REVIEW OF ECONOMIC AND BUSINESS STUDIES

INTERDISCIPLINARY PERSPECTIVES

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Alexandru Ioan Cuza University

Published by Alexandru Ioan Cuza University Press

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ISSN 1843-763X

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 11 of 31
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0001

PATENT SIGNALING AND VENTURE CAPITALISTS' INVESTMENT BEHAVIORS IN CHINA

XIAOLI WANG[I], YI TAN[II], JASON Z.-H. LEE[III]

Abstract: *In recent years, China's venture capital (VC) industry has experienced rapid growth. VC investments are widely believed to carry significant risks, primarily due to information asymmetry. As a result, VC firms continuously seek information signals to reduce these risks. This study examines the influence of patent signals on VC investment decisions in China, showing that the number of patents held by startups significantly increases the amount of VC investment they attract. VC firms tend to prioritize the quantity of patents, encouraging startups to enhance their technological capabilities. However, patents do not significantly impact the number of investing institutions, as most investments come from individual firms. While the influence of patent signals might vary across different types of investors, the study finds no evidence that patent signals affect the investment decisions of foreign or foreign-domestic joint VC firms regarding investment amounts.*

Keywords: *venture capital; technology innovation; patent signal; China*

JEL Classification: *C12; D83; E22; F21; G24; M13; O31*

1. INTRODUCTION

With rapid economic development globally, the venture capital (VC) industry has significantly expanded, attracting increasing attention from investors and investees. According to STATISTA[1], the total capital raised in the worldwide VC market is forecasted to reach $468.4 billion in 2024, up from $349.5 billion in 2023. However, global VC investment recently dropped to $75.9 billion across 7,520 deals in the first quarter of 2024 (Q1'24), down from $83.8 billion in the previous quarter, according to the KPMG Q1'24 Venture Pulse Report – Global Trends[2]. This decline was driven by

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[1] https://www.statista.com/outlook/fmo/capital-raising/traditional-capital-raising/venture-capital/worldwide

[2] https://kpmg.com/xx/en/home/campaigns/2024/04/q1-venture-pulse-report-global.html

concerns about geopolitical tensions, a lack of exits in the market, and a pullback in investment at the later deal stages. The Americas remained dominant, attracting the largest share of VC investment globally in Q1'24, followed by Asia, which saw significant investment led by major raises in China.

From a macro perspective, the VC industry positively impacts economic development in both prosperous and recessionary periods. From a micro perspective, VC involvement improves corporate governance and fosters innovation. Additionally, VC stimulates the job market, positively impacting employment in sectors such as semiconductors, biotechnology, telecommunications, AI, and computing, and increasing the demand for skilled labor. VC also effectively encourages innovation across various industries, including traditional sectors, benefiting a wide range of companies.

As the VC industry grows, academic interest has surged. While foreign research extensively covers VC decision-making, influencing factors, technological innovation performance, and signaling effects, studies in China remain limited, particularly regarding patent signals. Information asymmetry between venture capitalists and startups necessitates reliable signals to guide investment decisions. Patents, as indicators of technological innovation, are crucial in this context. This study focuses on the impact of patent signals on VC decisions in China, addressing a gap in domestic research with the theoretical foundation of VC and patent signals. It also explores the investment process, strategies, and factors influencing VC decisions, emphasizing the multifaceted role of patent signals in China's VC market.

China’s market has been influenced by events such as political tensions and competitions between China and certain Western countries since the pandemic. These events include trade wars, supply chain diversification, Huawei and 5G networks, territorial disputes over the South China Sea, and the origin of COVID-19. The volatility and complexity introduced to China’s market by non-business influences make it difficult to isolate business factors affecting VC investment decisions. Therefore, we have chosen to analyze data from a more stable period before the pandemic. This approach aims to better understand the business dynamics and their impact on VC decision-making in a more controlled environment. By doing so, we hope that our findings are not skewed by extraneous variables and provide clearer insights into how patent signals affect VC investments under typical market conditions.

Empirically, we collected data on VC investments and patents in China from January 1, 2013 to December 20, 2015 to analyze the impact of patents on VC decisions. According to 2015 data from the data terminal of ChinaVenture3, the domestic VC

[3] https://www.chinaventure.com.cn

market disclosed 2,824 deals with a total investment of $36.952 billion. This represents a significant increase from 2014, with the number of deals remaining stable but the investment amount doubling. The internet, telecommunications, and IT sectors were particularly attractive to Venture capitalists due to their rapid growth and high innovation potential. With the analysis results, our study aims to enhance the understanding of patent signals in VC decision-making and provide guidance for venture capitalists on selecting promising investments and for startups on attracting VC by enhancing their technological innovation capabilities. Our study will also offer policymakers advice on fostering innovation and investment.

2. LITERATURE REVIEW

VC investment is inherently high-risk due to technological challenges, lengthy research cycles, and complex legal environments, which heighten uncertainty and necessitate careful target selection (DiMasi & Grabowski, 2007). Start-ups, often characterized by a lack of profitability and stable organizational structures, pose additional risks, prompting venture capitalists (VCs) to adopt rigorous evaluation methods (Wilbon, 1999). Information asymmetry compounds these challenges, making it difficult for start-ups to effectively convey their potential to investors (Cumming, 2005). This issue is particularly acute in knowledge-intensive industries, where limited historical data and technological uncertainties exacerbate the knowledge gap (Haeussler et al., 2014).

To address these uncertainties, VCs rely on "signals" to aid decision-making. Spence (1973) introduced the concept of signaling as a means for companies to differentiate themselves. In this context, patents have emerged as a key signal for assessing a company's potential. Research demonstrates that patents reduce information asymmetry by signaling a company's research capabilities (Lemley, 2000; Mann & Sager, 2007; Hsu & Ziedonis, 2013). Two factors make patents effective signals: first, they undergo review and certification by independent bodies, such as patent offices, providing objective validation (Heeley et al., 2007). Second, patents confer competitive advantages by deterring rivals and enhancing a company's reputation, which attracts better external resources (Noel & Schankermann, 2013; Muller & Penin, 2006). The review of existing studies related to this topic is further organized into three areas.

2.1 The diminishing signaling power of patents

The signaling power of patents is not static and often diminishes over time. Fama (1980) linked information asymmetry to agency problems in VC-backed firms,

which Neher (1999) suggested could be mitigated through multi-round financing. Subsequent studies (Gorman & Sahlman, 1989; Gompers, 1995) found that multiple financing rounds reduce information asymmetry as VCs gain deeper insight into a company's operations. Patents play a critical role in the early financing stages but decline in importance as VCs become more involved (Higgins & Gulati, 2006; Hsu & Ziedonis, 2013).

Hoenen et al. (2014), focusing on biotechnology firms, found that patents increased funding in the first round but had less influence in later rounds, reinforcing the diminishing signaling effect. Similarly, Hsu and Ziedonis (2013) showed that patents positively influence valuation during early financing rounds. Fabrizi et al. (2013) advanced this understanding by proposing a patent-signaling model, arguing that VCs leverage patents to signal high-value companies to acquirers, boosting patenting intensity and long-term performance while inflating acquisition prices.

Other studies have linked patents to VC financing in diverse contexts. Baum and Silverman (2004) demonstrated a positive correlation between patent count and VC investment, while Cao and Hsu (2011) found that start-ups with patents received more investment and longer incubation periods. Bellucci et al. (2023) highlighted the growing importance of green patents, showing that green innovators are more likely to attract VC funding. Conversely, Guo and Jiang (2022) explored how VC characteristics influence the impact of patents on innovation, finding that VC-backed firms outperformed their non-VC-backed counterparts in patenting new product sales, and exports because of the ex-ante selection and ex-post value-added effects of VC investment. An et al. (2023) examined patents as signaling tools for IPO performance in Japan, analyzing 338 IPOs from 2000–2015 using an OLS model. They found a positive link between pre-IPO patents and cash raised, but for high-tech firms, patenting showed a negative interaction effect, reducing IPO proceeds.

2.2 Patents and VC interest

Patents not only influence the amount of funding but also the number of VC institutions interested in a start-up. Mina and Lahr (2013) found that patents primarily serve as a selection tool for attracting VC institutions, rather than guiding post-investment activities. Additionally, patent signals can reduce uncertainty and boost investor confidence. Haeussler et al. (2014) suggest that the patent application and review process influences VC decisions, with companies securing funding more quickly after applying for patents. The more patents a company holds, the faster it tends to obtain financing. Haeussler et al. (2013) found that patent applications positively influence VC financing in British and German companies. They argued that patents act

as signals for ventures and trigger institutional processes, such as generating search reports and citations, which provide valuable insights that further attract VC financing.

2.3 Insights from China

Global studies provide foundational insights into how patent signals influence VC investment decisions, but research in China highlights unique dynamics shaped by local market conditions, policies, and social connections (Guanxi). Until recently, most Chinese research focused on the effects of VC on corporate performance and innovation. For instance, Ma et al. (2005) and Zhai et al. (2010) showed VC's critical role in enhancing firm stability and growth in volatile markets, especially for early-stage companies.

On technological innovation, Chinese research has explored theoretical and empirical dimensions. Fang and Wang (2013) found that VC's impact on innovation depends on policy context, with stronger support significantly enhancing outcomes, contrasting with Western markets where VC is well-integrated into innovation systems. Empirical studies support this. Mai et al. (2012), using Kauffman Firm Survey data, compared VC and angel investments, highlighting distinct pathways for supporting entrepreneurship. Similarly, Gou and Dong (2013) found that VC's timing significantly influences innovation in Chinese SMEs, shaped by their development stages.

In examining the role of patents as signals for VC investment in China, recent studies by Xu et al. (2018) and Chen et al. (2017) demonstrated that patent activity significantly enhances the likelihood of securing VC investment in China, where Xu et al. noted that patent sensitivity is stronger in regions with robust intellectual property protections. Chen et al. (2016) found that each additional patent positively affects valuation, particularly for foreign VCs. Zheng and Zhang (2019) analyzed patents' technological, commercial, and legal signaling effects in bio-pharmaceutical start-ups, identifying factors that influence VC funding.

Recent studies provide more nuanced insights. Qi and Liu (2020) emphasized patents' signaling importance during early financing rounds. Chen et al. (2021) found that government VC agencies prioritize patent signals, particularly in state-owned or locally focused investments. Yang and Fan (2024) explored patent quantity and quality, showing that while patents attract VC interest, their effectiveness is moderated by VC reputation and geographic alignment with start-ups.

In summary, our study explores how patents influence VC investment decisions in China's evolving market, building on global and Chinese literature. By examining the relationship between patent signals and VC interest, we offer new insights into the role of intellectual property in investment strategies. The findings will highlight

practical implications: VCs can use patent portfolios to evaluate opportunities in high-growth sectors, while start-ups can leverage patents to attract investment and showcase innovation. Policymakers can apply these insights to strengthen the VC ecosystem, encourage intellectual property development, and support sustainable growth in China.

3. RESEARCH METHODOLOGY

This section outlines our research methodology and proposes four hypotheses regarding the impact of patent signals on VC decision-making. Building on the literature review of patent signals and VC investments, these hypotheses focus on the amount of financing, the number of investment institutions, the waiting time for financing, and the backgrounds of the investment institutions. This analysis involves a horizontal comparison across three dimensions: quantity, time, and institutional backgrounds.

3.1 Hypotheses

Based on the literature, we propose four hypotheses as follows.

- ***Hypothesis 1***: We argue that the number of patents held by invested companies significantly affects the amount of investment they receive from VC institutions. This is further divided into two sub-hypotheses:
  - ***Hypothesis 1-a***: Companies with patents receive more investment from VC institutions than those without patents.
  - ***Hypothesis 1-b***: The number of patents is positively correlated with the amount of investment a company receives from VC institutions; the more patents a company holds, the greater the amount of investment it will attract.
- ***Hypothesis 2***: The number of patents is positively correlated with the number of investment institutions; the more patents a company has, the greater the number of VC institutions that will invest in it.
- ***Hypothesis 3***: The more patents a startup holds, the faster it can secure financing from VC institutions.
- ***Hypothesis 4***: The impact of patent signals varies among different investment institutions, with the effect being greater for foreign institutions than for Chinese or joint Chinese-foreign institutions.

3.2 Data collection

Data collection is divided into two main parts: VC data and patent signal data. The VC data is sourced from the ChinaVenture data terminal, while the patent data is

sourced from the China National Intellectual Property Administration (CNIPA)4 patent information service platform.

The sample selection for the VC data includes all companies in China that received VC from January 1, 2013, to December 20, 2015. Then, companies were filtered using the following criteria:

- Kept companies if the financing nature is determined as Series A5, excluding those receiving Series B or higher.
- Excluded samples where the company is in the profitable phase.
- Selected companies located in China, excluding all foreign startups.

After filtering, 1,894 VC samples were selected. Subsequently, the names of the startups were used as keywords to search for each company's patent data on the CNIPA patent information service platform. The patent status is categorized into valid patents, invalid patents, and patents under examination, all of which are recorded. The total number of patents before the financing date is determined based on the financing date. Although patents may have different types (e.g., invention, design), we do not differentiate between patent types, treating all as equivalent. The author's name will use bold, 10pt characters, centered-aligned.

3.3 Data characteristics

The variables used in our data collection are summarized in Table 1. Based on the aforementioned hypotheses, the dependent (or response), independent (or explanatory), and control variables required for the testing model (outlined in Section 4) will be derived or calculated from these variables.

Table 1. *Data variables and descriptions*

Variable	Description
INV	Amount of financing received by the invested company
LNINV	Natural logarithm of INV
PATENT	Number of patents before receiving VC
PDUMMY	Dummy variable indicating whether the company had any patents before receiving VC (1 = yes, 0 = no)
AGE	Years since the invested company's establishment
LNAGE	Natural logarithm of AGE

[4] https://www.cnipa.gov.cn/col/col1510/index.html

[5] The startup company in Series A is basically on track and has a complete business and profit model, holding a certain position and reputation within the industry. However, it is still operating at a loss. At this stage, funding comes from professional venture capitalists, with investment amounts typically ranging from 10 million to 100 million RMB. The company's valuation has an estimated value of exceeding 100 million RMB.

Variable	Description
VCCOUNT	Number of investing institutions
PLACE	Dummy variable indicating the company's location (1=Beijing, Shanghai, or Guangzhou; 0=other locations)
INDUSTRY	Dummy variable indicating the industry of the company (1=information transmission, computer services, and software; 0=other industries)
DURATION	Waiting time for financing, calculated as the financing date minus the company's establishment date
LND	Natural logarithm of DURATION
S1	Dummy variable for the company's development stage (1=early stage, 0=others)
S2	Dummy variable for the company's development stage (1=growth stage, 0=others)
Y3	Dummy variable for the year 2013
Y4	Dummy variable for the year 2014

For Hypotheses 1-a and 1-b (the impact of patents on funding amount) and Hypothesis 4 (comparing the responses of investment institutions with different backgrounds to patent signals), the dependent variable is the natural logarithm of the funding amount (LNINV), as these hypotheses explore how patents influence the amount of funding. For Hypothesis 2 (the impact of patents on the number of investment institutions), the dependent variable is the number of investment institutions (VCCOUNT). For Hypothesis 3 (the impact of patents on the speed of financing), the dependent variable is the natural logarithm of the waiting time for financing (LND), calculated from the company's establishment date to the financing date.

In line with previous research, patents are typically used as explanatory variables, often including factors like the number of patents or the nature of patent-related news (positive or negative). However, due to limitations in China's domestic databases, patent application data is not readily available. Thus, in our study, we use the total number of patents before funding (PATENT) as the independent variable for all hypotheses except Hypothesis 1-b. There are two main reasons for this choice:

- The signals available to venture capitalists at the time of decision-making are based on patent information prior to the funding date, as only publicly available data can influence investment decisions.
- The total number of patents before funding includes valid, invalid, and pending patents. Although invalid patents have lost legal protection (e.g., due to expiration or voluntary abandonment), they can still be used for product development, similar to how patent applications are treated in previous studies. Therefore, we include all patents when calculating the total number before funding.

For Hypothesis 1-b, the independent variable is the dummy variable PDUMMY, which indicates whether the company held any patents prior to receiving VC funding.

