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THE USE OF FINANCIAL TECHNOLOGIES IN PROMOTING AND PROVIDING SERVICES IN THE FINANCIAL INTERMEDIATION INDUSTRY

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Rezumat: Cercetarea explorează utilizarea tehnologiei în industria de intermediere financiară și piețele de capital, subliniind relația de dezvoltare reciprocă și impactul inovațiilor tehnologice în democratizarea accesului la piețele financiare și creșterea eficienței tranzacțiilor. Studiul evidențiază avansul sectorului Fintech, care, prin soluții precum roboții de tranzacționare, blockchain și inteligența artificială, îmbunătățește semnificativ serviciile financiare. Deși implementarea noilor tehnologii deschide oportunități de profit, aceasta necesită analize detaliate și o gestionare atentă a riscurilor. De asemenea, cercetarea relevă apetitul investitorilor pentru instrumentele Fintech, inclusiv inteligența artificială, însă aceștia preferă să păstreze controlul direct asupra deciziilor de investiții.

Cuvinte cheie: Fintech, inteligența artificială, roboți de tranzacționare, riscuri

Abstract: The research explores the use of technology in the financial intermediation industry and capital markets, highlighting the mutually developing relationship and the impact of technological innovations in democratizing access to financial markets and increasing transaction efficiency. The study highlights the advancement of the Fintech sector, which, through solutions such as trading bots, blockchain and artificial intelligence, is significantly improving financial services. While the implementation of new technologies opens up profit opportunities, it requires detailed analysis and careful risk management. Research also reveals investors' appetite for fintech tools, including artificial intelligence, but they prefer to retain direct control over investment decisions.

Keywords: Fintech, artificial intelligence, trading robots, risks

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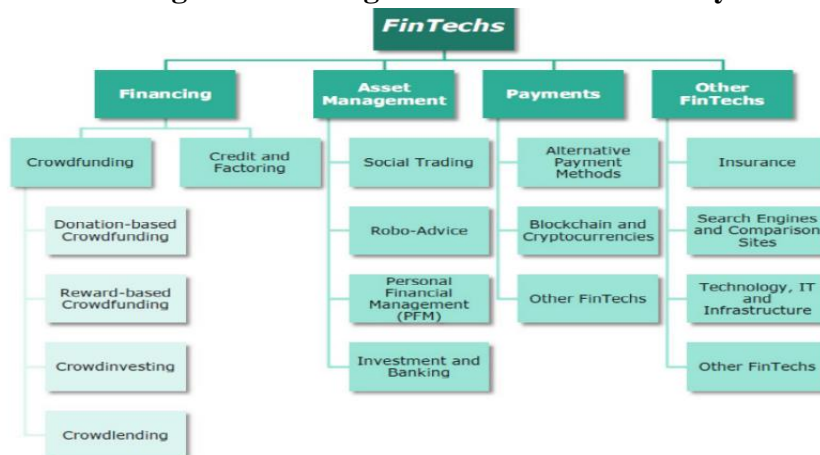
1. INTRODUCTION

Historically, the evolution of intermediaries in capital markets is intertwined with technological advancements. The introduction of computers and telecommunications in the 1970s and 1980s revolutionized financial markets, transitioning them to electronic trading systems that improved speed, reduced costs, and enhanced accessibility. In the 1990s, internet platforms enabled retail investors to access markets directly, bypassing traditional brokers (Ferguson, 2009). This democratization empowered individual investors and disrupted brokerage models dominated by large institutions. The (UK Government Office for Science, 2011) described this transformation as a gradual shift from manual to electronic systems, driven by advancements in computing power, telecommunications, and connectivity.

(Lo & Zhang, 2024) identified eight distinct financial eras defined by unique economic needs and technological progress. Their research underscores the symbiotic relationship between innovation and market dynamics, which has shaped modern financial ecosystems. This co-evolution fosters a responsive and dynamic environment, ready to adapt to future technological opportunities and challenges.

The concept of Financial Technology (Fintech) emerged in the 2000s to describe technologies that enhance and automate financial services. According to (Ernst & Young, 2019), two-thirds of consumers use at least two or more fintech services, and the same study indicates that these users are increasingly aware that fintech is part of their daily lives. Although the history of financial technology dates back some time, there is no official, aggregated classification for segmenting this industry. Based on the article by (Dorfleitner, Hornuf, Schmitt, & Weber, 2017), companies in the Fintech industry can be divided into four major segments, depending on distinct business models, as shown in Figure no. 1.

