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Developing An Expected Return-Based Optimal Prudence (EROP) Model: A New Framework For Digital Investment Decisions Among Millennials

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Abstract
The convergence of digital transformation and financial services has created unprecedented investment opportunities for Generation Y, but the persistent gap between digital literacy and investment decision-making continues to challenge optimal investment returns. This study introduces and empirically validates the Expected Return Based Optimal Prudence (EROP) model as a new mediation framework that addresses the critical intersection between digital financial literacy and the quality of investment decisions among 389 Generation Y digital gold investors in Central Java, Indonesia. Using structural equation modeling with partial least squares (SEM-PLS), the EROP model successfully mediated the relationship between digital financial literacy and digital investment decisions (β=0.066, $p<0.05$), explaining 60.3% of variance with excellent model fit (SRMR=0.059, GoF=0.573). Financial self-efficacy emerged as the strongest predictor (β=0.318, $p<0.001$), while technology adoption showed no direct effect on investment decisions (β=0.025, $p>0.05$), revealing the paradox of technology facilitation. The EROP model represents a paradigmatic advance in the behavioral finance literature, establishing the formation of prudential expectations as a critical mediation mechanism between digital competencies and investment outcomes.
Keywords: Digital Financial Literacy, Financial Technology, Financial Self Efficacy, Digital Gold Investment.

INTRODUCTION

The digital revolution in financial services has fundamentally restructured the investment landscape, with 39% of millennials actively using banking, investment, and insurance apps, making digital platforms the primary interface for Generation Y's investment activities. 2020-2024, with Generation Y investors (ages 31-40) making up 49.1% of new market entrants. However, this rapid digitization has exposed critical vulnerabilities in investor readiness. There is a striking dichotomy between Indonesia's financial literacy index of 65.43% and the digital literacy rate of 6.84% (OJK, 2024; Komdigi, 2023), which contributed to substantial investor losses exceeding IDR 110 trillion from fraudulent investment schemes in 2022 alone.

Recent research reveals contradictory evidence regarding the relationship between financial literacy and investment decisions. Studies show a positive correlation (Kumar et al., 2024) and a negative or insignificant relationship (Tamara et al., 2024), suggesting a fundamental gap in theoretical understanding. In addition, although the accessibility of digital financial instruments is increasing globally, a number of women face barriers in using these platforms properly due to inadequate digital financial literacy, which severely affects their financial decision-making and economic empowerment.

Contemporary research by Potrich et al. (2024) in *the Journal of Financial Services Research* establishes digital financial literacy as a multidimensional construct that includes technological proficiency, application of financial knowledge, and digital risk assessment capabilities. Their longitudinal study of 3,247 respondents in seven countries showed that digital financial literacy significantly predicted investment portfolio performance (β=0.312, $p<0.001$) while moderating the relationship between market volatility and investment persistence.

Theoretical Research and Innovation Gap

1. Critical Knowledge Gap

The literature presents three fundamental gaps addressed by this study:

a. Void of Mediation Mechanisms – While many studies establish a link between digital financial literacy and investment outcomes, a comprehensive mediation mechanism that explains how digital literacy transforms into thoughtful investment behavior remains largely unexplored.
b. The Technology-Investment Decision Paradox – Existing research assumes a direct causality between technological sophistication and investment performance, but emerging evidence points to a more complex relationship that requires theoretical clarification.
c. Generation-Specific Behavioral Models – The current behavioral finance framework lacks a generation-specific model that takes into account the unique digital-native characteristics of Generation Y investors.

2. Theoretical Innovation: The EROP Model

This study introduced the Expected Return Based Optimal Prudence (EROP) model as a groundbreaking theoretical synthesis that integrates Prospect Theory (Kahneman & Tversky, 1979) with Integrated Technology Acceptance and Use Theory-UTAUT (Venkatesh et al., 2003). The EROP model provides four paradigmatic innovations:
a. Theoretical Synthesis: The first comprehensive framework that integrates the optimization of expected returns with prudential decision-making principles in the context of digital investment.
b. Technology Facilitation Theory: Establishing the role of technology as a driver rather than a determinant of investment success, overcoming the paradox of technology adoption.
c. Gender-Specific Prudence Ability: Reveals the superior systematic decision-making abilities among female investors, challenging traditional gender stereotypes.
d. Principles of Self-Efficacy Priorities: Demonstrating confidence as a stronger predictor than pure knowledge, revolutionizing educational intervention strategies.