Additionally, we include multiple control variables to account for the characteristics of the startup companies and the VC firms. These control variables–company age (AGE), location (PLACE), industry (INDUSTRY), development stage (S1 & S2), and investment timing (Y3 & Y4)–are critical for the testing model. AGE reflects the number of years since the company's establishment, which is determined by verifying the founding date through online searches. PLACE is used to address the influence of a company's location on VC investment, as economic conditions and the investment climate are generally more favorable in Beijing, Shanghai, and Guangzhou. These locations are coded as 1, while other regions are coded as 0. Since different industries have varying levels of research and development (R&D) intensity, patent activity, and VC preferences, we distinguish between companies in the information transmission, computer services, and software industries (coded as 1) and other industries (coded as 0), under the variable INDUSTRY.

Moreover, we control for the development stages of the companies using two dummy variables, S1 and S2, to account for differences between early-stage and growth-stage companies, respectively. Given that our sample spans from 2013 to 2015, we also include the dummy variables Y3 and Y4 to control for the timing of investments during the observation period. These control variables help to isolate the effects of patent signals while accounting for the diverse characteristics of the companies and the investment environment.

4. EMPIRICAL ANALYSIS AND RESULTS

Three testing methods are employed in this study: descriptive statistical analysis and multiple linear regression analysis. Descriptive analysis involves examining the statistical results of various variables to analyze the characteristics of the sample. Multiple linear regression constructs regression models based on hypotheses to derive conclusions from the coefficients of the variables and the regression results.

4.1 Descriptive analysis for variables

Table 2 presents the descriptive statistics of variables in the study:

Table 2. *Descriptive statistics*

	Mean	**Median**	**Maximum**	**Minimum**	**Std. Dev.**	**Skewness**	**Kurtosis**
INV	6.705988	1.94	1000	0.01	29.06477	23.69634	744.4168
LNINV	0.75972	0.662688	6.907755	-4.605170	1.437012	-0.031140	3.621940
PATENT	4.041645	0	1000	0	30.81279	24.35279	710.5866
PDUMMY	0.215945	0	1	0	0.411585	1.380662	2.906228
AGE	5.307696	3	46	1	5.138128	2.628134	14.46011

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
LNAGE	1.317288	1.098612	3.828641	0	0.820891	0.309414	2.428011
VCCOUNT	1.214022	1	12	1	0.614139	5.521483	62.90753
PLACE	0.526927	1	1	0	0.499406	-0.107865	1.011635
INDUSTRY	0.491024	0	1	0	0.500051	0.035909	1.001289
DURATION	4.481521	2	45	0	4.937585	2.801645	15.80407
LND	1.064709	0.693147	3.806662	0	0.902721	0.473657	2.236330
S1	0.466737	0	1	0	0.499024	0.133347	1.017781
S2	0.499472	0	1	0	0.500132	0.002112	1.000004
Y3	0.226147	0	1	0	0.418445	1.309254	2.714146
Y4	0.363205	0	1	0	0.481050	0.568885	1.323630

The average financing amount among all samples is $6.706 million, with the highest financing amount reaching $1 billion. The average age of the companies is 5.3 years, with the longest being 46 years. The average number of investment institutions is 1.2, indicating that in most cases in the Chinese investment market, a single VC institution invests in one project. In terms of company locations, companies based in Beijing, Shanghai, and Guangzhou account for 52.7% of the samples, indicating that these three cities dominate half of the investment market. Regarding industry distribution, the sectors of information transmission, computer services, and software account for a large proportion, making up 49.1%. The average waiting time for financing in the sample is 4.5 years, meaning that on average, startups must wait 4.5 years after establishment to receive VC.

4.2 Testing Hypotheses 1-a and 1-b

The following regression models are used to test Hypotheses 1-a and 1-b respectively, and the results are summarized in Table 3.

$$\mathrm{LNINV} = \beta_1 \mathrm{PATENT} + \beta_2 \mathrm{VCCOUNT} + \beta_3 \mathrm{LNAGE} + \beta_4 \mathrm{Y3} + \beta_5 \mathrm{Y4} + \beta_6 \mathrm{INDUSTRY} + \beta_7 \mathrm{S1} + \beta_8 \mathrm{S2} + \beta_0 \quad (1)$$

$$\mathrm{LNINV} = \beta_1 \mathrm{PDUMMY} + \beta_2 \mathrm{VCCOUNT} + \beta_3 \mathrm{LNAGE} + \beta_4 \mathrm{Y3} + \beta_5 \mathrm{Y4} + \beta_6 \mathrm{INDUSTRY} + \beta_7 \mathrm{S1} + \beta_8 \mathrm{S} + \beta_0 \quad (2)$$

Table 3. *Regression results for the impact of patents on financing amount*

Explanatory variable	LNINV	
	Hypothesis 1-a	Hypothesis 1-b
PATENT	0.002255**	--
	(0.0263)	
PDUMMY	--	-0.00163
		(0.9849)
VCCOUNT	0.413643***	0.412459***
	(0.0000)	(0.0000)

Explanatory variable	LNINV	
	Hypothesis 1-a	**Hypothesis 1-b**
LNAGE	0.247865***	0.256256***
	(0.0000)	(0.0000)
Y3	-0.663520***	-0.66472***
	(0.0000)	(0.0000)
Y4	-0.504968***	-0.5079***
	(0.00000)	(0.0000)
INDUSTRY	-0.347653***	-0.35126***
	(0.000)	(0.0000)
S1	0.225324***	0.224896***
	(0.0095)	(0.0098)
S2	0.645880***	0.651968***
	(0.0000)	(0.0000)
R-squared	0.127906	0.125619
Adj. R-squared	0.124669	0.122374

Note: In parentheses are the p-values for the coefficients. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

The results indicate that the regression coefficient for the PATENT variable is 0.002255, which is positive and significant at the 5% significance level. This suggests that Hypothesis 1-a is valid; controlling for the number of institutions and company background, each additional patent before VC funding is associated with an approximate 0.23% increase in the financing amount. Therefore, the number of patents positively influences the financing amount, indicating that the stronger the patent signal, the greater the amount of VC investment. On the contrary, the regression coefficient for the PDUMMY variable is not significant, meaning that the presence of a patent does not affect the financing amount.

Comparing the results of the above two tests, it appears that VC companies pay more attention to the number of patents rather than the presence of patents. Therefore, the invested companies should not only apply for patents but also improve their technological capabilities to obtain more patent rights, thereby effectively attracting VC companies and increasing the financing amount.

4.3 Testing Hypotheses 2 and 3

The following regression models are used to test Hypothesis 2 and Hypothesis 3. The results are shown in Table 4.

$$\begin{aligned}\mathrm{VCCOUNT} = {} & \beta_1 \mathrm{PATENT} + \beta_2 \mathrm{LNAGE} + \beta_3 \mathrm{Y3} + \beta_4 \mathrm{Y4} + \beta_5 \mathrm{S1} + \beta_6 \mathrm{S2} \\ & + \beta_7 \mathrm{PLACE} + \beta_8 \mathrm{INDUSTRY} + \beta_0\end{aligned} \tag{3}$$

$$\mathrm{LND} = \beta_1 \mathrm{PATENT} + \beta_2 \mathrm{LNAGE} + \beta_3 \mathrm{Y3} + \beta_4 \mathrm{Y4} + \beta_5 \mathrm{S1} + \beta_6 \mathrm{S2} + \beta_7 \mathrm{PLACE} + \beta_8 \mathrm{INDUSTRY} + \beta_0 \quad (4)$$

Table 4. *Regression results for the impact of patents on the number of investment institutions*

Explanatory variable	**VCCOUNT**	**LND**
PATENT	-0.000180	0.001780***
	(0.7104)	(0.0029)
LNAGE	0.180974***	0.221115***
	(0.0000)	(0.0000)
Y3	-0.105017**	0.268074***
	(0.0157)	(0.0000)
Y4	-0.051819	0.119722***
	(0.1443)	(0.0041)
S1	0.968894***	0.200649***
	(0.0000)	(0.0001)
S2	0.863551***	1.173341***
	(0.0000)	(0.0000)
PLACE	0.116420***	-0.12543***
	(0.0001)	(0.0009)
INDUSTRY	0.093574***	0.00178***
	(0.0027)	(0.0029)
R-squared	-0.091263	0.228722
Adj. R-squared	-0.095313	0.226265

Note: In parentheses are the p-values for the coefficients. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

When using VCCOUNT as the dependent variable, the coefficient for the PATENT variable is negative but not significant. This suggests that patent signals do not have a significant influence on the number of investment institutions that invest in the company. We argue that in China's investment environment, most projects are funded by a single VC institution. Therefore, if startups aim to attract multiple investors, simply increasing the number of patents may not be an effective strategy. Startups likely need to pursue other approaches or business strategies to secure investment from multiple companies. Additionally, we observed that the R^2 value for this regression is negative, indicating that this model may not be well-suited for explaining the variation in the number of investment institutions using PATENT and other control variables.

In contrast, when LND is the dependent variable, the coefficient for PATENT is positive and significant (at the 1% level), suggesting that the more patents a company has, the longer the financing waiting time. However, this empirical finding does not support Hypothesis 3 and contradicts our initial expectations. This discrepancy may arise from the method used to calculate the financing waiting time. We collected data on the dates of financing and company establishment, calculating the financing waiting

time (DURATION) by subtracting the establishment date from the financing date. This approach assumes that companies apply for financing immediately after establishment, as data on the actual dates of financing applications are not available. In reality, many companies seek financing several years later due to strategic considerations, and some are founded only after receiving initial funding. Furthermore, when a company holds patents, VC institutions may require additional time to study and verify them, which extends the waiting period before the company secures financing. These factors may explain the unexpected result for Hypothesis 3.

4.4 Testing Hypothesis 4

Hypothesis 4 states that the effect of patent signals varies across different types of investment institutions in terms of their investment amount. We argue that patent signals have a greater impact on foreign investment than on Chinese (i.e., domestic) or joint (domestic and foreign) ventures. We categorized the samples into three groups based on domestic, foreign, and joint venture backgrounds. A regression model used for testing Hypotheses 1-a and 1-b was then applied, and the results are summarized in Table 5.

Table 5. *Regression results of LNINV on PATENT in three separate data samples*

Variable	**LNINV**		
	Domestic VC investment	**Foreign VC investment**	**Joint VC investment**
PATENT	0.003101*	0.016720	0.001816
	(0.0571)	(0.1470)	(0.1043)
VCCOUNT	0.435795***	0.716662***	0.542273***
	(0.0000)	(0.0001)	(0.0000)
LNAGE	0.209682***	0.148349	0.389897***
	(0.0002)	(0.5803)	(0.0000)
Y3	-0.737395***	-0.956165**	-0.687364***
	(0.0000)	(0.0216)	(0.0000)
Y4	-0.430072***	-0.943627***	-0.685842***
	(0.0000)	(0.0073)	(0.0000)
INDUSTRY	0.028716	0.779211*	0.374380**
	(0.7858)	(0.0723)	(0.0267)
S1	0.530249***	1.424164***	0.467211**
	(0.0000)	(0.0039)	(0.0107)
S2	-0.381075***	-0.445214	-0.319131***
	(0.0000)	(0.1241)	(0.0048)
R-squared	0.163846	0.244854	0.203854
Adj. R-squared	0.158491	0.193030	0.192315

Note: In parentheses are the p-values for the coefficients. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

The regression results indicate that the impact of patent quantity differs across the three types of investment institutions. Specifically, each additional patent increases the investment amount by 0.31% for domestic institutions, 1.69% for foreign institutions, and 0.18% for joint ventures (based on the increase in the natural logarithm of the investment amount from the coefficient). This suggests that the influence of patent signals is strongest for foreign VC institutions, followed by domestic and joint venture institutions. Intuitively, it is expected that foreign investment institutions, having less information about domestic startups, would find patent signals more impactful. In contrast, domestic and joint venture institutions, being more familiar with the local investment environment and information, may rely less on patent signals. However, our results show that for both the foreign VC and joint VC samples, the coefficients for PATENT are not statistically significant. Therefore, Hypothesis 4 cannot be confirmed.

4.5 Summative discussions

To explore the effects of patent holdings on startup financing, several key areas were focused in our study: financing amount, number of investment institutions, and financing waiting time. The content of hypotheses and empirical results are summarized in Table 6.

Table 6. *Summary of hypothesis testing results*

Hypothesis	**Conclusion**
Hypothesis 1-a: The more patents a company has, the higher the financing amount.	Supported
Hypothesis 1-b: Companies with patents receive more financing than those without.	Not supported
Hypothesis 2: The more patents a company has, the more investment institutions it attracts.	Not supported
Hypothesis 3: The more patents a company has, the faster it can obtain VC.	Not supported
Hypothesis 4: The effect of patent signals is greater on foreign investors than on domestic or joint ventures.	Not Supported

Regarding the impact of patents on financing amounts, the regression analysis indicates that the number of patents held by startups significantly affects the amount of financing they receive. Patents act as a positive signal that enhances investor confidence and reduces information asymmetry, prompting VC institutions to invest larger amounts in companies with a higher number of patents. Interestingly, it is not just the presence or absence of patents that matters, but the quantity, as VC firms tend to focus more on the number of patents when making investment decisions.

As for the impact of patents on the number of investment institutions, the findings suggest that in the Chinese investment environment, this impact is not significant. Startups typically have specific targets and strategies for attracting VC, and an increase in the number of patents does not necessarily lead to attracting more investors.

Regarding the impact of patents on financing waiting time, the analysis highlights data limitations in accurately capturing the financing waiting period, which is defined as the time between applying for and receiving financing. Additionally, VC firms may need time to vet the background of a startup's patent holdings before offering financing, which can extend, rather than shorten, the waiting period. These factors may explain why the model results do not align with the initial hypothesis. Future research should aim to collect more accurate data on financing waiting time to better understand the relationship between patent holdings and the speed of obtaining VC.

Lastly, concerning the influence of patent signals on different types of investment institutions, it was initially expected that patent signals would have varying impacts across different types of investors, with the strongest effect on foreign investors, followed by domestic or joint venture VC investors. This variation was attributed to differences in information accessibility: foreign investors often face greater information asymmetry when investing in domestic startups compared to domestic and joint venture institutions, which have better knowledge of the local investment environment and targets, making them less reliant on patent signals. However, our results indicate that patent signals do not significantly influence the VC amount decisions of foreign or joint venture institutions.

5. PRACTICAL IMPLICATIONS FOR ASIAN BUSINESS

China's pre-pandemic analysis of patent signaling in its venture capital market provides crucial lessons for Asian businesses navigating information asymmetry and innovation-driven growth. The study's empirical findings, particularly its hypothesis tests, reveal actionable strategies for startups, investors, and policymakers across the region:

For startups: Prioritize volume from substance

Hypothesis 1-a's validation (more patents correlate with larger funding rounds) is a key takeaway. In China's dominant tech sectors (internet/IT/telecom), patent quantity effectively signaled technological capability. Asian startups must therefore prioritize systematic patent accumulation tightly linked to genuine R&D programs, moving beyond treating IP as mere compliance. However, Hypothesis 1-b's rejection (merely possessing patents does not guarantee a

funding advantage) is a critical warning. Token filings are ineffective. Patents must stem from substantive innovation to be credible signals.

While patents didn't attract more investors (Hypothesis 2 rejected) or accelerate funding speed (Hypothesis 3 rejected), they secured deeper financial commitments from lead investors. Founders should focus on attracting specialized VCs who value technological depth over broad, shallow syndicates.

For VC: Decode signals locally

VCs can leverage patent quantity (Hypothesis 1-a supported) as a cost-effective initial screening tool, especially in high-information-asymmetry markets like Southeast Asia or India. Hypothesis 4's rejection (foreign investors did not rely more heavily on patents than local investors) is pivotal. Patents alone cannot substitute for deep local market knowledge. International VCs must either partner with local firms or build in-house expertise to accurately contextualize patents – their value is heavily dependent on local regulations, competitive landscapes, and enforcement realities.

China's trend towards single-lead investors demonstrates that strong signals enable concentrated, high-conviction bets. VCs need robust frameworks to assess not just patent volume, but also quality (strength, market fit, freedom-to-operate).