Figure no.1 – Segments of Fintech industry



Source: (Dorfleitner, Hornuf, Schmitt, & Weber, 2017)

The evolution of the fintech phenomenon has been remarkable in recent years, with a significant increase in the number of fintech companies globally. By January 2024, the Americas (North America, South America, Central America, and the Caribbean) became the region with the largest number of fintech companies, totaling around 13,100. In comparison, the EMEA region (Europe, Middle East, and Africa) had 10,969 fintech companies, while the APAC region (Asia-Pacific) had 5,886 (Statista). These figures highlight the ongoing growth and global expansion of fintech, emphasizing the increasing role these companies play in transforming the financial



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industry worldwide. The number of fintech companies has not only continued to grow over the years, but the fintech industry has also experienced significant revenue growth from 2017 to 2024. According to (Deloitte, 2020), industry revenues increased from approximately \$50 billion in 2017 to nearly \$180 billion in 2024, demonstrating a strong upward trend.

Traditionally, the main intermediaries in the primary markets were commercial banks and insurers, while secondary markets were dominated by stock exchanges and brokerage firms, which primarily provided liquidity. With the development of technology, capital markets shifted from a traditional, specialized model to a technology-driven model (Harasim & Janina, 2022). Thus, the fintech industry has had a profound impact on capital markets by enhancing the ease with which investors can access services, liquidity, and the efficiency of quick information transmission. It has also completely changed how investors trade, manage portfolios, and gather information about capital markets. According to (CBINSIGHTS, 2022) between 2016 and the first quarter of 2021, capital markets were one of the sectors attracting the most fintech investment, leading this category with an investment of \$8 billion. The integration of technology into capital markets has brought significant changes, increasing efficiency, transparency, and accessibility. Innovations introduced include algorithmic trading, high-frequency trading (HFT), Blockchain and distributed ledger technology (DLT), robo-advisors and automated investment platforms, Regtech (regulatory technology), and Artificial Intelligence (AI) for investments.

2. DEFINING THE RESEARCH PROBLEM

The research of this paper is divided into three segments to provide a comprehensive perspective on the fintech phenomenon in financial markets. A practical approach was taken by testing algorithmic trading robots while also aiming to measure investor interest in various emerging or developing technologies available in the market. Additionally, the study sought to understand the position of financial investment companies in Romania regarding these new technologies, particularly whether they have implemented or plan to implement solutions such as artificial intelligence in their operations.

The first part of the paper focuses on back-testing algorithmic trading robots on the MetaTrader 5 (MT5) platform, currently one of the most advanced multi-asset trading platforms globally. The second part of the paper involves a survey aimed at better understanding investors' preferences, behaviors, and attitudes toward new financial technologies. The third part of research involves a survey directed to Romanian investment firms, examining their adaptability to new financial technologies and their alignment with investor demands.

3. PRESENTING THE RESEARCH FINDINGS

3.1. Testing of trading robots

The tested trading robots, known as Expert Advisors (EAs), simulated trading from January 1, 2023, to December 31, 2023, using historical data under real market conditions with hourly candlesticks. Key parameters:

- **Initial Settings:** Developer-specified; \$5,000 initial deposit; leverage 1:100.

- **Performance Metrics:**

- **Net Profit:** Total earnings minus transaction fees.
- **Return (ROI):** Efficiency of investment, calculated by comparing net profit to the initial amount invested.
- **Profit Factor:** Ratio of total profits from winning trades to total losses from losing trades.
- **Sharpe Ratio:** Performance relative to risk, considering volatility and comparing to a risk-free rate.
- **Drawdown:** Maximum portfolio decline from a peak to a trough, indicating risk exposure.

For this study, a total of 12 trading robots have been tested on different financial instruments: 3 for gold (XAUUSD), 3 for a currency pair (EURUSD), 3 for cryptocurrency (BTCUSD), and 3 for the SPX500 index. The robots were chosen based on their user ratings and popularity, and for this case study, only DEMO or free versions have been used.

3.1.1. Testing Gold Trading Robots – XAUUSD

The Gold Reaper MT5 uses multiple confirmation algorithms and strategies, focusing on breakout trading at key support and resistance levels. Gold Trading Algo MT5 aims to minimize drawdowns with robust risk management. The XG Gold Robot MT5 utilizes technical indicators and price action strategies for trading. The results are presented below, in table no. 1.

