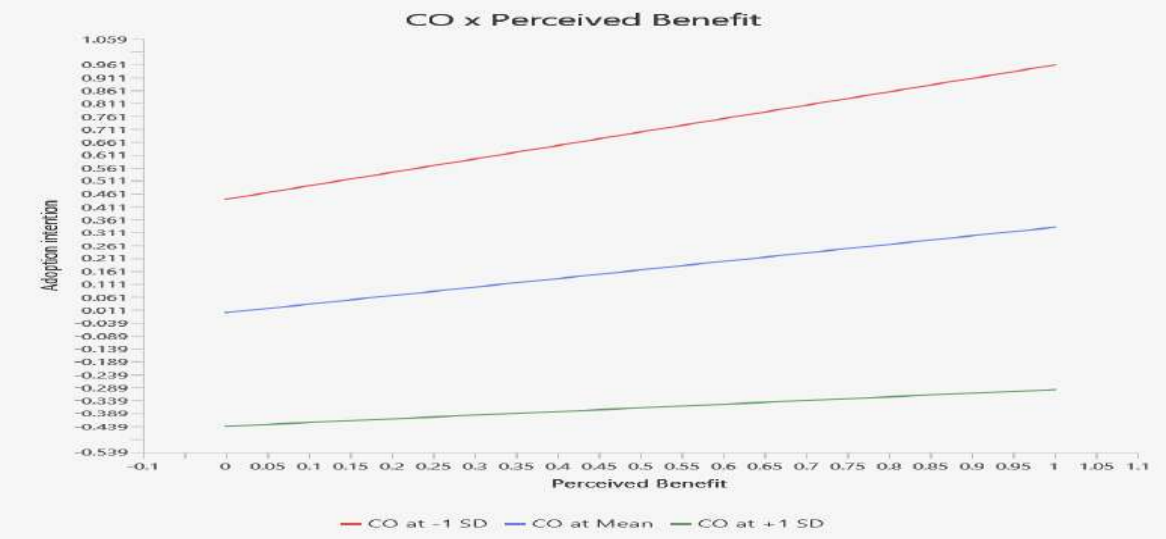
Source: Extracted from SmartPLS4

The findings indicate that an increase in perceived complexity diminishes the positive effects of both perceived benefit and perceived risk on adoption intention. Complexity reduces the perceived value and opportunity linked to financial derivatives, underscoring its significant function as a cognitive barrier in high-stakes financial decision-making. The moderate effect sizes

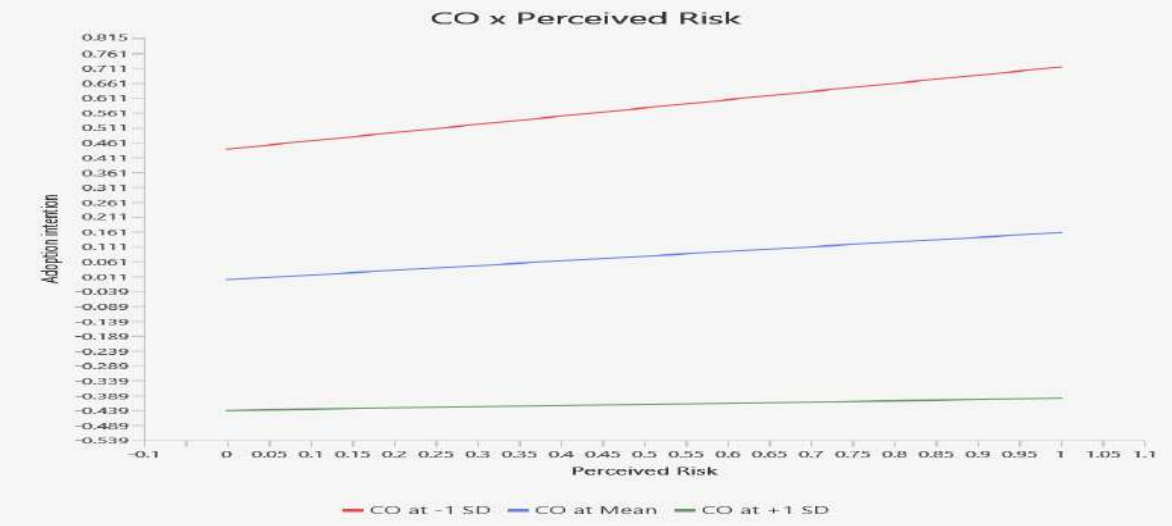
(F^2 = 0.053 and F^2 = 0.021, respectively) underscore the importance of effectively managing complexity in derivative adoption strategies.