For policymakers: Build credible intellectual property (IP) systems

The reliance on patent volume as a signal underscores the fundamental need for credible and trustworthy IP systems. Policymakers must actively ensure transparency (e.g., via real-time national patent databases as advised by the study) and reliability through rigorous examination processes and enforceable rights.

To attract VC investment (per Hypothesis 1-a), governments should explicitly link R&D incentives to tangible patent outputs, strengthen university technology transfer mechanisms, and offer subsidized IP services for SMEs (small and medium-sized enterprises). In addition, regional harmonization should be examined as regional cooperation (e.g., ASEAN patent data sharing and examination harmonization) is essential to reduce cross-border frictions and enhance the utility of patents as regional signals.

In summary, China's VC analysis confirms that patent quantity (Hypothesis 1-a) unlocks larger funding by mitigating information asymmetry, while mere patent possession (Hypothesis 1-b rejected) offers no inherent advantage. Patents neither attract more investors (Hypothesis 2 rejected) nor accelerate funding speed (Hypothesis 3 rejected), and foreign VCs show no heightened reliance on them

versus local knowledge (Hypothesis 4 rejected). For Asia's burgeoning innovation economies, this demands:

- Startups prioritize generating significant patent volume stemming from genuine R&D.
- VCs balance quantitative patent metrics with deep local insight and quality assessment.
- Policymakers fortify IP systems to ensure patent signals are transparent, reliable, and regionally compatible.

Effectively harnessing these insights allows patent signals to function as powerful catalysts for resilient, innovation-driven growth across the diverse Asian landscape.

6. CONCLUDING REMARKS

In this study, we investigate the impact of patent signals on VC investment behaviors in China between January 1, 2013, and December 20, 2015. We proposed and empirically tested four hypotheses. Our results indicate:

- The number of patents positively influences the amount of financing. The more patents a startup holds, the more investment it can attract from the VC institutions. We argue that a greater number of high-quality patents leads to higher valuations by VC firms, who view them as indicators of strong innovation capabilities and future potential returns, thereby increasing the financing amount a startup can secure.
- VC institutions pay more attention to the number of patents rather than whether a company simply has patents or not. Startups should not only acquire patents but also enhance their technological capabilities to increase their patent portfolio.
- Patent signals do not significantly influence the number of VC firms involved in financing. In China's investment environment, most projects receive investment from a single VC firm.
- For startups, patents do not significantly impact the waiting time to secure VC financing. However, we argue that this might be due to data limitations for our calculation of accurate waiting time, where the data of the start times of startups' financing applications was not available.
- About the influence of patent signals on different Investment Institutions, we found that the impact of patent signals varies across different types of investment institutions, but the results are not statistically significant. Patent signals'

associations with different VC investment decisions, beyond the VC amount used in our study, can be explored in future research.

Our research contributes to the literature by systematically analyzing the relationship between patents and VC investment behavior in China. From a governmental perspective, to foster a robust investment environment and promote a thriving VC market, it is advisable to increase market transparency and openness, including the establishment of comprehensive patent information platforms. Such platforms should provide rich, timely, and broad coverage, regularly updated to reflect companies' patent statuses. This would offer VC institutions a reliable source of information, enabling them to make informed investment decisions. Moreover, such a platform could encourage companies to seek patent recognition, highlighting their research and development efforts and fostering innovation. Startups could also use this information to understand market trends and innovate accordingly.

For VC firms, patents serve as a critical tool for reducing information asymmetry. The patent information of startups reflects their research capabilities and signals their future potential, thereby reducing investment risk and increasing potential financial returns. Additionally, investing in patent-holding startups offers VC firms the opportunity to learn new technologies, with the assurance that these innovations are recognized by patent offices, potentially yielding strategic benefits.

For startups, the research findings indicate that patents have a positive impact on financing. While patent signals do not notably affect the number of investment institutions or the financing waiting time, they play a crucial role in reducing uncertainty and increasing investor confidence. Consequently, startups with more patents are likely to secure more substantial VC investments. Also, companies should leverage their technological innovations to develop and apply for patents early on. While the cost of obtaining patents is significant, patents can substantiate the company's value and secure more substantial financial support.

Our research has the following limitations. First, we purposely chose the data sample that ends before the COVID pandemic to avoid the influence of unknown and non-business factors during the pandemic period. Due to time and resource constraints, the study's sample period covers three years and includes 1,894 samples, which may limit our analysis implications. Our future research could extend the timeframe and include more samples for greater generalizability and accuracy. Additionally, the selected projects in our samples have only undergone their first round of financing. Extending the study period could provide data on second or subsequent rounds of financing, allowing for a more dynamic analysis of the impact of patent signals. Specifically, it would enable comparisons between companies with and without patents,

assessing whether companies with patents achieve higher valuations or secure more substantial second-round financing. In addition, the study acknowledges the potential inaccuracy in calculating financing waiting times due to assumptions made. Future research should seek more precise data from other sources to improve this calculation.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 33 of 49
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0002

UNDERSTANDING THE IMPACT OF PERCEIVED RISKS ON AI ADOPTION AMONG PHYSICIANS

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Abstract: *Artificial intelligence (AI) is progressively transforming the medical field, offering new diagnostic and therapeutic possibilities. However, its adoption remains uneven among physicians, shaped by the tension between technological promises and perceived risks. This study explores the factors influencing AI adoption by combining the concepts of technological promises and the temporality of perceived risks.*

We conducted 20 semi-structured interviews with physicians from various specialties, analyzed through a thematic approach using NVivo. Findings reveal a dual dynamic structuring attitudes toward AI. On the one hand, physicians view AI as a promising tool capable of improving diagnostic accuracy, streamlining patient management, and reducing administrative burden. On the other hand, four categories of perceived risks hinder adoption: (1) professional risks (loss of autonomy, algorithmic dependence), (2) risks for patients (dehumanization, standardized care), (3) algorithmic biases (inequities, diagnostic errors), and (4) data security concerns (breaches of confidentiality, control of sensitive information).

Perceptions are strongly shaped by temporality: immediate risks (such as errors or loss of expertise) are more salient, while delayed risks (such as long-term role transformation or evolving care standards) create persistent uncertainty. This temporal tension influences adoption decisions, particularly in specialties where human interaction is central.

The study underscores the need for proactive management of expectations and uncertainties to support the responsible integration of AI in medical practice.

Keywords: *Artificial intelligence, technology adoption, perceived risks, technological promises, temporality, medicine.*

JEL Classification:

1. INTRODUCTION

Artificial intelligence (AI) is at the heart of a major transformation in the healthcare sector. Its adoption generates both hope and concerns, forming what some authors call a "digital mythology," where the vision of a life-saving technology ("tech for good") contrasts with that of a potential threat ("tech for worst") (Mateu, 2019).

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Driven by significant advancements in algorithms, AI technologies have rapidly expanded in the healthcare sector (Rialle, 2021). In the medical field, AI is defined as a technology capable of learning and understanding health data, performing complex diagnoses, and analyzing large volumes of information to support healthcare professionals (Pelaccia et al., 2020).

However, the integration of AI in medicine still raises many questions among practitioners. Although these technological solutions continue to advance, their adoption remains uneven across medical specialties. For instance, radiology is among the fields most heavily invested in AI applications, whereas other areas, such as psychiatry or general medicine, remain less engaged (Pakdemirli & Weigner, 2020; Stewart et al., 2020).

Most physicians, who are key players in the healthcare system, face a lack of in-depth research on the effects of AI on their practice and the conditions that facilitate its acceptance (Stewart et al., 2020). It is within this context that our study is positioned, aiming to explore AI adoption among physicians through the concepts of technological promises and the temporality of perceived risks.

Our research seeks to understand how the promises surrounding AI technologies influence their adoption, while also identifying the perceived risks that may hinder the integration of AI into physicians' daily practice. This study aspires to enrich the existing literature, which still lacks appropriate theoretical frameworks to describe the challenges healthcare professionals face in response to major technological innovations (Habib et al., 2017).

The adoption and diffusion of innovations have been extensively studied in academic research (Rogers, 2003; Roehrich, 1993, 2004; Volle, 1995; Cestre, 1996; Jansson, 2011; Flight et al., 2011), yet few studies have specifically focused on physicians' perceptions of AI.

In general, technology acceptability can be defined as an individual’s a priori perception of a system or technology, leading to their intention to use it (Tricot et al., 2003). Acceptability is thus closely linked to use scenarios and the promises of AI. For example, a study conducted among gastroenterologists indicates that the usage scenarios of AI solutions significantly influence their acceptability among healthcare professionals (Goh et al., 2024).

Adoption (Rogers, 1995), on the other hand, refers to the transition from acceptability to the actual integration of AIinto daily medical practice. This transition can be explained both by the temporal gap between risk perception and benefit perception and by the distortion of risk perception over time (Baucells & Heukamp, 2012).

However, AI is often regarded as a "promising technology" since its various stages of development have always been driven by technological promises about its special capabilities and potential when applied to economic and societal challenges (Hirsch-Kreinsen, 2024). AI promises often manifest in the implicit or explicit commitments of developers and companies toward users, promising improvement, efficiency, and societal transformation. Unlike a pure promise, which is an unconditional commitment detached from real-world constraints (Jean-Pierre Lalloz, 2000), AI promises are often conditional commitments tied to expected performance, measurable results, or specific improvements.

In the healthcare sector, AI-related promises focus on two main areas: enhancing prevention and diagnostics for patients, and maximizing performance, profitability, and competitiveness of medical institutions, whether public or private.

In medical AI solutions, these promises represent potential engagement levers, influencing how physicians perceive the benefits of AI (e.g., improving diagnostics, optimizing treatments, or efficiently managing medical records). Understanding how these promises are perceived by healthcare professionals can significantly impact AI acceptability and adoption (Liang et al., 2023).

However, these promises can also generate mistrust due to perceived risks, particularly when considered holistically. Ravichandran et al. (2001) argue that "perceived risks can be defined as the risk of making the wrong choice, a particularly significant concern for systemic innovations–those that modify standards and create network externalities."

Behavioral economics research has highlighted the complex interaction between risk and time in decision-making (Halevy, 2008; Andreoni & Sprenger, 2012). Physicians' decisions regarding AI adoption are not limited to an immediate evaluation of its benefits and drawbacks but are embedded in a temporality where consequences can be either immediate or delayed. These dynamic leads professionals to assess risks differently, depending on whether they manifest in the short or long term. For instance, loss of decision-making autonomy is an immediate concern, whereas the gradual alteration of the physician's role constitutes a long-term risk.

The evaluation of risk associated with an innovation is thus a critical step in the overall assessment of the innovation itself (Guilhon & Montchaud, 2003). The gap in perception between those who design an innovation and those who use it poses a major risk to its adoption.

However, this risk assessment is not uniform: according to intertemporal risk theory (Halevy, 2008; Baucells & Heukamp, 2012), individuals may perceive an immediate risk and a delayed risk differently over time. In the case of AI in healthcare,

certain risks are immediate (e.g., loss of physician autonomy, diagnostic errors due to algorithmic biases), while others are deferred (e.g., gradual transformation of the physician's role, long-term impact on the doctor-patient relationship).

This duality between immediate and deferred risks can have a direct influence on AI acceptability and adoption among physicians, who must balance the immediate benefits of AI with the long-term uncertainties it generates. The gap between AI promises and the perceived risks among physicians could serve as an early indicator of whether AI solutions will be widely adopted or not.

Given these insights, we observe the emergence of a triptych between technological promises, perceived risk temporality, and AI adoption in the context of introducing AI to physicians. Increasing AI adoption requires a management strategy that aligns expectations generated by AI promises while simultaneously mitigating the risks that may arise from its implementation.

Building on the work of Halevy (2008) and Baucells & Heukamp (2012) on decision-making under uncertainty across different time horizons, we propose an original conceptual framework that examines whether perceived risk can explain the low adoption rate of AI in medical practice.

2. METHODS

To conduct this study, we opted for a qualitative and exploratory research method. This approach was chosen to explore or deepen the understanding of an empirical phenomenon that has been little addressed in the literature. We also adopted a phenomenological reasoning approach, involving multiple iterative exchanges between the collected data and existing literature. For instance, while the study initially focused exclusively on physicians, it was later expanded to include medical interns due to the low number of responses.

Regarding data collection, we conducted 20 semi-structured interviews with physicians (radiologists, nephrologists, geneticists, psychiatrists, etc.) and medical interns. We present in Table 1 some the characteristics of the participants along several dimensions including age, gender, medical specialties and workplace. All interviews were conducted via videoconferencing, recorded, and transcribed.

Table 1. *Characteristics of Participants*

Characteristics	**Physicians (n=20)**
Age (years)	30–70
Gender (M/F)	10 / 10
Medical Specialties (N=20)	

Characteristics	**Physicians (n=20)**
Psychiatry	5
Genetics	2
Radiology	3
Anatomopathology	2
Anesthesiology	2
Others (Oncology / Nephrology / Urology / Gastroenterology / Cardiology / Surgery)	6
Workplace (N=20)	
Public / Private	15 / 5
Paris / Other regions	14 / 6
Attitude toward AI (Favorable / Unfavorable)	18 / 2
Experience with AI (Yes / No)	8 / 12
Professional Role (Junior / Senior)	8/12

We performed a thematic analysis of the collected material using NVivo coding software. The dataset was segmented into representative themes aligned with our research focus, allowing us to create a coding framework combining emerging codes (E) and a priori codes (AP). This framework was structured around three key concepts: AI promises, Perceived risks, and AI adoption.

A priori codes were derived from existing literature on consumer vulnerability, AI ethics, and clinical risk (Baker et al., 2005; Hamilton et al., 2015; Ganascia, 2018). These included loss of autonomy, relational vulnerability, responsibility gaps, risk perception, and data vulnerability. Inductive coding identified several emerging codes such as loss of diagnostic sovereignty, deskilling, algorithmic dependency, loss of empathy, communication breakdown, unequal training data, misdiagnosis concerns, and fears of data misuse. All codes were grouped into five overarching themes: perceived benefits, professional risks, patient-related risks, algorithmic biases, and data security risks. A basic quantitative lexical analysis was also performed, showing that terms related to risk, diagnosis, data and control were the most frequent, reflecting the categories identified (see table 2). To ensure reliability, a test-retest intra-coder check was performed on 10% of the corpus, producing a Cohen's Kappa of 0.82, indicating strong coding consistency over time.

Table 2. *Summary of the Thematic Analysis Protocol*

	Description
Type of Analysis	Hybrid thematic analysis (inductive + deductive coding)
Corpus	20 semi-structured interviews (≈ 75 pages)
A Priori Codes (Deductive)	Loss of autonomy; Relational vulnerability; Moral vulnerability; Perceived risk; Informational vulnerability; Perceived usefulness of AI

	Description
Emergent Codes (Inductive)	Loss of clinical intuition; Deskilling; Algorithmic dependency; Dehumanization ; Communication breakdown; Data bias; Fear of data leakage; Diagnostic enhancement; Patient flow optimization; Reduction of administrative burden; Support for clinical decision-making
Final Categories (Themes)	(1) Professional risks; (2) Risks for patients; (3) Algorithmic biases; (4) Data-related risks; (5) Perceived benefits of AI for physicians (improved diagnosis, optimized patient management, reduced administrative workload)
Lexical Analysis	Word frequency analysis → 20 most frequent terms (e.g., algorithm, data, error, decision, diagnosis, patient, trust, risk, control)
Category Weighting	Professional risks (31%), Risks for patients (24%), Algorithmic biases (19%), Data-related risks (14%), Perceived benefits (12%)
Temporal Codes	Immediate risks: loss of autonomy, diagnostic errors, overload. Delayed risks: long-term deskilling, transformation of the physician's role, structural inequalities
Reliability (Test–Retest)	Cohen's Kappa = 0.82 (intra-coder agreement, indicating strog reliability)

3. RESULTS

Our research identified four types of perceived risks among physicians that may influence the adoption of AI in healthcare, as well as the promises associated with the projected use of AI solutions. The perceived risks are categorized into four main groups: professional risks for physicians, risks for patients, risks related to algorithmic biases, risks concerning data security.