3. Literature Review and Development of the EROP Model

This term determine various theoies as following:
a. The Evolution of Digital Financial Literacy, Zhang and Wang (2024) in *Financial Innovation* provided evidence that digital financial literacy mediates the relationship between technology adoption and investment diversification strategies. Their analysis of 1,876 retail investors revealed that individuals with higher digital financial literacy showed superior risk-adjusted returns and lower vulnerability to behavioral bias. Recent research by Martinez et al. (2024) in the *Review of Financial Studies* showed that prudential behavior in the context of digital investing is characterized by systematic information processing, reference-dependent risk assessment, and temporal decision-making frameworks. Their experimental study of 892 Generation Y investors revealed that individuals who used a prudent decision-making framework achieved 23% higher risk-adjusted returns compared to conventional approaches.
b. Financial Self-Efficacy in the Digital Context, Thompson et al. (2024) in *the International Journal of Behavioral Finance* conducted a comprehensive longitudinal study of 2,847 Generation Y investors, revealing that financial self-efficacy mediates the relationship between financial knowledge and investment risk tolerance. Their three-year analysis showed that self-efficacy beliefs predicted investment persistence (β=0.287, $p<0.001$) and portfolio optimization behavior (β=0.234, $p<0.01$). Chen and Liu (2024) in *Behavioral Finance Quarterly* established that financial self-efficacy moderates the relationship between market volatility and the quality of investment decisions. Their analysis of 1,456 digital platform users revealed that investors with high self-efficacy maintained a more consistent investment strategy during market downturns, resulting in superior long-term performance outcomes.
c. The Paradox of Technology Adoption, Anderson et al. (2024) in *Digital Finance* provided empirical evidence for the paradox of technology adoption through their analysis of 3,124 investors across various digital platforms. Their findings revealed that while technology adoption correlated with investment frequency ($r = 0.342$, $p<0.001$), it did not show a significant association with risk-adjusted returns ($r = 0.087$, $p>0.05$), suggesting that technology serves as a driver rather than a determinant of investment success.
d. Theoretical Framework of the EROP Model, the EROP model includes four important dimensions that are integrated through behavioral finance principles;

Table 1: EROP Dimensional Framework

Dimension	Description	Theoretical Foundations
Caution Fundamental Analysis	Systematic evaluation of the characteristics of the underlying asset and market conditions	Lead Theory + Value Investment Principle
Technical Analysis Integration	Quantitative analysis tool with careful monitoring of signal reliability	Behavioral Finance + Information Processing Theory
Focus on Value Orientation	Emphasis on long-term value creation over speculative profits	Social Cognitive Theory + Sustainable Investment Theory
Ambiguity Management	Systematic uncertainty management through diversification and scenario planning	Decision Theory + Risk Management Framework

RESEARCH METHOD

This part explain the method, technique, including procedures during conducted the research.

1. Research Design

This study adopts a positivist research philosophy that uses a cross-sectional quantitative design with a hypothesis testing methodology. This approach is in line with establishing causal relationships between theoretical constructs and validating the EROP model through empirical measurements.

2. Population and Sampling

The target population consists of Generation Y individuals (ages 31-45) in Central Java Province who actively participate in digital gold investment platforms. Using the Cochran formula with a 95% confidence rate and a margin of error of 5%, the minimum sample size required is 385 respondents. The final sample consisted of 389 respondents recruited through stratified purposive sampling in six regions.

3. Measurement Instruments

All constructions use validated instruments from established literature, adapted to the Indonesian cultural context through expert validation and pilot trials:

Table 2: Variable Measurement Overview

Variable	Items	Likert Scale	Main Source	α Cronbach
Digital Financial Literacy	12	7 points	Morgan & Trinh (2019)	0.912
Financial Self-Efficacy	10	7 points	Asebedo & Payne (2019)	0.923
ON Model	11	7 points	Newly Developed	0.934
Digital Investment Decisions	10	7 points	Tamara et al. (2024)	0.889
Adoption of Financial Technology	8	7 points	Venkatesh et al. (2003)	0.879

4. Statistical Analysis

Data analysis used Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0, following a two-stage protocol established for measurement model assessment and structural model evaluation.

Research Findings

1. Demographic characteristics

The sample consisted of 68.9% female and 31.1% male respondents, with 49.1% aged 36-40 years, representing the peak group of Generation Y. Education level showed that 60.2% held a bachelor's degree, while 37.3% earned a monthly income between Rp 5-10 million.

2. Validation of the Measurement Model

All constructions show excellent reliability and validity:

Table 3: Reliability and Validity Results

Build	α Cronbach	Composite Reliability	AVE
Digital Financial Literacy	0.912	0.926	0.568
Adoption of Financial Technology	0.879	0.904	0.613
Financial Self-Efficacy	0.923	0.936	0.591
ON Model	0.934	0.945	0.623
Digital Investment Decisions	0.889	0.914	0.579

3. Structural Models and Hypothesis Testing

Table 4: Hypothesis Testing Results

Hypothesis	Road	β	t-value	p-value	Decision	Effect Size
H1	DFL → DO	0.289***	4.803	<0.001	Supported	Keep
H2	DFL → ON	0.243**	2.952	0.003	Supported	Small
H3	FTA → ON IT	0.228**	3.003	0.003	Supported	Small
H4	EUROPE→ DO IT	0.271***	4.567	<0.001	Supported	Keep
H5	ESF → ON IT	0.358***	4.118	<0.001	Supported	Keep
H6	FSE → DO	0.318***	5.123	<0.001	Supported	Keep
H7	FTA → DO	0.025	0.575	0.566	Not Supported	Not

Note: ***p < 0.001, **p < 0.01, *p < 0.05

4. Mediation Analysis

The EROP model successfully mediated the relationship between digital financial literacy and digital investment decisions with 18.6% of Variance Accounted For (VAF).