Simple slope analysis

This study employed simple slope analysis to evaluate the moderating role of complexity on the relationship between perceived benefit, perceived risk and adoption intention, specifically examining variations at low, average, and high levels of complexity. Graph 1 shows that perceived complexity moderates the relationship between perceived benefits and adoption intention. Under low complexity, perceived benefits have the most substantial positive influence on adoption intention, while increasing complexity reduces this motivating power, potentially discouraging adoption even when benefits are recognised.



Graph 1 The interaction of Complexity with Perceived **Source**: Smart PLS4



Graph 2: The Interaction of Complexity with Perceived Risk Source: Smart PLS4

Complexity significantly moderates the relationship between perceived risk and adoption intention. Low complexity increases risk perception, while moderate complexity weakens it, and

high complexity reduces its influence. This indicates that high complexity impairs the risk-reward trade-off, making it difficult for users to weigh potential gains against potential losses accurately**.**

Bootstrap-Based Sensitivity Tests

Additionally, the analyses were performed to verify the complexity's moderating influence. A mean-split technique was used to re-operationalise complexity, categorising respondents into high and low complexity groups by mean score. Higher perceived complexity diminishes the favourable impact of benefit on adoption intention (β = -0.174, t = 2.865, p = 0.004). Second, outer loading analysis was used to re-estimate the moderation model after deleting the weakest-loading indicator from the complexity construct. The interaction term remained significant and negative (β = -0.181, t = 2.996, p = 0.003), showing a durable and resilient impact of slight changes in construct definition.

Table 8: Bootstrap-Based Sensitivity Checks

Method	Path Coefficient	T-Statistic	P-Value	Significance	Interpretation
Mean-Split (High vs Low)	-0.174	2.865	0.004	Yes (p < 0.01)	The effect remains negative and significant
Removed weakest complexity item	-0.181	2.996	0.003	Yes (p < 0.01)	The effect remains negative and significant

Source: Smart PLS 4

Model Fit Assessment

Model fit is essential for assessing how well the theoretical model reflects the observed data. Table 8 shows that Standardised Root Mean Square Residual (SRMR) values are 0.077 for the saturated model and 0.078 for the estimated model. Both values are below the acceptable threshold of 0.08, which indicates a good model fit (Henseler et al., 2014).

Table 9: Model Fit Assessment

Assessment	Saturated model	Estimated model
SRMR	0.077	0.078
d_ULS	1.511	1.537
d_G	0.569	0.575
Chi-square	440.839	448.108
NFI	0.769	0.765

Source: Smart PLS4

The d_ULS and d_G values further confirm this, indicating a low discrepancy between the empirical and model-implied correlations. The Normed Fit Index (NFI) values range from 0.765 to 0.769. While this falls below the conventional threshold of 0.90, it is considered a moderate fit. The results suggest the potential for further model refinement; however, PLS-SEM does not require strict adherence to NFI criteria (Hair et al., 2021) ().

Robustness Check

To test the robustness of the structural relationships, a quadratic effects test was conducted to evaluate linearity (Sarstedt et al., 2020). This test determines whether the relationships between predictors and the dependent variable (adoption intention) exhibit a non-linear curvilinear pattern.

Table 10: Robustness Check using the Quadratic effect (QE) on relationships

Relationships	Path coefficient	T statistic	P values	Significant
QE (Complexity -> Adoption Intention)	-0.017	1.006	0.151	Insignificant
QE (Perceived Benefit -> Adoption Intention)	0.017	0.390	0.348	Insignificant
QE (Perceived Risk -> Adoption Intention)	0.053	1.003	0.142	Insignificant

Source: Smart PLS4

The findings from Table 9 indicate that all direct linear relationships, perceived benefit, perceived risk, and complexity are statistically insignificant on the quadratic effect. The relevance of linearity in this study is its capacity to guarantee that the relationships are theoretically robust and interpretable, as linear relationships enhance the understanding of how changes in each factor influence adoption. The non-significant quadratic effects, therefore, suggest adherence to the principles of model robustness.

The PLS-SEM analysis addressed endogeneity issues, including reverse causality between dimensions like adoption intention and its predictors, utilising theory-based causal ordering and bootstrapping with 5,000 subsamples. Valence and complexity theories supported the model specification's directed flow from perceived benefit, risk, and complexity to adoption intention. Despite not using PLS-based endogeneity correction methods, robust bootstrapping improved estimate reliability and reduced bias.