On the other hand, the promises of AI refer to its perceived potential benefits, which directly impact physicians' ability to envision its future use. Many physicians view AI as an opportunity to reduce errors, acting as a safeguard to maintain consistent medical practice. AI is also perceived as a means to keep pace with medical innovation, improve efficiency and productivity, and treat more patients in less time. Finally, AI is seen as providing greater freedom, by democratizing medical knowledge and making medical communication more accessible and understandable.

Our research also revealed a form of duality, stemming from the contradiction between AI promises and perceived risks among physicians. This duality plays a crucial role in AI adoption and is structured around two key dimensions:

- The tension between AI promises and high expectations: AI is perceived as a major breakthrough that enhances diagnostics, therapeutic effectiveness, and healthcare organization. However, these promises often creates high expectations, and any gap between actual performance and initial expectations can lead to disappointment.

- The relationship between perceived risks and resistance: The more ambitious the promises, the more concerns arise regarding dehumanization, algorithmic biases, and data security. This contrast reinforces physicians' caution, often slowing down the adoption of AI technologies.

3.1 The Impact of AI Promises on Adoption

One of the main drivers of AI adoption lies in its potential to enhance medical diagnostics. AI is perceived as a complementary tool, capable of optimizing diagnostic accuracy and reducing medical errors.

"*I see AI as a kind of safety net that can help me avoid missing a diagnosis.*" (Gastroenterologist)

This safeguarding role is particularly valued in specialties such as radiology and pathology, where image analysis plays a crucial role.

"*In radiology, we often face an overwhelming workload of image analyses. AI can help us prioritize the most critical cases and reduce the risk of errors.*" (Radiologist)

Another key argument favoring AI adoption is its ability to reduce the cognitive and administrative burden on physicians.

"*Nowadays, we spend an incredible amount of time on paperwork. If AI can relieve us of administrative tasks, that's more time we can dedicate to our patients.*" (Gastroenterologist)

Some practitioners also see AI as an opportunity to enhance their role, allowing them to focus on more complex medical tasks.

"*Rather than wasting time on technical tasks, I prefer using my expertise to engage in meaningful discussions with my patients.*" (Oncologist)

However, this transformation also raises concerns among some physicians, who fear a reduction in their role to that of a mere supervisor of algorithms.

"*There is a real risk that AI will change our profession. If it does everything for us, we will eventually lose our own expertise.*" (Radiologist)

3.2 Risks and Temporality

3.2.1 Professional Risks for Physicians

One of the main perceived risks concerns the transformation of the physician's role over time and the fear of losing expertise.

"*The risk is that, over time, physicians will lose what we call... the art of practice, and everything will become automatic...*" (Nephrologist)

Some practitioners also fear excessive dependence on AI system recommendations, which could impair their clinical judgment and reduce their decision-making autonomy.

"*Well, I think relying too much on AI without knowing its limitations can be a real risk.*" (Cardiologist)

"*We risk becoming dependent on these AI tools, and that's why we need to be careful about how we use them.*" (Surgeon)

"*AI might make our job more complicated because we will be faced with an overwhelming number of possibilities. This is something we already see in lung nodule screening–there is an explosion in case recruitment… We spend more time ruling out nodules than confirming them.*" (Radiologist)

This concern can be analyzed through two types of intertemporal risks:

Immediate risk, perceived at the time of AI adoption, when physicians experience a rapid transformation of their role, a devaluation of their working time, or a loss of control over patient data.

"*Obviously, this poses an immediate problem for radiologists because there will be less need for them.*" (Emergency Physician)

"*This AI-based application will soon be available on all European physicians' smartphones, allowing anyone to request a diagnosis at any time of the day. And now I'm being asked to diagnose cases for everyone without being paid, so I asked this question: Who will pay for the medical time dedicated to these patients?*" (Geneticist)

"*The real risk for physicians is that they will feel dispossessed of their own patient data.*" (Oncologist)

Delayed risk, more diffuse, materializing over time (e.g., gradual loss of clinical expertise, reduction in the value of human diagnosis compared to AI, increased fragmentation of medical tasks).

"*We need to keep in mind that if we rely too much on AI for contouring, younger physicians will lose the habit over time. As generations pass, this skill could disappear if we are not careful.*" (Radiologist)

"*In the future, everything will be put into a machine, and then we'll just extract the numbers and tell the patient that the doctor no longer matters.*" (Nephrologist)

"*I can't say exactly, but I fear that AI will eventually take control, and people will rely entirely on it, to the point where clinical reasoning is no longer used.*" (Radiologist)

"*This is already the current trend, and I think it could go even further, which is a major, major risk–moving towards something even more technical than today, with an increasingly fragmented view of the person, even their psychological structure.*" (Psychiatrist)

These risks resemble the violations of Expected Utility (EU) observed in decision-making literature under risk and uncertainty (Allais, 1953; Tversky & Kahneman, 1992). Physicians must weigh the immediate gains in efficiency against the long-term risk of losing autonomy, which could explain the variability of attitudes towards AI across different medical specialties.

The standardization of diagnostics and treatments imposed by AI also raises concerns, especially in specialties where personalized care is essential (e.g., psychiatry).

"*That's the real risk with AI–that we end up with something very reductive, which doesn't take into account the complexity of the human being.*" (Psychiatrist)

Furthermore, physicians' performance evaluations could be influenced by AI-imposed criteria, leading to a form of algorithmic control over medical practice.

"*With AI, there will also be increased pressure on those who remain in the system–they will be more tested, more controlled.*" (Pathologist)

3.2.2 Risks for Patients

The risk of dehumanizing the doctor-patient relationship is a central concern raised by practitioners.

"*After 25 years in psychiatry, I have learned–and all my colleagues say the same–that it is the relationship that heals. Nothing can replace human interaction. If AI completely replaces human relationships, that is not good.*" (Psychiatrist)

"*The main risk for patients is the loss of human presence–it's the risk of eliminating human interaction.*"(Nephrologist)

Physicians are questioning AI's impact on the quality of clinical interactions and personalized care. Some fear that increased reliance on AI could reduce empathy and diminish consideration for the subjective aspects of patient suffering.

"*It's hard to say, but if human contact disappears with the arrival of AI, we will also lose compassion, empathy, and the ability to understand suffering. The human aspect of the relationship will be greatly diminished.*" (Radiologist)

"*Replacing human interaction between the doctor and the patient with AI can sometimes lead to significant errors.*" (Gastroenterologist)

This concern reflects a dual temporality of risks:

In the short term, doctors perceive a potential degradation of human interaction, particularly in consultations where AI is too prominent.

"*I notice that more and more, the care relationship is being replaced by highly technical elements–we are overwhelmed by these things… But today, with the arrival of AI, a kind of imbalance is emerging; it is becoming very, very technical and fragmented.*" (Psychiatrist)

"*I think a machine will never be able to do what we do–detect the emotions of patients when you see them face-to-face.*" (Gastroenterologist)

In the long term, changes in medical practice could lead to a deeper transformation of the healthcare model, gradually reducing the physician's role in personalized patient care.

"With AI, the doctor-patient relationship weakens over time. If the relationship disappears, diagnostic accuracy declines, and the patient begins to think they no longer need you. Sometimes, this could lead to missing very serious conditions." (Gastroenterologist)

"In psychiatry, the main risks related to AI are primarily medical risks, such as overdiagnosis–where AI might detect and label problems that don't actually exist." (Psychiatrist)

This temporal duality echoes research on preference for certainty (Andreoni & Sprenger, 2012), which suggests that individuals tend to prefer decisions with an immediate impact over those with long-term consequences. This preference may explain greater reluctance to adopt AI in specialties where the doctor-patient relationship is central (e.g., psychiatry, general medicine).

Additionally, there is widespread concern that automated decision-making could marginalize human intervention, particularly in cases where available data is incomplete or ambiguous.

3.2.3 Risks Related to Algorithmic Biases

Physicians also express strong distrust toward biases inherent in AI models. These biases can be structural (linked to the datasets used to train the algorithms) or amplified by design errors.

"*We must also be very vigilant about the biases we introduce into AI ourselves, whether through the data or the algorithmic methods we use. Sometimes, we notice these biases, but the risk exists that in other cases, we don't, and we end up using tools that produce poor results.*" (Pathologist)

For example, several practitioners have raised concerns about sociocultural biases in AI-assisted diagnostics, which could lead to discrimination in healthcare access.

"*It depends on the type of data we choose to include in these algorithms. If we use relevant medical data such as patient history, age, or syndromes, that makes sense.*

But if we start incorporating social status or economic conditions into the dataset, it could lead to discrimination in patient selection." (Gastroenterologist)

"*Algorithmic discrimination is a societal issue that must be addressed through discussions with public authorities.*" (Psychiatrist)

"*Of course, there is discrimination through AI algorithms. As I mentioned, look at the example of insurers–it's terrible. This is already happening today with people who have had cancer or chronic kidney disease. They systematically get denied bank loans. The problem is, AI will assign you a probability–your likelihood of staying healthy or getting sick–but it's just a global percentage. That's why the role of physicians must remain crucial.*" (Nephrologist)

The lack of transparency in algorithmic decision-making also reinforces fears about medical responsibility in case of errors.

"*Biases are significant, especially when predicting unknown variables, such as a genetic marker. In my training set, I know the expected output variable, but I don't know which specific parts of the image will predict it… That's the real issue with the AI 'black box'–it's a major problem.*" (Pathologist)

3.2.4 Risks Related to Data Security

The protection of health data is also a major concern for the professionals interviewed. The integration of AI requires the processing of large volumes of medical data, posing challenges in terms of cybersecurity and confidentiality.

"*I wonder where medical confidentiality stands because everything is so public today... it's terrible (…), there's almost no medical secrecy in practice anymore.*" (Surgeon)

"*This is still a form of commercialization because patient data is being used for purposes other than research.*" (Radiologist)

Physicians highlight the risks of hacking, data misuse, and loss of control over sensitive medical information. Some also express concerns about dependence on private sector actors developing these technologies, particularly regarding the commercial use of health data.

"*As a French pathologist, when I see that I check a patient's name, date of birth, diagnosis, number of affected lymph nodes, and histological type, and then a commercial representative from a U.S. company calls me saying, 'So, Mrs. S., you have X% of this and Y% of that'–I find that shocking. But well, that's how the oncology business works.*" (Pathologist)

Our findings indicate that perceived risks are also influenced by their temporality.

Professional risks: Physicians immediately perceive a loss of decision-making autonomy, making AI intrusive and limiting their clinical judgment. However, in the long term, repeated use of AI could reduce learning and expertise, leading to growing dependence on these systems and a decline in medical skills.

Risks for patients: In the short term, AI may improve diagnoses and treatments, but physicians fear that in the long run, dehumanization of the doctor-patient relationship could negatively impact the quality of care. Increased reliance on AI at the expense of human interaction could weaken physicians' ability to fully understand patient needs.

Algorithmic bias risks: In the short term, algorithmic biases can lead to diagnostic and treatment errors, making certain patients more vulnerable than others. Over time, these biases could reinforce inequalities in healthcare access, structurally altering the way medical services are organized and delivered.

Risks related to data security and access: Data vulnerability is an immediate concern, particularly due to the risks of cyberattacks and information leaks. However, in the long term, dependence on private AI systems could create an information monopoly over health data, jeopardizing the sovereignty of public healthcare systems.

Our findings also reveal a contradiction between AI promises and physicians' perceived risks. This duality is structured around two key dimensions:

The tension between AI promises and high expectations – AI is perceived as a revolutionary tool, expected to enhance diagnostics, improve treatment effectiveness, and optimize healthcare organization. However, any discrepancy between real-world performance and initial expectations can lead to disappointment.

The link between perceived risks and resistance – The more ambitious the promises, the greater the concerns about dehumanization and data security. This opposition reinforces physicians' caution, often slowing the adoption of these technologies.

The study highlights a dual dynamic in AI adoption in medicine: AI promises drive conditional adoption and gradual acceptance among physicians, particularly in areas related to diagnostic assistance, administrative task management, and overall healthcare improvement. Perceived risks (automation of medical decision-making, algorithmic biases, and organizational transformations) slow down adoption and create resistance, especially in specialties where human interaction is central (e.g., psychiatry, general medicine).

This tension between AI-driven optimism and fears of its structural drawbacks shapes the temporality of AI adoption. The challenge for healthcare policymakers will

be to turn promises into concrete guarantees, reduce perceived uncertainty, and ensure the controlled and progressive integration of AI into medical practice.

4. DISCUSSION AND LIMITATIONS

In this article, we propose a conceptual framework that examines how the technological promises of AI can increase physicians' perception of risks. This framework draws on decision-making approaches under uncertainty and integrates research on the temporality of risk. By combining perceived risk theories (Ravichandran et al., 2001) and intertemporal decision-making theories under uncertainty (Halevy, 2008), we demonstrate that physicians assess immediate and delayed risks of AI differently.

Adoption decisions are influenced by the perceived moment when the consequences of risk materialize. Thus, AI adoption is conditioned by the perception of when the risk will be resolved. In some cases, uncertainty about when AI will become fully functional (e.g., long-term algorithm reliability) may delay its adoption.

AI in healthcare represents a particular case of decision-making involving both risk and time. As seen in other fields (e.g., economics, politics, law), individuals may adjust their choices depending on when the effects of a technology become visible (e.g., immediate impact vs. delayed impact).

This theoretical framework helps explain how physicians oscillate between enthusiasm for AI's potential benefits and distrust toward its unforeseen side effects.

The economy of promises, as developed in the technological innovation literature (Borup et al., 2006; Brown & Michael, 2003), highlights that new technologies always emerge within an environment of expectations and anticipated commitments. Technological promises play a structuring role in the acceptability and adoption of AI by physicians, as they shape perceptions of both benefits and associated risks.

In healthcare, these promises take several forms: AI as a tool for improving diagnostic accuracy, reducing medical errors, and optimizing personalized treatments (Topol, 2019). However, this raises concerns, as high expectations can make any algorithmic failure particularly problematic. AI as a solution for improving efficiency and reducing workload. AI is often presented as a way to free up medical time by automating administrative and repetitive tasks (Liang et al., 2023). However, this raises concerns about over-standardization of care and growing dependence on technology. AI as an enabler of physicians' strategic decision-making. AI is expected to shift physicians toward more complex, decision-based roles. However, some practitioners

fear that this shift could turn them into mere supervisors of algorithms, reducing the meaning and autonomy of their profession.

Thus, technological promises directly shape physicians' attitudes toward AI. When these promises are not backed by solid assurances regarding risk management and uncertainties, they can lead to increased skepticism and even resistance to adoption.

Research in behavioral economics and decision-making under uncertainty (Halevy, 2008; Baucells & Heukamp, 2012) has shown that individuals evaluate risks differently depending on whether they are immediate or delayed. This dynamic is particularly relevant in the case of AI in healthcare.

Immediate risks (e.g., loss of decision-making autonomy, diagnostic errors due to algorithmic biases, complexity of AI integration in medical practice) are more prominent in specialties like radiology and pathology, where AI is already deeply integrated.

Delayed risks (e.g., long-term transformation of the physician's role, potential dehumanization of patient care, increased dependence on AI systems) are harder to anticipate and may be underestimated in early adoption phases.

By examining these temporal dimensions, our study highlights a tension between short-term expectations and long-term uncertainties. This phenomenon may explain why some medical specialties, such as nephrology, cardiology, or psychiatry, show greater resistance to AI adoption, while fields like radiology, where immediate benefits are more tangible, exhibit higher adoption rates.

Despite the valuable insights obtained, several limitations must be acknowledged: the interviewed professionals expressed their opinions based on personal experience, which may influence the types of risks discussed and introduce perception biases. The study does not allow for tracking changes in perceptions over time, particularly after prolonged AI use. Additional quantitative research could help measure the extent of perceived risks on a larger scale. A comparative analysis between different medical specialties could identify disparities in AI adoption depending on the clinical context. Exploring organizational strategies to mitigate these risks could offer promising insights for improving AI integration in healthcare.

Finally, this study has an additional limitation related to the heterogeneous composition of the sample. The participants came from different medical specialties (radiology, psychiatry, cardiology, nephrology, etc.) and held diverse professional statuses, ranging from senior physicians to medical trainees. This diversity enriched the range of perspectives but may also introduce bias, as levels of exposure to AI, clinical responsibilities, and decision-making frameworks vary considerably across these profiles. Such disparities may influence how risks associated with AI are perceived.