Table no. 1 – Results of EAs on XAUUSD

Indicator/EA	The Gold Reaper MT5	Gold Trading Algo MT5	XG Gold Robot
Net Result (\$)	12,314.34	476.87	737,213.00
Return (%)	246.29%	9.54%	14,744.00%
Profit Factor	4.08	18.28	5.15
Sharpe Ratio	6.15	5.48	22.06
Total Number of Trades	996	143	14,619
Profitable Trades	787	132	12,789
Profitable Trades (%)	79.02%	92.31%	87.48%
Losing Trades	209	11	1,800
Losing Trades (%)	20.98%	7.69%	12.52%
Relative Drawdown (%)	7.71%	0.18%	5.32%
Absolute Drawdown (\$)	651.49	9.97	34,254.21

Source: Authors' projection

Overall, XG Gold Robot provided the best results with the highest return and Sharpe ratio, ideal for risk-seeking traders. Gold Trading Algo MT5, while lower in profit, had the best stability with minimal drawdown, appealing to conservative traders. The Gold Reaper MT5 offers a balanced option with decent profitability and moderate risk.

3.1.2. Testing Currencies Trading Robots – EURUSD

The tested trading robots for EURUSD are Aura White Edition MT5, Big Forex Players MT5, and Quantum StarMan. Aura White Edition MT5 is an advanced, fully automated Expert Advisor



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(EA) designed for currency pairs, using a multi-layer neural network to adapt to market conditions. Big Forex Players MT5 operates with two complex strategies, one based on large bank positions and the other using three technical indicators, while avoiding trading around significant news events. Quantum StarMan is specialized in currency pair trading, offering risk protection and a simple operating method. All three robots showed varying performance in terms of profitability and trade success.

Table no. 2 – Results of EAs on EURUSD

Indicator/EA	Aura White Edition MT5	Big Forex Players MT5	Quantum StarMan
Net Profit (\$)	1,566,709.18	517,843.56	833.57
Return (%)	31,334%	10,356%	16.66%
Profit Factor	17.47	11.28	2.38
Sharpe Ratio	9.02	38.37	1.43
Total Trades	85	6,887	325
Profitable Trades	84	6,218	257
Profitable Trades (%)	98.82%	90.29%	79.08%
Losing Trades	1	669	68
Losing Trades (%)	1.18%	9.71%	20.92%
Relative Drawdown (%)	13.27%	2.57%	1.45%
Absolute Drawdown (\$)	95,145.46	9,244.48	85.97

Source: Authors' projection

Table 2 compares the performance of the three trading robots on the EURUSD currency pair. Aura White Edition MT5 stood out with impressive profitability and a high return, achieving a high success rate with most of its trades. Big Players Forex MT5 delivered solid performance, with a strong profit and a high percentage of profitable trades, though its performance was not as remarkable as Aura White Edition. Quantum StarMan, on the other hand, showed more modest results with a lower success rate compared to the other two. It is important to note that these results are based on tests, and real-world performance may vary significantly.

3.1.3. Testing Cryptocurrencies Trading Robots – BTCSUD

Bitcoin Robot MT5 is a trading robot for the MT5 platform, specializing in BTCUSD, using an algorithmic approach based on price action, market trends, and custom indicators, with a news filter to avoid trades during major announcements. Money Mind BTC is designed for a wide range of cryptocurrencies, offering customizable settings and utilizing multiple technical indicators to analyse market trends and suggest optimal entry points. VR Smart Grid MT5 works with any financial instrument, employing a strategy of closing positions in small lots to achieve consistent profits and efficiently reduce losses, incorporating several trading strategies. All three robots were tested using free/demo versions.

Table no. 3 – Results of EAs on BTCUSD

Indicator/EA	Bitcoin Robot MT5	Money Mind BTC	VR Smart Grid MT5
Net Result (\$)	743.60	10,311.93	-4,243.05
Return (%)	14.82	206.22	-84.86
Profit Factor	10.13	5.42	0.09
Sharpe Ratio	20.63	1.27	-5.00
Total Trades	352	141	1,874
Profitable Trades	176	132	564
Profitable Trades (%)	97.73%	93.62%	30.10%
Losing Trades	176	9	1,310
Losing Trades (%)	2.27%	6.38%	69.90%
Relative Drawdown (%)	0.20%	4.04%	85.42%
Absolute Drawdown (\$)	11.21	619.05	4,436.26

Source: Authors' projection

Table no. 3 summarizes the performance of three cryptocurrency trading robots: Bitcoin Robot MT5, Money Mind BTC, and VR Smart Grid MT5. Bitcoin Robot MT5 showed steady results with minimal risk, achieving a high percentage of profitable trades and a low relative drawdown. Money Mind BTC was the most profitable, delivering an impressive return and maintaining strong profitability with a moderate level of risk. In contrast, VR Smart Grid MT5 underperformed significantly, with a high drawdown, a low percentage of profitable trades, and an overall negative net result, highlighting its substantial risk and inefficiency.