Implications of Findings

This study provides empirically grounded evidence that the intention to adopt financial derivatives within Tanzanian financial institutions is primarily shaped by valence factors: perceived benefit, perceived risk, and the complexity of financial derivatives, which acts as a moderator. The first research objective, as per Hypothesis 1 (H1), investigated the influence of Perceived Benefit (PB) on adoption intention. This result corroborates earlier research on both financial derivatives (Al-Slehat et al., 2018; Bezzina & Grima, 2015; Vu et al., 2020), and non-financial innovations (Abramova & Böhme, 2016; Bangkit et al., 2022; Cheung et al., 2024; Chong, 2019; Hubert et al., 2019; Jain & Raman, 2022; Kerviler et al., 2016; Kumar et al., 2022; Luo & Liu, 2024; Mou et al., 2020; Ozturk et al., 2017; Sullivan & Kim, 2018).However, an exception was noted by Annisa and Nurmala (2018), who found no significant relationship with intention. It can be concluded that the perceived benefit derived from six key aspects, risk hedging, portfolio management, and debt management, significantly elevates financial institutions' intention to adopt financial derivatives.

The second objective, outlined in Hypothesis two (H2), examined the impact of perceived risk on adoption intention. The result, a significant but positive relationship, differs from typical valence frameworks. Perceived risk is typically regarded as a barrier to the adoption of many innovations. However, this relationship may not be consistent across all contexts; the literature has shown three positions: negative, positive and no significant influence. The results are in line cryptocurrency studies (Dabbous et al., 2022; Dewi & Diwya, 2024; Dunbar & Owusu-Amoako, 2022; Field & Inci, 2023; Sridharan et al., 2023) However, the results differ with Meyliana and Fernando (2019), Sridharan et al. (2023), Tingchi Liu et al. (2013), Gong et al. (2019), Bangkit et al. (2022), Park et al. (2019), Meyliana and Fernando (2019). Xie et al. (2021), Alalwan et al. (2016), Kaur and Arora (2021).and Bhatti and Rehman (2019). This unexpected result needs further investigation, considering the unique structure of players in financial derivative markets: hedgers and speculators. Each possesses distinct risk perceptions. While hedgers mitigate risk exposure, speculators take risks to capitalise on market movements (Júnior, 2013). Speculators facilitate price discovery and contribute to volatility through their risk-taking behaviours (Brunetti et al., 2016)). Financial institutions, with their advanced risk mitigation mechanisms such as collateral requirements and margin calls, often use derivatives for calculated speculation for high returns (Alnassar & Chin, 2015). This suggests that for some institutions, perceived risk is not a deterrent but an opportunity for profit, which explains the positive relationship with adoption intention found in this study.

Financial institutions price, manage, and transfer risk through derivatives, insurance, and structured financial instruments, making risk a strategic asset and profit generator. In the derivatives market, institutions trade interest rate, credit, and currency risk for premiums. Derivatives pricing relies on risk-neutral valuation models, which presume financial players actively seek and absorb risk based on probabilistic assumptions. This is supported by empirical research, such as that by Bartram et al. (2009) and Bartram (2019), who discovered that firms, especially financial institutions, employ derivatives not only for hedging but also for speculating and enhancing performance(Bate, 2022). The study further explores perceived complexity as a moderating variable in the relationship between perceived benefits, perceived risk, and adoption intention. The findings indicate that complexity negatively moderates these relationships. That is, while perceived benefits and risks may positively influence adoption, the effect is weakened in the presence of high complexity. Therefore, complexity not only has a direct adverse effect on adoption intention but also indirectly diminishes the motivational power of perceived benefits and risks.

Conclusion and Recommendations

The study concludes with a recommendation that the Tanzanian government invest in the necessary infrastructure to support derivative markets and the development of underlying financial markets. Although financial derivatives involve inherent risks, institutional investors in Tanzania have shown a willingness to adopt them. To foster confidence and promote adoption, policymakers and regulators should implement clear guidelines, improve transparency, and expand financial literacy initiatives tailored to derivative use and risk management. Clearing mechanism and changing the close out netting is important to mitigation of risks related with counterparty. To address the complexity challenges, the study highlights the importance of simplifying derivative instruments, mainly through the development of structured products that are easier to understand and apply. Planned implementation helps adoption therefore, a

derivatives market roadmap committee is suggested. The role of government is enabling infrastructure such as clearing houses and regulations. Financial institution needs to assess internal readiness, connect derivative plans with institutional goals during preparation. Monitoring and evaluation plan metrics should be established. Financial assessments should compare implementation costs to benefit. Stakeholder engagement is important as task Workshops, feedback loops, and phased adoption can help to build trust reduce risk and adoption resistance.

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