Future research could consider stratifying the analysis by specialty or by level of experience to refine the understanding of the dynamics specific to each group.

To facilitate AI adoption in hospitals, decision-makers should proactively manage the temporality of perceived risks. Several strategies can be considered AI benefits visible in the short term:

- pilot projects should demonstrate quick and tangible results to encourage practitioner buy-in,
- communicating about progressive risk resolution,
- transparency on algorithmic evolution and error correction mechanisms could help reduce long-term uncertainty,
- implementing continuous AI validation frameworks,
- regular audits and real-time evaluations could ensure that AI benefits outweigh risks over time.

By addressing these concerns, healthcare institutions can foster a more controlled, structured, and confident adoption of AI in medical practice.

5. IMPACT AND PRACTICAL IMPLICATIONS FOR HEALTHCARE MANAGEMENT

The obtained results highlight several key issues related to the management and integration of AI in medicine.

The analysis of perceived risks underscores the need for tailored support to facilitate the adoption of AI tools. Hospital administrators and healthcare policymakers could implement training and awareness programs to help physicians better understand the functionalities and limitations of AI solutions. Additionally, involving practitioners from the early stages of AI development could foster a more positive and proactive adoption of these technologies.

The importance of risks related to algorithmic biases and data security calls for a reinforcement of AI governance in healthcare projects. Establishing ethical standards and rigorous validation protocols is crucial to ensuring the reliability and transparency of AI systems. Furthermore, adopting shared responsibility mechanisms (e.g., audits, algorithm certification) would help create a climate of trust among medical professionals.

Identifying physicians' concerns should guide change management policies in healthcare institutions. AI adoption should not solely rely on technical performance but also on the alignment between practitioners' expectations and perceived benefits. Establishing evaluation committees that include healthcare professionals could

facilitate a smoother integration of AI by ensuring that technological advancements align with real-world medical practices and constraints.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 51 of 78
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0003

EXPLORING THE EFFECT OF STOCK MARKET DEVELOPMENT DETERMINANTS ON THE COST OF EQUITY CAPITAL: THE CASE OF TUNISIAN LISTED FIRMS

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Abstract: *This paper investigates the effects of stock market development determinants on the cost of equity capital of non-financial Tunisian listed companies. We use a sample includes 24 Tunisian listed firms observed over the period 2007–2016, resulting in a total of 240 firms-year observations. The empirical results reveal that the performance has a significant positive effect on the cost of equity capital. Additionally, various factors such as turnover rate, price spread, stock market capitalization, value of traded shares, volatility of financial asset prices, leverage, dividend policy, size, and inflation all have varying effects on the cost of equity capital. The findings align with existing literature and provide insights into the relationship between various financial factors and Tunisian companies' equity capital costs. This paper offers an important implication for investors, policymakers, and market participants to make informed decisions regarding investment opportunities and the overall development of the stock market.*

Keywords: *stock market development, cost of equity capital, asset pricing, Tunisian listed firms*

JEL Classification: *G1; G11; G12; G13; G14*

1. INTRODUCTION

In recent years, Tunisia's stock market has experienced notable growth and development, increasingly positioning itself as a key platform for capital mobilization and investment facilitation(Jeribi et al., 2015; Saad, 2024); Souffargi and Boubaker (2024). As the market continues to evolve, understanding the factors that influence its dynamics has become essential for policymakers, investors, and researchers. A central element in this context is the cost of equity capital, which represents the return required

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by investors to compensate for the risk associated with equity investments. Asset pricing models, such as the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964), typically rely on two key variables: the risk-free rate and the asset's sensitivity to market risk (beta). According to CAPM, the expected return on an asset is linearly related to these variables. However, numerous empirical studies have asked the adequacy of such models in ensuring efficient asset pricing. For instance, Smith (1977) found evidence of persistent asset underpricing, raising concerns about the validity of traditional pricing frameworks. Brav (2003) further introduced the concept of market indeterminacy, a condition in which it becomes impossible to determine whether an asset is efficiently or inefficiently priced. This perspective challenges the foundational assumptions of asset pricing models and underscores the complexity of accurately assessing equity value in evolving and imperfect markets such as Tunisia. Simlai (2021) found that empirical tests of linear asset pricing models show presence of mispricing in asset pricing. Asset pricing is considered efficient when market prices fully reflect all available information, such that no informed trader can consistently achieve returns that outperform the market or uninformed participants (Yang & Li, 2013).

The main objective of our study is to contribute to the existing literature on stock market development and cost of equity capital by providing empirical evidence from the Tunisian context. The study covers the period from 2007 to 2016 and using sample of 24 listed Tunisian companies. By analyzing various determinants, such as market size, liquidity, regulations, and investor protection, we seek to provide valuable insights into the relationship between these factors and the cost of equity capital. The choice to focus on Tunisian listed firms is justified by the unique nature of the Tunisian stock market, which operates within a developing economy(Saad, 2024). To achieve our objective, we will employ a quantitative research methodology, utilizing a comprehensive dataset covering a significant time period. We will employ various statistical techniques, such as regression analysis, to empirically test the relationship between the determinants of stock market development and the cost of equity capital.

As a result, our research contributes to better understanding of financial market in time of major political crisis, notably in the context of Arab spring (Tunisian revolution). They are of great importance for policymakers, investors, and firms in Tunisia, as they can contribute to the formulation of effective strategies to enhance stock market development and reduce the cost of equity capital. The study found that performance has a significant positive effect on the cost of equity capital for Tunisian companies listed on the stock exchange. Additionally, factors such as turnover rate, price spread, stock market capitalization, value of traded shares, volatility of financial asset prices, leverage, dividend policy, size, and inflation all have varying effects on the cost of equity capital.

The results suggest that factors such as turnover rate, price spread, volatility of financial asset prices, leverage, and dividend policy significantly impact the cost of equity capital. The findings align with existing literature and provide insights into the relationship between various financial factors and Tunisian companies' equity capital costs.

This paper sheds light on the factors influencing the cost of equity capital in the Tunisian stock market and provides valuable insights for investors, firms, and policymakers in formulating strategies to enhance stock market development. By understanding these determinants, stakeholders can work towards creating a more vibrant and efficient stock market, ultimately boosting economic development in Tunisia.

The subsequent sections of the paper are organized as follows. Section 2 presents an overview of the related literature. Section 3 outlines the research methodology used in this study. Section 4 discusses and analyzes the empirical findings. Finally, section 5 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In recent years, the corporate financial performance has become a focal point for several researchers, particularly the emerging markets where structural and institutional dynamics significantly influence firm outcomes(Missaoui & Brahmi, 2025; Simlai, 2021). A growing body of literature seeks to identify and analyze the determinants of the contribution of such financial market. Furthermore, the link between strategy and finance shows a close connection between the company's strategic situation and its performance. These studies underscore the importance of aligning financial decisions with broader strategic goals, especially in environments characterized by volatility and limited access to capital.

In Tunisia, the strategic-financial nexus is particularly pronounced due to the underdevelopment of the capital market(Saad, 2024; Souffargi & Boubaker, 2024). While the stock exchange offers theoretical advantages such as diversified funding sources and reduced dependency on traditional banking most domestic firms continue to rely heavily on bank credit as their primary external financing channel. This reliance is partly attributed to the emerging stage of the Tunisian stock market, which is delayed by issues such as information asymmetry, low liquidity, and higher costs of transaction (Meskini & Chaibi, 2024; Missaoui & Alduraywish, 2023; Saad, 2024). These structural inefficiencies limit the market’s capacity to serve as a viable financing alternative, thereby shaping firms’ capital structure decisions.

Several financial empirical evidence from Tunisia reveals that firm-specific characteristics such as profitability, asset tangibility, and size play a critical role in

determining leverage levels (Mansali & Daadaa, 2018; Meskini & Chaibi, 2024; Missaoui & Aldurayiwish, 2023; Missaoui & Brahmi, 2025; Psillaki & Daskalakis, 2008; Saad, 2024; Yadav et al., 2021). These findings are consistent with the trade-off and pecking order theories, which suggest that firms balance the costs and benefits of debt based on internal financial metrics and market conditions(Missaoui & Aldurayiwish, 2023; Missaoui & Brahmi, 2025). Moreover, macroeconomic factors such as interest rates, inflation, and unemployment have been shown to exert significant influence on capital structure decisions, particularly in the context of publicly traded Tunisian firms (Missaoui & Aldurayiwish, 2023). The Tunisian case illustrates the broader challenges faced by emerging markets in developing efficient financial systems. Despite policy efforts to modernize the financial sector and attract foreign investment, structural reforms remain incomplete, and the capital market continues to lag behind its regional peers (Baghdadi & Labidi, 2023). As such, understanding the determinants of financial performance and capital structure in Tunisia requires a nuanced approach that considers both firm-level dynamics and systemic constraints.

The investigation of this relationship has played a major role in recent research (Abaidoo & Agyapong, 2024; Chowdhury & Maung, 2012; Masoud & Hardaker, 2012; Missaoui & Brahmi, 2025; Montes & Oliveira, 2025). Economists have long understood that financial development affects economic growth. This can be explained by the tendency of companies to rely on external financing. Financial development helps companies obtain external financing at a low cost(Colombo & Grilli, 2005). It provides the right measure for financing companies. Furthermore, it ensures that investors achieve high returns. The financial market facilitates access to credit at a low cost. It also helps new companies enter the market(Colombo & Grilli, 2005). A developed financial system plays an important role in improving the services of financial intermediaries by reducing transaction and information control costs. It identifies good investment opportunities, mobilizes savings, encourages transaction activities and mitigates risks. Hail and Leuz (2006) emphasize that quality information disclosures increase returns and reduce the cost of equity capital. Masoub (2013) announce that the development of the stock market supports technical innovations, long-term investments, and improves the return on investments. High liquidity, efficient capital allocation, and technological innovation reduce investment risk. Therefore, this eliminates additional demand for a premium from investors to take on additional risk. However, the speed of adaptation to this process depends on specific factors related to the company (difficulty of financing, company valuation in the capital market, company size, profitability, and leverage) and the macroeconomic conditions of countries. As a result, we propose the following hypothesis:

Hypothesis 1: Stock market development has impact on the cost of equity capital.

To test the effect of the determinants of financial market development on the cost of equity capital of listed Tunisian companies, we have derived the following sub-hypotheses:

An investment cannot be separated from its risk (uncertainty) since the investment decision can lead to unexpected profit. Rational investors, before making an investment decision, must consider two things, namely the expected return and the risk that depend on the type of investment. Investment risk is generally classified into two types of investment risks: non-systematic risk and systematic risk. Non-systematic risk originates from factors specific to a particular company or a group of similar companies, and is often influenced by issues such as the liquidity of the company's securities (Shahed & Shohana, 2022). According to portfolio theory, investors expect a particular return by investing their funds in the form of stocks or other securities. Investing funds entails a risk to be assumed. Therefore, to reduce the risk, investors can diversify the investment of their funds. Furthermore, Jonathan and Lorie (2007) observes that an increase in the return of financial securities results in a rise in the cost of equity capital for a company. Herwany et al. (2014) found a positive correlation between returns and risks. Simlai (2021) argue that investors impose a risk premium compensating for the risk of mispricing the return on assets. Therefore, increased disclosure mitigates the risk of mispricing, increases returns, and reduces the cost of capital.

Barry and Brown (1984) suggest that information produced by a company helps to reduce the risk of error and the cost of equity. Nadarajah et al. (2018) examined the relationship between stock market liquidity and capital structure. They found that companies with more liquid equity have less leverage. Furthermore, they show that stock market liquidity reduces financing costs. Some studies have demonstrated that financial communication of a company plays a very important role in the evolution of the cost of equity (Ajina et al., 2015; Cheriyan & Lazar, 2019; Diamond & Verrecchia, 1991; Hail & Leuz, 2006; Psillaki & Daskalakis, 2008). Beyer et al., (2010) argue that transparency in financial information helps reduce uncertainty (expectation and risk) faced by investors in allocating future cash flows. Another interesting paper by Diantimala et al. (2022) argue that increased public disclosure of information decreases information asymmetry, increases return levels, and therefore leads to a lower cost of capital. emphasize that the relevance and transparency of quality information disclosure help to mitigate information asymmetry and attract investors to invest more, thereby reducing companies' financing costs. As a result, we propose the following hypothesis:

Hypothesis 1.1: The dividend policy has a positive effect on the cost of equity capital.

The turnover rate is considered a relevant indicator of financial market activity because it implicitly reflects the extent of transaction costs. Levine and Zervos (1996) indicate that the turnover ratio measures the volume of stock transactions relative to market capitalization. This ratio measures the volume of stocks traded relative to market size. A high turnover rate is often used as an indicator of low transaction costs. It is important to note that a large stock market is not necessarily a liquid market: a large but inactive market will have a high market capitalization ratio but a low turnover ratio. Levine and Zervos (1996)demonstrate that a high turnover rate means the market is active and transaction costs are low. Datar et al. (1998) use the turnover ratio as a liquidity indicator. They conclude that liquidity plays an important role in explaining differences in yield. They conclude that each 1% increase in the turnover rate reduces annual yields by approximately 0.54%.

Diamond and Verrecchia (1991) described an inverse relationship between financial disclosure and the cost of equity capital through the concept of stock liquidity. Low information asymmetry tends to strengthen the liquidity of securities. This helps reduce the cost of equity capital by reducing the transaction costs of traded securities. Darwish (2012) examines the effect of returns on transaction volume for the Palestinian financial market using weekly data. He shows that the relationship between return and transaction volume is positively correlated and there is a bidirectional causality between these two variables (returns and transaction volumes). Goldstein and Nelling (1999) demonstrate that high transaction volume leads to high liquidity levels.

Hypothesis 1.2: Turnover rate has a positive effect on the cost of equity capital.

According to the theoretical foundations of market microstructure theory, the bid-ask spread reflects the total cost associated with trading an asset. This includes costs arising from cost of information asymmetry, market making activities, order transmission, and position management(Peng et al., 2024). Easley and O'hara (1992) suggests that a significant volume of transactions is linked to a reduction in spreads, which reflects the presence of economies of scale in market making. Also, Market making theory indicates that the spread widens with the cost of holding the position. This cost stems from opportunity cost and the risk generated by holding a position. This unobservable variable can be estimated through its components, such as the cost associated with volatility risk (Zhu et al., 2025) and liquidity cost(Huang et al., 2025). The price spread can be considered as a signal of the expected volatility by agents placing limit orders. In this context, Huang et al. (2025) demonstrate that when the proportion of informed agents is reduced, anonymity leads to a reduction in the price

spread. Therefore, the informed agent acts cautiously by presenting a wider spread. However, the uninformed agent, who cannot identify the leader, interprets this price spread as a weak signal of information risk because it could potentially come from a pre-committed intermediary.

Uninformed agents are more active, the informational content of the bid-ask spread is lower. The opposite consequences are observed when the quota of informed agents is high: anonymity increases the bid-ask spread and its informational content. Amihud and Mendelson (1986) assert that more transparent financial communication helps reduce information asymmetry and increase the liquidity of stocks issued by a company. Indeed, out of fear of trading with better-informed investors, uninformed investors defend themselves through bid-ask spreads. This condition leads to a wide bid-ask spread. In addition, agency costs reduce the volume of securities traded by uninformed investors. Ultimately, these two combined effects reduce the liquidity of company securities in the markets and increase their cost of capital.

Ajina et al. (2015) investigated the impact of corporate disclosure on information asymmetry and stock market liquidity among French companies listed between 2004 and 2007. Their findings highlight the critical role of information contained in annual reports in shaping investor behavior. Specifically, they measured information asymmetry using the bid-ask spread and assessed liquidity through market indicators. The study revealed that the extent of corporate disclosure in annual reports positively influences market liquidity. Moreover, a negative relationship was observed between the level of disclosed information and the adverse selection component of the bid-ask spread, suggesting that greater transparency reduces information asymmetry and enhances trading efficiency.