3.1.4. Testing Indexes Trading Robots

Within this category, the experts advisors tested are the one specialised in transaction of CFD on indexes. Diamond Titan FX is a trading robot designed for the Dow Jones Industrial Average (US30) and it provides targeted strategies for this major index. US30 Scalper EA MT5 specializes in scalping the US30 index with predefined take profit and stop-loss thresholds, ensuring safer trading. Universal Breakout MT5, a free Expert Advisor, employs a classic breakout strategy, adaptable for various price trend movements and offering customizable parameters for flexibility. The results for these robots are presented below:

Table no. 4 – Results of EAs on indexes(CFD)

Indicator/EA	Diamond Titan FX	US30 Scalper EA MT5	Universal Breakout MT5
Net Result (\$)	1,050.96	510.51	169.71
Return (%)	21.02	10.20	3.40
Profit Factor	2.65	1.60	1.08
Sharpe Ratio	21.70	11.36	0.27
Total Number of Trades	90	72	51
Profitable Trades	77	58	21
Profitable Trades (%)	85.56%	80.56%	41.18%
Losing Trades	13	14	14
Losing Trades (%)	14.44%	19.44%	58.82%
Relative Drawdown (%)	4.01%	6.01%	17.46%
Absolute Drawdown (\$)	203.36	303.60	872.81

Source: Authors' projection



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The table no. 4 highlights the 2023 performance of Diamond Titan FX, US30 Scalper EA MT5, and Universal Breakout MT5. Both Diamond Titan FX and US30 Scalper EA MT5 demonstrated strong results, surpassing the annual performance of the Dow Jones index. These robots showed effective risk management and a high percentage of profitable trades. In contrast, Universal Breakout MT5 delivered more modest outcomes, falling short of the index's performance.

One key observation is that, despite all trading robots being configured with identical initial settings and starting balances, their results varied significantly. This highlights that profit factors, returns, and volatility are heavily influenced by each robot's unique algorithms and the market conditions they operate in. For instance, some robots achieved high returns with moderate drawdowns, reflecting efficient risk management, while others exhibited higher volatility and larger drawdowns, indicating more aggressive strategies with greater risks. Robots like Aura White Edition MT5 and XG Gold Robot stood out, achieving notable profits, while Big Forex Players also performed strongly. The study underscores the importance of diversifying and tailoring automated trading strategies to specific needs. The varied performance across robots demonstrates there is no one-size-fits-all solution for all markets and instruments. To maximize investment efficiency and minimize risks, rigorous back-testing and careful evaluation of each robot's features are essential before live deployment. Moreover, while some robots exhibit promising potential, investors should remember that past performance is not a guarantee of future success, and results in testing may differ significantly from real-world market conditions.

3.2. Survey for investors

In the second part of the case study, a questionnaire was developed and distributed to investors to gain a deeper understanding of their preferences, behaviours, and attitudes toward new financial technologies. The questionnaire included questions regarding age, investment experience, net worth, types of traded instruments, information sources, and satisfaction with portfolio performance. It also explored openness to using robo-advisors and other technological solutions, such as AI-based financial tools, to determine which solutions generate the most interest. The questionnaire, consisting of 17 questions, was made accessible online and remained open for three weeks. Efforts to maximize participation included disseminating the questionnaire via investor forums, social media groups, personal contacts in financial markets, and Romanian investment firms. Attempts to involve educators in financial literacy and investment training for wider distribution were unsuccessful. In total, 53 responses were collected, providing insights into participants' investment experiences, preferences, and attitudes toward emerging technologies.

Data analysis offered valuable insights into current and future trends in investor behaviour and highlighted the influence of new technologies on investment decisions and portfolio management. Of the 17 questions, four were selected for detailed discussion due to their relevance to the research objectives. Initial questions aimed to profile respondents by gathering demographic data such as age, education level, and approximate net worth. Other questions focused on past investment experience, traded instruments, returns achieved, and satisfaction with portfolio performance to better understand respondents' financial behaviours.