Table 5: Effects of EROP Mediation

Mediation Pathway	Direct Effects	Indirect Effects	Total Effect	VAF	Types of Mediation
DFL → EROP → DO	0.289***	0.066*	0.355***	18.6%	Partial Mediation

5. Model Quality Assessment

Table 6: Model Quality Indicators

Quality Measures	Value	Threshold	Interpretation
R^2 (Digital Investment Decisions)	0.603	>0.25	High explanatory power
R^2 (Model EROP)	0.502	>0.25	Explanatory power is medium
Q^2 (Digital Investment Decision)	0.341	>0	Good predictive relevance
SRMR	0.059	<0.08	Suitable models
Benefits of the Conformity Index	0.573	>0.36	High overall quality

DISCUSSION

1. The Paradox of Technology Facilitation

The study's most striking finding was the insignificant relationship between financial technology adoption and investment decisions (H7: β=0.025, p>0.05). These counterintuitive results challenge the prevailing assumptions about the role of technology in investment behavior, suggesting that technology serves as an enabling infrastructure rather than a key decision driver. These findings are in line with recent behavioral finance research that argues that stock prices can be influenced by psychological factors rather than purely technological capabilities.

2. Gender-Based Prudential Advantages

Multi-group analysis revealed significantly higher EROP formation among female respondents (β=0.312 vs β=0.189 for males), contrary to traditional gender-based investment behavior stereotypes. These findings suggest that women have superior prudential decision-making abilities characterized by more systematic risk assessment and long-term value orientation, challenging existing literature assumptions about women's risk aversion.

3. Principle of Self-Efficacy Priority

Financial self-efficacy emerged as the strongest predictor of investment decisions (β=0.318), providing empirical support for trust-based intervention strategies versus purely knowledge-focused approaches. These findings revolutionized the design of educational interventions, emphasizing experiential learning and building confidence over traditional information transmission models.

Implications

The following was implication of this research:

1. Implications for fintech platforms:

a. Embed an EROM-based decision support tool that combines fundamental analysis, technical indicators, and risk assessment protocols

b. Prioritize confidence-building features over pure technological sophistication

c. Design a gender-sensitive platform that harnesses women's systematic decision-making power.

2. Implicationsf for financial educators:

a. Integrating components of the EROP framework in curriculum design.

b. Emphasizing the development of self-efficacy through experiential learning methodologies.

c. Focus on the formation of prudent behavior rather than speculative trading education.

3. Implication for policy makers:

a. Incorporating prudential behavior assessments into the supervision of digital investment platforms.

b. Developing a generational and gender-sensitive approach to education.

c. Addressing the digital-financial literacy gap through targeted interventions

CONCLUSIONS

1. Major Theoretical Contributions

This research introduces and validates the EROP model as a transformative advance in understanding digital investment behavior, making four important contributions:

a. Validation of the EROP Model: Successfully explained 60.3% of variances in digital investment decisions with a strong mediation effect (18.6% VAF), demonstrating superior explanatory power compared to existing behavioral finance models.

b. The Paradox of Technology Facilitation: Reveals that the adoption of financial technology does not directly affect the quality of investment decisions, establishing the role of technology as a facilitator rather than a determinant of investment success.

c. Advantages of Gender-Based Prudence: Shows that female investors exhibit much higher EROP formation abilities, challenge traditional stereotypes, and reveal superior systematic decision-making abilities.

d. Establishment of Self-Efficacy Excellence: Affirms financial self-efficacy as the strongest predictor of investment decisions, providing an empirical basis for faith-based educational interventions.

2. Scientific impact

The EROP model provides a new theoretical framework for:

a. Behavioral Finance Theory: Extending the application of Prospect Theory to the context of digital investing.

b. Technology Acceptance Theory: Demonstrates the facilitation of technology rather than defining roles.

c. Financial Literacy Research: Identifying the formation of prudential expectations as a critical mediation mechanism.

d. Digital Investment Literature: Building the first comprehensive Generation Y behavioral model.

3. Future Research Directions

a. Longitudinal Validation: An extended time series study that examines the stability of EROP models across market cycles and life stages to strengthen causal inference capabilities.

b. Cross-Cultural Testing: An international comparative study that assesses the generalization of models in a variety of cultural, economic, and regulatory contexts.

c. Integration of Technological Evolution: Investigate the influence of emerging financial technologies (AI, blockchain, robo-advisors) on the dynamics of the EROP model.

d. Integration of Behavioral Biases: Incorporation of specific cognitive biases into the EROP framework to improve theoretical completeness.

e. Industry Extension: Testing the application of the EROP model across various investment instruments (cryptocurrency, peer-to-peer lending, sustainable investing).

4. Limitation and future research

This study acknowledges geographical constraints (Central Java focus), cross-sectional design limitations that prevent the formation of definitive causality, and platform-specific focus (digital gold) that have the potential to limit wider deployment. Future research should address these limitations through expanded geographic coverage, longitudinal design, and multi-asset class investigations.

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