Li and Tam (2011) argue that lower transaction costs facilitate quicker adjustments toward target capital structures following deviations, thereby diminishing the persistence of market timing effects. This dynamic contributes to enhanced market liquidity by increasing the volume of securities traded and reducing the overall cost of capital. In contrast, Brock and Kleidon (1992) predict that wider bid-ask spreads (indicative of lower liquidity) are paradoxically associated with higher transaction volumes. This suggests that while liquidity constraints may exist, trading activity can remain elevated due to other market forces, highlighting the complex relationship between transaction costs, liquidity, and market behavior. Therefore, we hypothesize the following:

Hypothesis 1.3: The spread has a positive effect on the cost of equity capital.

Several studies have shown the importance of market capitalization as a key macro indicator for country analysis. It provides an indication of the impact of

financial market development on economic growth (Kumar N., 2010). According to Robins et al. (2015), the effect of market capitalization can be interpreted as an investment strategy. A variety of researchers (Khediri & Daadaa, 2011; Masoub, 2013; Montes & Oliveira, 2025; Sethi et al., 2019) have used market size as an indicator of financial market development. For instance, Hina and Ajmal (2018) studied the relationship between capital structure and company performance before and during the financial crisis. The study focused on 49 construction companies listed on Bursa Malaysia from 2005 to 2008. They showed a relationship between capital structure and company performance.

More precisely, for large companies, there is a positive relationship between return on assets and debt to market capitalization. Phan and To (2025) demonstrate that market capitalization has a positive and statistically significant effect on capital market liquidity. Agarwal and Mohtadi (2004) suggest that stock market development (represented by the percentage of transaction value in market capitalization) generates financial resources to better support companies. This means that companies can leverage equity further by issuing shares and increasing share liquidity.

Hypothesis 1.4: Market capitalization has a positive effect on cost of equity capital.

The transaction value can be examined as a liquidity criterion as it allows measuring the speed at which a security can be traded on the financial market. Nowbutsing and Odit (2011) examined the impact of stock market development on growth in Mauritius. An econometric survey on time series is conducted for the period 1989-2006. They analyzed short and long-term relationships by constructing an Error Correction Model (ECM). Two measures of stock market development, namely size and liquidity, were considered. They found that the value of traded securities as a percentage of GDP has a positive impact on short and long-term economic growth. Demirguc-Kumt and Maksimovic. (1994) argue that the increase in volume and value of stock transactions can justify the ability to generate equity.

Hypothesis 1.5: The value of transactions as a percentage of GDP has a positive effect on the cost of equity capital.

Several studies show that capital structure decisions are more sensitive to stock return volatility as default risk increases. Companies significantly opt for reducing their debt financing due to the high volatility of stock returns and to avoid the possible consequences of default. Darrat et al. (2003) investigate the relationship between trading volume and volatility. They show that the volume of traded securities increases in parallel with return volatility. In other words, an increase in trading volume is associated with an increase in return volatility, leading to an increase in capital costs.

Given this, the literature has extensively attempted to understand the relationship between liquidity, volatility, and transaction activity in different markets. The inverse relationship is predicted between return volatility and liquidity in market microstructure theory based on the assumption that market makers bear significant inventory risk for holding a highly volatile security. Empirical studies confirm this relationship by showing a positive relationship between a security's return volatility and its illiquidity(Amihud & Mendelson, 1986; Cheriyan & Lazar, 2019; Diamond & Verrecchia, 1991; Loukil et al., 2010). This contradicts traditional market microstructure theory, where low return volatility is associated with higher trading volumes.

Hypothesis 1.6: The volatility of returns has a positive effect on the cost of equity capital.

Financial leverage is a measure of the level of debt (Jaisinghani & Kanjilal, 2017). It is defined as the ratio of total debt to total assets. Debt provides tax savings opportunities because interest is deductible; however, higher leverage is also associated with higher risk (risk of bankruptcy) (Fama & French, 1993). In addition, Modigliani and Miller (1958) show that the cost of equity increases as financial leverage increases. Jaisinghani and Kanjilal (2017) indicate that small businesses are negatively influenced by the presence of high levels of debt. Vithessonthi and Tongurai (2015) examined a sample of 159,375 non-financial companies in Thailand during the period 2007-2009. They find that leverage is negatively related to company performance. Khediri and Daadaa (2011) examined the effect of stock trading on capital structure of Tunisian companies listed on the stock exchange during the period 2000-2009. They find that leverage is negatively related to stock trading activity and profitability.

Hypothesis 1.7: The financial leverage variable has a negative effect on the cost of equity capital.

According to the traditional market microstructure theory, a liquid market will have higher trading volume and therefore be less volatile. From this triangular relationship, a theoretically supported inverse relationship between liquidity and volatility can be revealed, indicating that greater volatility can lead to a decrease in the liquidity of a stock market and vice versa. By focusing on this relationship, the literature identifies a severe liquidity crisis associated with increased volatility that led to the global financial crisis during the period 2007-2009.

Similarly, Barclay and Warner (1993) reveal a direct relationship between liquidity and volatility. Indeed, higher volatility is associated with greater liquidity, where the majority of participants are not informed. Inconsistently, the literature also

suggests that professionals' knowledge of the existence of informed traders can cause an inverse relationship between the two (Foster and Viswanathan, 1990). Thus, empirical analysis yields two different results such as a positive relationship between volatility and liquidity as indicated by (Cheriyan & Lazar, 2019). The inverse relationship is predicted between volatility and liquidity in market microstructure theory. Market makers bear a greater inventory risk to hold a highly volatile security. Empirical studies have confirmed the existence of a positive relationship between the volatility of a security's price and its illiquidity (Amihud & Mendelson, 1986). In the Tunisian financial market context, Chabeb and Boubaker (2021) show that short-term volatility only affects buyers in the Tunisian stock market, as limit orders are likely to be placed when volatility increases. They find a weakly significant positive correlation between volatility and selling depth.

Hypothesis 1.8: Volatility has a positive effect on the cost of equity capital in the Tunisian financial market.

In this study, we added three control variables (dividend policy, size, and inflation rate) to analyze the effects of other variables on the cost of capital. Multiple studies have indicated that dividend policy is important informational content. It provides a good or bad signal to market participants. In this context, Ntui et al. (2015) found a positive relationship between dividend yield and stock price. Distributing dividends can increase stock prices and reduce the cost of capital. It can also be adopted by shareholders to adjust the risk-sharing between themselves and creditors. In cases where the level of debt is lower than it was at the time of issuing the bonds, shareholders may pay themselves a dividend to restore the situation. If they do not, creditors will receive too high a return given the additional risk.

Many empirical studies show that small companies are associated with higher risk, therefore have a higher cost of capital. In other words, a negative relationship occurs between size and stock returns as size decreases, returns tend to increase, and vice versa. Banz. (1981) analyzed the size effect in stock returns. He noticed that small companies had a higher average return than large companies. This indicates that the higher the risk, the higher the return. Consequently, investors demand higher returns to compensate for a high level of risk. Several studies have highlighted the importance of the inflation rate, especially in the context of countries facing economic difficulties (Elkhaldi & Daadaa, 2015). Empirically, Boyd et al. (2001) studied the relationship between inflation and the stock market evolution (represented by the market capitalization ratio, transaction value ratio, turnover ratio, and return volatility). They indicate that an increase in inflation rates reduces the real rate of return of currency and all other assets. Therefore, this reduces the incentive for agents to lend and increases

their incentive to borrow. As a result, a higher inflation rate reduces the availability of credit. De Jong and Van Dijk (2007) emphasize that macroeconomic factors have a significant impact on companies' capital structure decisions. When the stock market expands, the equity ratio would be higher in the capital structure. Elkhaldi and Daadaa (2015) analyzed the macroeconomic determinants of the capital structure of Tunisian companies listed on the stock exchange over the period 2002-2012. The authors show that macroeconomic variables related to monetary and fiscal policy have an impact on leverage. They find a negative correlation between macroeconomic determinants (interest rate, unemployment rate, and inflation rate) and financial leverage.

3. RESEARCH METHODS

3.1 Data

In order to test our hypotheses in the Tunisian context, we built a sample of 24 listed Tunisian companies. The sample is limited due to the exclusion of financial companies because of the specificity of their financial data. Additionally, we eliminated companies with missing data. Our work is based on observations from 2007 to 2016. The data is calculated manually from publications available at the Financial Market Council, from certain brokers, or on the websites of some firms, as well as from the publications of the Tunis Stock Exchange. The use of panel data offers the advantage of benefiting from both the individual and temporal dimensions of the available information.

To study the effect of the development of the financial market on the cost of equity capital of Tunisian companies listed on the Tunis Stock Exchange (BVMT), we conducted a multiple linear regression analysis on panel data. Therefore, our methodology is based on a regression analysis on panel data for a sample of 24 Tunisian companies listed on the BVMT over 10 years (2007-2016). Panel data allows to consider two dimensions at the same time: an individual dimension designated by the index "i" representing the firm, and a temporal dimension indicated by the index "t", representing time. It is therefore a form of multiple regression that allows to address both individual and temporal effects simultaneously. On the contrary, this is impossible with time series or cross-sectional data. The estimation of the cost of equity capital variable is determined by the ex-post method through the Capital Asset Pricing Model (CAPM). Data collection is daily from 01/01/2005 to 12/31/2016.

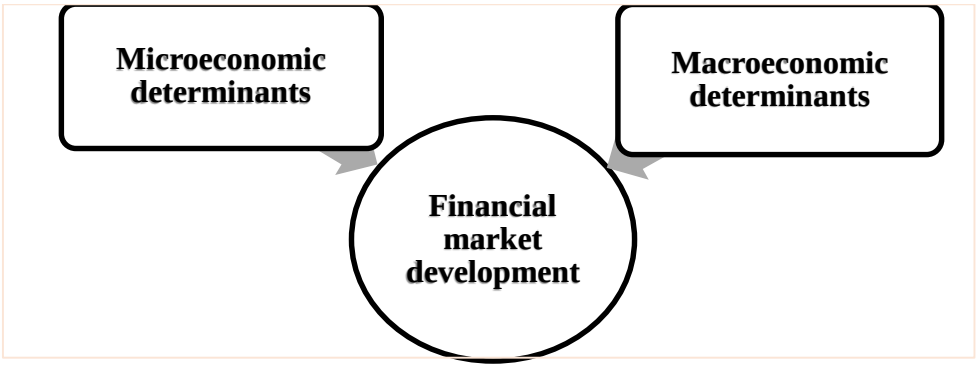


Figure 1. *Determinants of the development of the Tunisian financial market*

Source: Author

Table 1. *Summary table of measures of financial market development and cost of equity capital*

Variable	**Notation**	**Mesure**	**Signe attendu**
dependant variable			
Cost of equity capital	COE	Re=rf+β(rm-rf)	
Les variables indépendantes			
Return	REND	Measured by the ratio of prices at T and T-1 increased by the dividend	(+)
Turnover Rate	TURNOVER	Trading volume as a percentage of market capitalization.	(+)
Spread	Spread	The ratio between the fork and the middle of the fork	(+)
Market Cap to GDP Ratio	CPIB	Market capitalization expressed in GDP.	(-)
Transaction Value to GDP	VPIB	Value of transactions as a percentage of gross domestic product.	(+)
Return Volatility	Rvar	Is a control for a firm's risk is calculated as the standard deviation of monthly stock returns over the past 12 months.	(+)
Leverage	Lev		(-)
Historical Volatility	Vol	Total liabilities as a percentage of equity	(+)

Variable	Notation	Mesure	Signe attendu
		Historical volatility based on the historical variations that a security's price has experienced.	
Control variables			
Dividend Policy	DIVI	Dummy variable equal to 1 if firm i distributed dividends in year t,	(+)
Size	Taille	otherwise 0.	(-)
Inflation	INF	Logarithm of total assets	(-)
		Log of inflation rate	

3.2 Statistical development of the conceptual model

The cost of equity capital can depend on several factors, such as: Return, turnover rate, price range, stock market capitalization as a percentage of GDP, transaction value as a percentage of GDP, return volatility, financial leverage, volatility, dividend policy, size, inflation. This is a multiple linear regression that takes the form:

$$COE_{i,t} = \beta_0 + \beta_1 Rend_{i,t} + \beta_2 ROTATION_{i,t} + \beta_3 Spread_{i,t} + \beta_4 CPIB_{i,t} + \beta_5 VPIB_{i,t} + \beta_6 Rvar_{i,t} + \beta_7 LEV_{i,t} + \beta_8 Vol_{i,t} + \beta_9 DIVI_{i,t} + \beta_{10} Taille_{i,t} + \beta_{11} INF_{i,t} + \varepsilon_{i,t}(1) \quad (1)$$

Analysis and Discussion

Bivariate analysis

Table 2. *Descriptive statistics*

	Kcp	REND	TURNOVER	Spread	CPIB	VPIB	Rvar	DIVI	Lev	Taille	INF	Vol
Mean	0.0003	0.080	0.061	0.060	0.0105	0.913	0.102	0.704	1.711	7.896	0.041	0.036
Median	0.0003	-0.0002	0.019	0.015	0.1245	0.875	0.082	1.000	0.980	7.848	0.040	0.010
Maximum	0.002	3.947	0.794	1.213	1.7068	2.450	0.689	1.000	36.075	9.374	0.063	0.884
Minimum	-0.011	-0.652	1.20E-05	-0.741	-2.694	-0.801	0.026	0.000	-26.804	6.386	0.020	0.001
Standard Deviation	0.0009	0.435	0.104	0.163	0.798	0.551	0.084	0.457	4.021	0.4191	0.011	0.089

Table 2 represents the descriptive statistics of the independent variable and the dependent variables that will be introduced in our model. We find that listed Tunisian companies have an average cost of equity capital equal to 0.03%. The maximum cost of equity capital is around 0.2% and the minimum cost of equity capital is equal to -1.1%, indicating a significant divergence among the listed Tunisian companies in our sample.

Table 3. *Correlation matrix of measures of financial market development*

	REND	TURNOVER	Spread	CPIB	VPIB	Rvar	DIVI	LEV	Size	INF	Vol
REND	1										
TURNOVER	0.052	1									
Spread	0.135	-0.128	1								
CPIB	0.208	0.290	0.072	1							
VPIB	0.160	-0.259	0.175	0.531	1						
Rvar	0.144	-0.002	0.174	-0.003	-0.002	1					
DIVI	0.039	-0.036	0.129	0.240	0.162	-0.153	1				
LEV	0.098	-0.039	-0.040	0.002	0.002	0.021	-0.233	1			
Size	-0.060	-0.083	0.015	0.191	0.493	-0.036	-0.217	0.452	1		
INF	-0.013	0.043	-0.021	-0.054	-0.064	-0.025	0.0166	0.036	0.022	1	
Vol	0.141	0.016	0.028	-0.063	-0.096	0.484	-0.150	0.006	-0.125	0.067	1

Table 3 presents the Pearson correlation matrix between the different variables selected in our model. Volatility has a strong positive correlation (0.48) with return volatility. However, it has a negative correlation with market capitalization as a percentage of GDP, value of transactions as a percentage of GDP, size, and dividend policy. Turnover variable has a positive correlation with return, value of transactions as a percentage of GDP, inflation, and volatility. It has a negative correlation of -0.128 with price range, transaction volume as a percentage of GDP, return volatility, dividend policy, leverage, and size are equal to -0.083. The dividend policy variable has a positive correlation with return, price range, market capitalization as a percentage of GDP, and size. However, it has a negative correlation of -0.036 with TURNOVER, -0.153 with return volatility.

Table 4. *multicollinearity test on the variable characteristics in the VIFs calculation*

Variable	VIF	1/VIF
CPIB	2.95	0.338
Taille	2.55	0.391
VPIB	2.07	0.483
LEV	1.69	0.590
ROTATION	1.55	0.644
Rvar	1.39	0.721
Vol	1.38	0.725
DIVI	1.29	0.777
REND	1.14	0.873
FOURCHETTE	1.11	0.899
INF	1.03	0.968
Mean VIF	1.65	

Source: author

Subsequent the realization of various tests to determine the most appropriate estimation method for the equation, it was observed that there is no significant

multicollinearity between the variables. Additionally, the assumption of normality of the residuals was validated, but individual heteroscedasticity is present. In other words, no VIF greater than or equal to 10 was detected (the highest being 2.95). However, the average of the VIFs is slightly below 2 (1.65). Therefore, the threshold of 10 was retained, indicating the absence of significant multicollinearity for our variables. Furthermore, the probability of the Jarque-Bera statistic exceeds the 5% threshold, confirming the presence of individual heteroscedasticity according to the White test. Finally, the Hausman test showed that the coefficients of the two estimations (fixed and random) are not statistically different, leading to the preference for adopting a random effects model. Therefore, the model was estimated using the generalized least squares method.