The first question served as a filter: respondents not active as financial market investors were excluded, resulting in six eliminations. Among the 47 investors, 68% were aged 18-30,

indicating a predominantly young respondent group. Question three, which addressed net worth, revealed a wide diversity among participants. The fourth question examined the respondents' highest educational attainment, showing a well-educated sample, with 43% holding a bachelor's degree and 43% a master's degree. Higher education likely supports better risk comprehension and more analytical financial decision-making. Regarding experience, 34% had 1-3 years of investing, while 26% had less than a year, suggesting a relatively recent interest in financial markets and a readiness to adopt new technologies.

The types of financial instruments traded by respondents provided key insights into risk profiles and preferences. Stocks emerged as the most traded instrument (42 out of 47 participants), indicating moderate risk tolerance given their return potential and volatility. Bonds or government securities were mentioned by 21 participants, reflecting their preference for stability and predictable income. Cryptocurrencies, cited by 20 participants, underscored a significant interest in digital assets despite their high risk and volatility. ETFs, Forex instruments, commodities, and derivatives were also noted, offering a comprehensive view of investors' preferences.

Regarding portfolio performance, approximately half of the respondents reported returns of 6%-20% in the previous year, reflecting favourable market conditions in 2023. Satisfaction with these returns averaged 3.98 on a scale of 1 to 5, indicating a generally positive sentiment. When asked about sources of information, respondents relied mainly on company reports and news, followed by broker recommendations and social media. Familiarity with FinTech solutions varied, with 9 respondents regularly using such tools, 14 occasionally using them, and 24 either unfamiliar or inexperienced with FinTech.

Participants showed differing levels of interest in FinTech services, with priorities including mobile trading platforms, technical assistance, and financial analyses. Robo-advisors and robo-trading were less popular, despite their potential benefits. When asked about specific AI-based financial tools, respondents preferred tools that analyse company reports and classify future performance (28 responses) or summarize financial news with market impact analysis (24 responses). Fewer showed interest in automated trading (13 responses), highlighting a cautious approach toward full automation in investments.

The factors influencing the adoption of robo-trading services included the historical performance of trading algorithms (29 responses), service costs (17 responses), user reviews (18 responses), and the level of control retained by the investor (17 responses). This indicates that while historical profitability is key, control and cost considerations also play significant roles.

When discussing AI in investment decision-making, 81% expressed a positive or open attitude, indicating trust in the technology's potential benefits. However, scepticism among some participants suggests a need for further education on AI's capabilities and limitations. Despite openness, respondents were cautious about allocating significant portions of their portfolios to AI management. Most were willing to allocate less than 25%, and 14 participants were open to assigning up to 50%. Full portfolio reliance on AI was favoured by only 19%, with 47% preferring a model where AI operates under investor oversight. A combined approach involving AI and human expertise was supported by 36%.

The findings portray a group of young, educated investors open to technological innovation and diversification. While there is strong interest in AI and robo-advisors, reservations persist, highlighting the need for balanced approaches that combine technological and human expertise. Investor satisfaction with portfolio performance and willingness to explore advanced tools are encouraging trends, although the study's limitations—sample size, theoretical responses, and



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temporal context—must be considered. Further research and discussions could enhance these findings and inform practical applications.

3.3. Survey for Romanian investment firms

The third part of the study consists of a questionnaire addressed to investment firms in Romania, aiming to explore their adaptability to new financial technologies and the evolving demands of investors. Following the analysis of investors' perceptions of financial technologies in the previous section, it became essential to examine the preparedness of intermediaries at the Bucharest Stock Exchange (BVB) to meet the challenges of this technological wave. The questionnaire aimed to assess the adoption and integration of artificial intelligence (AI) in these firms, identifying associated benefits and challenges. Comprising 15 questions, of which nine were directly relevant to the research, the questionnaire was sent to the 17 intermediaries listed on the BVB website. Unfortunately, only one intermediary responded. Nevertheless, this intermediary conducts between 2%-3% of the total transaction value on the BVB in a year, based on published data. The intermediary's identity has been kept confidential.

The first question explored the perception of AI's importance over the next five years. The respondent considered AI implementation important but not critical, reflecting a moderate acknowledgment of its potential value. Regarding the benefits of adopting AI, the intermediary highlighted increased operational efficiency and cost reduction. The main obstacles cited were data security concerns and a lack of technical expertise—challenges commonly encountered in the industry. Additionally, the respondent acknowledged that the current level of AI implementation within the company is low, a situation likely influenced by these challenges and possibly by differing strategic priorities.