4. ANALYSIS AND DISCUSSION

Table 5. *Impact of the development of the financial market on the cost of equity capital of Tunisian listed firms*

Variable	Coefficient	t-Statistic	Prob.
Constant	0.0004	0.776	0.438
REND	0.0002	2.729	(0.006) ***
TURNOVER	0.0005	1.894	(0.061) *
Spread	0.0003	1.714	(0.098) *
CPIB	4.18E-05	0.500	(0.124)
VPIB	-9.16E-05	-1.827	(0.068)
Rvar	-0.0006	-1.648	(0.1006)
Vol	0.0009	3.284	(0.001) ***
LEV	-1.51E-05	-2.595	(0.010) **
DIVI	-0.00015	-2.553	(0.011) **
Taille	4.21E-05	0.547	(0.584)
INF	-0.006	-3.051	(0.002) ***
R-squared	0.189		
F-statistic	4.842		
Prob(F-statistic)	0.000		
Durbin-Watson stat	1.671		

Notes: This table presents the effect of the development of the financial market on the cost of equity capital of the 24 non-financial companies listed on the BVMT observed over the period from 2007 to 2016. The dependent variable is the cost of equity capital (COE). The independent variables are: return (REND); turnover rate (TURNOVER); Spread; market capitalization as a percentage of GDP (CPIB); trading volume as a percentage of GDP (VPIB); return volatility (Rvar); dividend policy (DIVI). In all regressions, we control for a number of variables specific to financial performance and risk, including company size, inflation, and volatility. The estimation method used is the generalized least squares estimated (MCG estimated). ***, **, and * respectively represent statistical significance levels at 1%, 5%, and 10%. Values in parentheses are p-values.

Table 5 presents the relationship between the cost of equity capital and various determinants of stock market development. The Durbin-Watson statistic, calculated at 1.671, supports the acceptance of the null hypothesis, indicating the absence of autocorrelation in model's residuals of errors. Furthermore, the p-value associated with the Fisher statistic is effectively zero (0.000), confirming that the overall model is statistically significant.

The empirical analysis demonstrates that the retrun level exerts a statistically significant and positive effect on the cost of equity capital for Tunisian firms listed on the stock exchange, with significance at the 1% level. Specifically, a one-percentage-point increase in firm performance is associated with an average rise of 0.06 percentage points in the cost of equity capital. This result aligns with the theoretical expectation that enhanced performance boosts investor confidence, thereby reducing perceived risk and lowering the required rate of return. In financial markets, investors typically demand compensation for risk through higher returns; thus, superior performance serves as a signal of reduced risk, contributing to a more favorable cost of capital structure. Furthermore, market liquidity emerges as a pivotal factor in this dynamic. Increased liquidity tends to elevate stock valuations, which in turn compresses the cost of capital. The foundational work of Diamond and Verrecchia (1991) supports this relationship, arguing that improved corporate disclosure reduces information asymmetry, thereby enhancing market liquidity and stimulating investor demand. Their model suggests that firms engaging in transparent reporting practices can attract a broader investor base, leading to higher asset prices and a lower cost of equity.

We also find that the turnover rate is positively and statistically significantly associated with the cost of equity capital, with significance at the 10% level. This suggests that turnover rate serves as a critical indicator of market liquidity, which in turn influences investor behavior and financing costs. Empirically, a one-percentage-point increase in turnover rate corresponds to a 0.6% rise in the cost of equity capital, indicating that higher trading activity may be linked to increased transaction costs and perceived risk. This positive relationship aligns with theoretical expectations, where elevated turnover reflects greater liquidity but also potentially higher volatility and trading costs. As a result, investors may demand a higher risk premium, thereby increasing the cost of equity. This result algins with the work of Datar, Naik, and Radcliffe (1998). They found that the turnover rate plays a significant role in explaining cross-sectional variations in stock returns. Their study concluded that each 1% increase in turnover is associated with a reduction in annual returns by approximately 0.54%, which indirectly contributes to a higher cost of equity. These findings underscore the importance of liquidity metrics in financial market analysis and suggest that firms

operating in less liquid environments may face higher equity financing costs due to increased investor risk aversion.

The bid-ask spread, widely recognized as an inverse proxy for market liquidity, exhibits a positive and statistically significant impact on the cost of equity capital at the 10% significance level. Empirical evidence suggests that a 10% increase in the spread corresponds to a 0.98% rise in the cost of equity capital. This relationship is consistent with microstructure theory, which posits that the bid-ask spread reflects the cumulative costs of trading, including those arising from information asymmetry, inventory holding, and order processing. A wider spread signals greater uncertainty and higher transaction costs, prompting investors to demand a higher risk premium, thereby increasing the cost of equity financing. This finding is supported by studies in financial economics. For instance, Demsetz (1968) introduced the concept of transaction costs as the "cost of exchanging ownership titles," emphasizing the role of the bid-ask spread in capturing market inefficiencies. Biais (1993) extended this framework by analyzing how market structure influences price formation and liquidity, showing that fragmented markets tend to exhibit more volatile spreads, which can elevate financing costs. Moreover, holding securities entails opportunity costs, particularly when spreads are wide. Investors facing higher spreads may require greater compensation for illiquidity and uncertainty, which translates into a higher cost of equity capital for firms. These findings underscore the importance of market microstructure in understanding the dynamics of equity financing and investor behavior.

The variable representing stock market capitalization as a percentage of GDP (CPIB) shows a positive coefficient, although it is statistically insignificant. Despite the lack of significance, the direction of the relationship suggests that higher market capitalization may contribute to improved liquidity and reduced transaction costs, thereby lowering the cost of equity capital. This finding is consistent with the theoretical and empirical literature on financial development. For instance, Levine (1996) provides robust evidence that stock market development is positively associated with long-run economic growth, emphasizing the role of liquid and efficient markets in facilitating capital accumulation and productivity gains. Moreover, Mureșan and Silaghi (2013) demonstrate that market capitalization significantly influences liquidity in European Union capital markets, suggesting that larger and more developed markets tend to exhibit greater trading activity and efficiency.

As market capitalization reflects the aggregate value of listed firms – essentially the present value of expected future dividends – its expansion is generally associated with enhanced investor confidence, improved price discovery, and reduced financing costs. Although the statistical insignificance in the current model may reflect country-

specific factors or data limitations, the theoretical foundation and cross-country evidence underscore the potential relevance of market capitalization in shaping equity financing conditions.

The variable Rvar, which captures the volatility of returns, displays a negative but statistically insignificant coefficient. This suggests that lower return volatility may be associated with higher trading volumes, potentially leading to a reduced risk premium demanded by investors and, consequently, a lower cost of equity capital. However, this interpretation is not statistically robust and contradicts findings in the existing literature. For instance, Darrat et al. (2003) and Huang and Masulis (2003) report a positive relationship between return volatility and trading volume, indicating that increased volatility tends to stimulate trading activity rather than suppress it. In contrast, the variable Vol, representing the volatility of financial asset prices, exhibits a positive and statistically significant effect on the cost of equity capital at the 1% level. This result implies that heightened market volatility increases the cost of equity for Tunisian firms, as investors demand higher returns to compensate for elevated levels of risk and uncertainty. This finding is consistent with the theoretical and empirical work of Sbeai et al. (2014), Nikoomaram et al. (2011), Amihud and Mendelson (1989), Foster and Viswanathan (1990), and Stoll (2000). These studies collectively argue that price volatility amplifies perceived risk, prompting investors to require a higher risk premium. Moreover, empirical evidence has shown a positive association between asset price volatility and liquidity costs, reinforcing the notion that volatile markets impose additional financing burdens on firms. In the context of the Tunisian financial market, Hmaied et al. (2004) identified a weak but positive correlation between volatility and market depth, suggesting that investors operating in uncertain environments demand substantial compensation to mobilize their capital. Overall, the observed relationship between price volatility and the cost of equity capital aligns with theoretical expectations and underscores the importance of market stability in reducing financing costs.

Leverage demonstrates a negative and statistically significant relationship at the 5% level, indicating that higher debt levels relative to equity are associated with increased financing costs. This suggests that firms with greater market liquidity tend to favor equity financing over debt, a finding consistent with prior research by Lipson and Mortal (2009), Vithessonthi and Tongurai (2015), and Khediri and Daadaa (2011). The analysis of control variables reveals several notable effects on the cost of equity capital.

Among the control variables, dividend policy exhibits a negative and statistically significant effect at the 5% level. A reduction in dividend payouts may send adverse signals to investors, potentially leading to lower stock valuations and a higher cost of

equity capital. This outcome is consistent with signaling theory, which highlights the role of dividends in conveying information about a firm's future profitability and financial stability. However, this result contrasts with earlier studies such as Brennan (1971) and Shobhana & Karpagavalli (2011), who reported a positive relationship between dividend yield and stock prices, suggesting that dividends can enhance investor confidence and firm valuation. The variable representing firm size, measured by the logarithm of total assets, shows a positive but statistically insignificant coefficient. Although larger firms are generally expected to benefit from lower capital costs due to economies of scale, better access to financial markets, and reduced agency problems, this relationship is not confirmed in the Tunisian context. This finding diverges from the results of Kim et al. (2015) and Jaisinghani & Kanjilal (2017), who observed a negative correlation between firm size and the cost of equity capital in other markets. Finally, inflation demonstrates a negative and highly significant effect at the 1% level. Elevated inflation rates are associated with increased equity financing costs, reflecting the adverse impact of macroeconomic instability on investor sentiment and market conditions. This result is supported by studies such as De Jong et al. (2007), Mills (1994), and Elkhaldi and Daadaa (2015), which emphasize the influence of inflation on corporate financial decisions and investor behavior.

Robustness test

We are moving on to the robustness test (Appendix 1 and 2) in order to better study the effect of financial market development determinants on the cost of capital. We observe that the turnover rate, price range, and volatility have a positive and statistically significant effect at the 5% and 1% threshold. However, the value of securities traded as a percentage of GDP, financial leverage, dividend policy, and inflation have a negative and statistically significant effect at the 10% threshold. Our result confirms the importance of macroeconomic and activity factors in stimulating the growth of the stock market Chen (2018), Maverick (2019).

5. CONCLUSION

This paper explores the impact of financial market development on the cost of equity capital for Tunisian firms listed on the Tunis Stock Exchange (BVMT). We applied a panel data from a sample of 24 listed companies observed over the period from 2007 to 2016. Our research falls within the field of financial market microstructure, which seeks to document the evolution of various measures of financial market development. It also enables the study of the impact of factors that may explain

these measures, particularly identifying the elements driving the development of the financial market for securities listed on the Tunisian stock exchange.

First, on a theoretical level, we attempted to find an appropriate measure of financial market development and to present a literature review of the financial structure of cost of capital. We found a lack of agreed-upon mechanisms for measuring financial market development. However, there are determining factors of financial market development. The literature on microstructure shows that trading volume, transaction value, and returns can support these shortcomings. Indeed, this literature explains the trajectory of financial market development. The final stage of our theoretical study focused on studying the microstructure of the financial market and liquidity as well as market anomalies (notably the studies conducted by Amihud, Mendelson, and Wood (1990)). These studies show that financial crises have impacted the price spread mechanism and liquidity provision in the market. Indeed, financial crises have had a systematic and dramatic effect on the liquidity of global financial markets.

Literature supports the positive impact of stock market development on economic growth, as well as a reverse causality from the latter to the former. Therefore, researching appropriate measures for determining factors in stock market development is an important step for creating and implementing adequate financing and investment policies. We have followed the Capital Asset Pricing Model (CAPM) to measure the cost of equity capital for listed Tunisian companies. As such, we used daily data including portfolio and market returns, in addition to the risk-free interest rate of securities listed on the Tunisian stock market from 2005 to 2016, to calculate the cost of equity capital. This likely validates these measures in the Tunisian stock market. Finally, we used data including closing prices, trading volume, number of transactions, prices and quantities offered and demanded. We presented a liquidity market model for most securities listed on the Tunisian stock market.

We noticed that the Tunisian financial market has experienced multiple reforms marked by the following criteria: innovation, security, transparency, the need for quality information disclosure, and liquidity which constitutes a criterion for adjudicating the stock market. These changes have brought the Tunisian financial market in line with international standards. Furthermore, the adaptation and integration of new technologies into the functioning and organization of the Tunisian stock market allows for an increase in transaction volume and the introduction of new investors to the stock market. This helps to reduce transaction costs and ensure the quick execution of such transactions, as well as encourage foreign investors. We observe that the development of the stock market reduces the cost of equity capital. This supports the argument that the financial market plays a significant role in providing liquidity, reducing information

asymmetry, diversifying risks, improving corporate governance, and reducing systematic macroeconomic uncertainty.

Furthermore, we found that the turnover rate, return on investment, price range, transaction value as a percentage of GDP, volatility, financial leverage, dividend policy, and inflation are significantly correlated with the cost of equity capital. In addition, the study of the simultaneous effect of these variables indicates that the development of the financial market in the industrial and commercial sector appears as a specific element for each security belonging to the same sector. Past information can also be considered as a specific element for the different determinants of the development of the financial market of securities listed on the Tunisian stock market. One way to refine our results is to conduct a more comprehensive study on the understanding of the inter-temporal variation in the development of the stock market, taking into account all securities listed on the Tunisian stock market over a longer period of study. Indeed, this would allow us to draw more relevant conclusions and better generalize our results. Similarly, the results highlighted in the Tunisian stock market open up multiple paths for future research, such as considering economic and financial crises, political crises, etc.

6. APPENDIX

Appendix 1:
Selected sample of Tunisian listed companies for the period 2007 to 2016 (0: industrial company, 1: commercial or service company).