The budget allocated for AI implementation was estimated to be under €50,000, suggesting either cautious investment or an early stage in the digital transformation journey. The priorities for using AI included risk identification and reporting, fraud detection, compliance investigations, and the analysis of suspicious market abuse transactions. These priorities emphasize a strong focus on safety and regulatory compliance in daily operations. When asked about AI-based tools that could offer a competitive advantage, the intermediary pointed to automating financial report analysis, summarizing financial news, a tool to answer investment-related queries, and AI-based robo-trading for clients. These preferences align significantly with the priorities expressed by investors in the earlier study.

When questioned about the frequency of AI use, the respondent indicated occasional usage, motivated by a desire to experiment with new methods for optimizing current processes. Despite recognizing AI's benefits, the intermediary did not express interest in participating in a professional training course on AI. This response may reflect either a lack of a clear digital transformation strategy or an underestimation of the personal and professional growth potential offered by these technologies.

The questionnaire responses reveal an awareness of AI's potential to improve operational efficiency and reduce costs, as well as significant barriers such as technical expertise gaps and data security concerns. While the level of AI adoption is currently low and investments remain cautious, the identified priorities point to a clear strategic direction: leveraging AI for safety and compliance purposes. The mutual interest of investors and intermediaries in tools that automate analysis and

enhance financial decision-making underscores the substantial potential of these technologies to improve performance and competitiveness in the market.

4. CONCLUSIONS

The research confirms that using trading robots on the MT5 platform offers users the potential for substantial profits. However, it is crucial to conduct thorough analysis and testing for each Expert Advisor (EA) employed. To ensure stability and maximize returns, investors must align their risk tolerance with the strategy they adopt. Furthermore, as highlighted in the presentation materials of the tested robots, past performance of these tools does not guarantee future results.

The questionnaire addressed to investors provides insight into their preferences, behaviours, and attitudes toward new financial technologies. While there is an increasing openness to using AI and trading robots, investors remain cautious, preferring to retain decision-making control or adopt a hybrid approach that combines technology with human expertise. This indicates a growing trend in adopting advanced technologies for portfolio management while underscoring the need for education to ensure their efficient integration.

The findings from the questionnaire for intermediaries at the Bucharest Stock Exchange (BVB) reveal that, despite recognizing the importance of artificial intelligence (AI), its implementation is still in the early stages. Key barriers include concerns about data security and a lack of technical expertise. Declared benefits focus on enhancing operational efficiency and reducing costs, while strategic priorities are directed toward automating financial analysis and improving decision-making processes based on actionable information.

In conclusion, tools for investors are becoming increasingly sophisticated, tailored to meet individual user needs, while both intermediaries and investors are beginning to appreciate the advantages these technologies bring. However, to thrive in such a dynamic environment, continuous education for all stakeholders in the industry is essential. This ensures the effective and sustainable integration of emerging technologies into the investment landscape.

Bibliography

- Bencivenga, V., & Smith, B.** (1991). Financial Intermediation and Endogenous Growth. *Review of Economic Studies*, 195-210.
- Cbinsights.** (2022) State Of Fintech Q1'21 Report: Investment & Sector Trends To Watch. *State of Wealth Tech*.
- Deloitte.** (2020). Fintech - On the brink of further disruption.
- Dorflleitner, G., Hornuf, L., Schmitt, M., & Weber, M.** (2017). FinTech in Germany. *Springer International Publishing*.
- Ernst & Young.** (2019). Global Fintech Adoption Index 2019.
- Ferguson, N.** (2009). *The ascent of Money*. Penguin Books.
- Gurley, J. & Shaw, E.** (1955) Financial Aspects of Economic Development. *American Economic Review*, 515-38
- Harasim, & Janina.** (2022). *The Digitalization of Financial Markets*. Taylor & Francis.
- Lo, A. W., & Zhang, R.** (2024). The Co-Evolution of Financial Markets and Technology. *The Adaptive Markets Hypothesis*, 511-550.
- McKinnon, R.** (1973). *Money and Capital in Economic Development*. Washington: Brookings Institution.
- Neal, L.** (1990). *The rise of financial capitalism. International capital markets in the Age of Reason*. Cambridge University Press.
- Pilbeam, K.** (2005). *Finance and Financial Markets*. London: Palgrave.
- Schumpeter, J.** (1932). *The Theory of Economic Development*. Cambridge: Harvard University Press.
- UK Government Office for Science. (2011). Technology Trends in the Financial Markets: A 2020 vision. 47