Code	Sector	Abbreviation	Name
1	1	Magasin générale	Magasin générale
2	1	Monoprix	Monoprix
3	0	Siphat	Société des Industries Pharmaceutiques de Tunisie
4	0	ASSAD	ASSAD
5	1	Electrostar	Electrostar
6	0	GIF	GIF FILTER
7	1	STEQ	Société Tunisienne d'Equipement
8	0	STIP	Société Tunisienne des Industries de Pneumatique
9	0	SOTRAPIL	Société de transport des hydrocarbures par pipelines
10	1	SOMOCER	SOMOCER
11	1	SIAME	Société Industrielle d'Appareillage et de Matériels Electriques
12	0	ICF	Industries Chimiques du Fluor
13	1	AIRLIQUIDE	AIR LIQUIDE
14	0	ALIKIMIA	ALIKIMIA
15	1	SOTETL	Société Tunisienne d'Entreprise et Télécommunication
16	1	SOTUMAG	Société Tunisienne des Marchés de Gros
17	0	SOTUVER	Société Tunisienne de Verreries
18	1	TUNISAIR	Société tunisienne d'Air
19	0	SFBT	Société de Fabrication des Boissons de la Tunisie
20	1	SIMPAR	Société Immobilière et de Participations
21	1	SITS	Société Immobilière Tunisio-Saoudienne
22	1	ESSOUKNA	ESSOUKNA
23	1	ADWYA	ADWYA
24	0	TPR	Tunisie Profilés Aluminium

Appendix 2:
Chow Test before revolution period

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.239076	(23,63)	0.2477
Cross-section Chi-square	35.826286	23	0.0430

Cross-section fixed effects test equation:
Dependent Variable: COE
Method: Panel Least Squares
Date: 11/10/21 Time: 16:28
Sample: 2007 2010
Periods included: 4
Cross-sections included: 24
Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RVAR	-0.000232	0.000376	-0.618172	0.5381
DIVI	1.03E-05	9.69E-05	0.105910	0.9159
LEV	-3.37E-05	1.55E-05	-2.169960	0.0328
size	9.54E-05	4.65E-05	2.053529	0.0431
INF	-0.012403	0.002442	-5.079428	0.0000
Turnover	8.06E-05	0.000145	0.554584	0.5806
LOGPIB	0.004049	0.001053	3.843600	0.0002
GROWTH	4.81E-05	1.77E-05	2.722861	0.0078
POLRISK	-0.000111	9.56E-05	-1.160920	0.2489
C	-0.028106	0.007034	-3.995627	0.0001

R-squared	0.397488	Mean dependent var	0.000510
Adjusted R-squared	0.334435	S.D. dependent var	0.000438
S.E. of regression	0.000357	Akaike info criterion	-12.93925
Sum squared resid	1.10E-05	Schwarz criterion	-12.67213
Log likelihood	631.0838	Hannan-Quinn criter.	-12.83127
F-statistic	6.303980	Durbin-Watson stat	2.495588
Prob(F-statistic)	0.000001		

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Appendix 3: Chow Test after revolution period

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.609594	(23,63)	0.0704
Cross-section Chi-square	44.375233	23	0.0047

Cross-section fixed effects test equation:
Dependent Variable: KCP
Method: Panel Least Squares
Date: 11/10/21 Time: 16:19
Sample: 2011 2014
Periods included: 4
Cross-sections included: 24
Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.017124	0.007901	-2.167158	0.0330
RVAR	-0.000460	0.000674	-0.682428	0.4968
DIVI	-0.000119	0.000111	-1.075848	0.2850
LEV	2.64E-06	1.71E-05	0.154441	0.8776
size	-5.26E-05	5.44E-05	-0.965909	0.3368
INF	0.008058	0.010552	0.763669	0.4472
Turnover	-3.68E-05	2.72E-05	-1.354162	0.1792
LOGPIB	0.002637	0.001160	2.272108	0.0256
GROWTH	-1.44E-05	1.89E-05	-0.760376	0.4491
POLRISK	3.99E-05	0.000116	0.342949	0.7325

R-squared	0.108682	Mean dependent var	0.000189
Adjusted R-squared	0.015404	S.D. dependent var	0.000406
S.E. of regression	0.000402	Akaike info criterion	-12.69951
Sum squared resid	1.39E-05	Schwarz criterion	-12.43239
Log likelihood	619.5764	Hannan-Quinn criter.	-12.59153
F-statistic	1.165146	Durbin-Watson stat	1.936101
Prob(F-statistic)	0.327574		

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 81 of 108
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0004

ENTREPRENEURSHIP AND ECONOMIC AND SOCIAL MOBILITY: A FRAMEWORK OF THEORETICAL NOTIONS AND POLICY CONSIDERATIONS[I]

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Abstract: *The paper is structured around two main sections, which provide the necessary theoretical aspects and the deriving policy implications. The first main section (sub-sections b, c and d) discusses the current state of the literature on the role of entrepreneurship in economic development that creates wealth for broad sections of the community, specifically the role to which it can create economic and social mobility. The subsequent second section (sub-sections e, f and g) examines the role of government and business initiatives in providing accelerators for entrepreneurship, including the degree to which access to finance encourages entrepreneurship, and explore the degree to which endogenous growth via bottom-up entrepreneurial efforts that typically are found at the household level (home based, Internet-based, lifestyle entrepreneurs, social entrepreneurs) contrasts with top-down entrepreneurial efforts (venture capital, franchise, and high potential entrepreneurs). Some brief conclusions end the paper.*

Keywords:

JEL Classification:

1. INTRODUCTION

While economic development has often centered upon attracting large mature employers to depressed areas in order to provide economic and social mobility as part of an overall economic plan, the role of entrepreneurs in economic growth and social mobility is often overlooked. According to the Ewing Marion Kauffman Foundation (2015), virtually all job growth occurs in companies that are less than five years old and half of that job growth occurs within companies that are no more than a year old, a clear

[i] The authors wish to thank the Workrise Network, which is part of the Urban Institute, for providing funding in the amount of $16,672 to allow this project to come to fruition.
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indication that entrepreneurship, as opposed to firm size, is what drives our economy. At the same time, small businesses are not a great engine of net job growth (Atkinson and Lind 2018), as they tend to churn jobs given that a large percentage of these firms fail. Yet, much technological innovation is seen in startup enterprises that quickly grow to scale. Thus, it must be realized that firm creation is a necessary, but not sufficient, component of economic development. There must be a nurturing pathway to ensure these companies have the capability to grow into the next generation of major enterprises. However, new businesses account for a decreasing share of overall enterprises, with their share falling by half during the Carter and Obama administrations. As the economy gravitates towards existing firms, the dynamism of the economy is reduced and the ability of individuals to clear their own pathway forward is negatively affected (Hathaway and Littan 2014).

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2. Role of Entrepreneurship in Economic Development and Social Mobility

Entrepreneurship plays a complicated role in economic development as well as economic and social mobility. Acs (2006) notes that entrepreneurship may not increase development when it is fostered out of necessity, such as when it is exclusively a response to labor market changes that require individuals to adopt self-employment practices. Indeed, it could be argued that the rise of the ‘gig economy’ that has thrown numerous people into self-employment out of necessity has a negative impact on economic growth since the division of labor process that is conducive to economic growth is being divided amongst hundreds of different microenterprises that operate in

a market rather than within the firm. According to Coase (1937), firms exist to reduce transaction costs that are widespread in the market economy. It is unclear whether breaking up firms in this manner will increase or decrease economic development, but it is probable that they will decrease economic and social mobility since such self-employed individuals lack access to basic worker protections and this seems to be one of the major driving forces behind cost-savings in the gig economy. Indeed, entrepreneurship can be "a simultaneous source of enhanced income mobility for some but a potential source of poverty for others" (Halvarsson, Korpi, and Wennberg 2018, 275) with those who had higher initial income earning in the labor market being representative of opportunity entrepreneurs and those with lower initial incomes typifying those who have become entrepreneurs out of necessity rather than choice. Yet, while the returns to self-employment are often less than that found in the labor market, this is an ex post analysis that often fails to consider non-pecuniary gains from entrepreneurship that may serve as compensating wage differentials for such activities (Hamilton 2000).

At the same time, encouraging persons of color to become entrepreneurs appears to significantly reduce the racial and ethnic wage and wealth gap (Bradford 2014). This effect is self-reinforcing in that reducing the racial and ethnic wage and wealth gap will also create more opportunities for such individuals, especially Blacks and Latinos, to become entrepreneurs out of choice, rather than necessity, since decades of systemic racism has hampered their ability to accumulate assets that serve as a necessary precursor to accessing financial capital, which is often a barrier to such endeavors (Klein 2017).

Contrary to necessity entrepreneurship, opportunity entrepreneurship tends to increase economic development using the reasoning of Schumpeter's (1934) creative destruction argument since breakthrough technologies are often the result of small- and medium-sized enterprises that have breakthrough technologies that larger, more established firms have eschewed by focusing on their present markets. It is difficult for larger firms to cannibalize their existing profit base, so this presents an opportunity for new entrants that can provide substantial well-paid employment as they develop their economies of scale. Consequently, such entries tend to increase competition (Abdurahmanovich 2022). Since these two types of entrepreneurship work at cross-purposes to one another with respect to advancing development, Acs (2006) finding "the ratio of opportunity-to-necessity entrepreneurship is a key indicator of economic development. As more and more of the population becomes involved in opportunity entrepreneurship and as more and more people leave necessity entrepreneurship (self-employment), the more we see rising levels of economic development."

Toma, Grigore, and Marinescu (2014) point out that there are positive and negative influences on economic development as a result of entrepreneurship. On the positive side, entrepreneurship creates a large number of diverse and varied enterprises to compete with existing firms, as well as spur innovation through knowledge spillovers. On the negative side, entrepreneurship carries with it considerable risk that can increase the cost of capital as investors need to be compensated for that risk. Such increases can have a negative impact on economic growth.

Policies can be put in place to encourage this transition, and while different stages of development often necessitate different policy responses (Abosde and Onakoya 2013; Acs 2006; Acs and Naude 2011), this can be problematic when these prescriptions are set forth solely in the context of a country's overall development. After all, there have always been pockets of underdevelopment in developed countries. Ethnic enclaves, where immigrants from certain countries have come together to live and work, can have a negative impact on earnings (Xie and Gough 2011) and do not have any clear impact on self-employment, which is often seen a mechanism for immigrants to achieve economic success (Toussaint-Comeau 2008). This is ironic in the context of entrepreneurship since the definition of such enclaves requires that there be ethnic minority entrepreneurs who employ their co-ethnics as workers, thus creating a cohesive community that partially replicates the culture and life in the country of origin (Light 1972; Wilson and Portes 1980). Other areas that suffer from underdevelopment are poorer areas often targeted for urban gentrification. While such actions to change the character of the locale do not negatively affect homeowners (Martin and Beck 2018), they often mean displacement of the existing renter population, unless effective polices are put in place to limit evictions as the area becomes more upscale (Ghaffari, Klein, and Angelo Baudin 2018). Indeed, given the increase in property values, it could mean that gentrification could be a catalyst for entrepreneurial efforts in an area if existing homeowners tap the increased equity as potential seed capital for new enterprises.

There are also many potential barriers to entrepreneurship that need to be overcome when viewing it as an economic development pathway, some of which may prove difficult to address depending on the specific locale. Low-income areas may prove particularly difficult to development due to a lack of networking opportunities, poor levels of overall health, low educational attainment, low housing values, limited work experience, absent skillsets, language difficulties, limited transportation options, poor access to finance, lack of role models that reflect the community, high rates of crime, unsuccessful government regulations, and systemic issues related to going from government assistance to self-reliance (Nolan 2006). Successfully encouraging

entrepreneurship will require addressing these concerns, and entrepreneurship will aid in solving many of them. Thus, a comprehensive development plan needs to be in place that encompasses more than just ending barriers to and promotion of enterprise and job creation activities. At the same time, it is worth doing because entrepreneurship is significantly and positively correlated with economic mobility (Qian 2020).

Some of the ways that governments can encourage entrepreneurial efforts include reducing or eliminating unproductive regulations, especially when these regulations result in a lessening of competition such as is the case with occupational licensing (Wiens and Jackson 2014), providing technical and managerial assistance in the form of small business development centers, offering financial assistance through small business development grants, encouraging technology transfer practices, promoting entrepreneurship in schools (Acs 2006), and creating university-based incubators and entrepreneurship degree programs (Guerrero, Urbano, and Gajón 2020). Abosde and Onakoya (2013) emphasize the need for including the local community in the discussion about how to promote entrepreneurship and suggest setting monitoring mechanisms to ensure that participation is broad-based. Such an undertaking should include all groups in the discussion of public policies so that these will reflect the priorities of the most vulnerable in the population. They further note that gender inequality in entrepreneurship remains a persistent issue and that encouraging more women to become entrepreneurs will require more than simply providing education and training opportunities but will necessitate as well as change in the cultural dynamic to promote these options to women starting with equitable socialization programs in the public schools.

Bruton, Sutter, and Lens (2021) find that inclusive policies help reduce economic inequality, while failing to have such polices tends to increase economic inequality. Although they focus on emerging economies, these insights can play a role in examining underdevelopment in developed nations. They distinguish between the formal and informal economies and note that policies encouraging entrepreneurship in the formal economy tend to have deleterious effects on incomes in the informal economy. Although they do not discuss how this impacts developed economies, we can see these effects in the ‘gig economy’ where innovations in the formal sector that have made high-tech startups billions of dollars have depressed wages not only among those who are working in the disrupted industries but also among the self-employed gig economy workers who make up the lion’s share of those who are contracted with by these start-ups to provide the actual services rendered (Cook 2020; Zeitlow 2020). The inability of the law to keep up with this by retaining its distinction between workers and

the self-employed is a key feature of 21st century capitalism that the gig economy exploits (Snider 2018; Abadie 2019; Lata, Burdon, & Reddel 2022).

To combat this, Bruton, Sutter, and Lens (2021) suggest that more exclusionary institutions also lead to more economic inequality. This can be seen in the increased use of occupational licensing in the United States designed, at least partially, to reduce competition. Occupational licensing tends to reduce entrepreneurial efforts by effectively creating barriers to entry as well as increasing economic inequality for the same reason (Kleiner and Vorotnikov 2017; Zhang and Gunderson 2020).

Litwan and Phan (2012) point out that almost all the job creation that is attributed to small- and medium-sized businesses in this country is carried out by new businesses (i.e., by entrepreneurs) as opposed to small and medium-sized businesses that have been around for a decade or more. Due to perceived or actual issues related not just to scale economies but also to firm age, such enterprises are at a disadvantage relative to more established peers in providing health insurance and pension support to their employees. Positive steps that have been taken are the Affordable Care Act provisions and various pension reforms, but they suggest that government procurement policies could provide set asides for new business startups and thus encourage the provision of these benefits. They also note that such provisions will tend to coincide with better, more engaged, employees and result in superior productivity that, if subsidized in this manner, can prove economically advantageous for such companies. In so doing, the quality of jobs afforded by entrepreneurs can be markedly improved, thus economically lifting not only the entrepreneurs themselves, but also their employees.

Chatterjee, Glaser, and Kerr (2014) suggest that providing tax benefits to large employers discourages entrepreneurship but also do not approve of trying to use government policy to promote entrepreneurship. At the same time, they discuss how anchor institutions play a powerful role in entrepreneurship and how entrepreneurship aids local economic growth and contemplate an experimental approach to the question. In a similar vein, governments should avoid trying to pick winners and instead focus on dissuading losers from entering by being economical with subsidies (Shane 2009) as well as imposing taxes on entities that might be undesirable from a public policy perspective (Karagiannis and Madjd-Sadjadi 2007). Such policies will reduce overall tax burdens and thus create a positive business climate for those entities that still enter the marketplace.

3. TYPES OF ENTREPRENEURSHIPS

In the previous section, we discussed two types of entrepreneurships: necessity and opportunity entrepreneurship. The former is one that is thrust onto an individual who, due to economic necessity, becomes an entrepreneur, while the latter is one that is choice-based wherein a person or persons see an opportunity present itself in the marketplace and thus decides to address it. The motivations for each of these are critically important in understanding the role of entrepreneurship in modern society. Given that necessity entrepreneurship is not a choice that individuals make, it is something of which government needs to be cognizant while simultaneously creating policies that ameliorate its negative effects and thus allow for such entrepreneurs to still be successful. One major reason for the persistence of necessity entrepreneurship is systemic racism with black and Latino individuals, as well as individuals who are disabled, deciding to start their own businesses as a solution to labor market discrimination (Maalaoui 2021). This is also true for those who have previously been incarcerated since employment is often a condition of parole, but many businesses refuse to hire previously incarcerated individuals (Baskarin 2019). However, necessity entrepreneurs soon find that discriminatory practices are present not just in the labor market but also in the lending (Meyers and Chan 2017), investment (Eyal-Cohen 2021), and social networking markets (Neumeyer, Santos, and Morris 2019). In addition to these concerns, the smaller size of necessity entrepreneurial firms compared to other firms means that the relative regulatory burdens that they face are greater given the fixed cost for firms of compliance with most regulations – even after controlling for the fact that smaller firms may be exempted from some regulatory burdens with the greatest relative regulatory burdens facing those with fewer than five employees (Calcagno and Sobel 2014). Ways to address these inequities are to create municipality-run venture development funds, networking opportunities, and reduced regulatory burdens for necessity entrepreneurial businesses, providing them a way forward to become scalable enterprises (Baskarin 2019). Other possible solutions include providing microgrants, government-supported credit rehabilitation services, creating and supporting existing community development financial institutions and minority-owned depository institutions that can support their localities with debt capital in ways that traditional banks do not, paid access to lawyers who can assist in navigating the regulatory framework, dedicated minority enterprise incubators, and special government procurement opportunities that have reduced paperwork requirements and are not subject to competition from larger firms (Eyal-Cohen 2021).

At the same time, opportunity entrepreneurship needs to be cultivated, especially in distressed and rural areas. Agglomeration economies have tended to favor urban

areas, but this leaves vast swaths of the country behind when it comes to economic opportunities. This is the classic "place prosperity versus people prosperity" conundrum first identified by Winnick (1966), who coined the phrase and studied various issues that shape governmental policies which abate individuals and regions that are economically desolated. Winnick claimed that if a policy decision drives economic activity in a region, it is oftentimes at the expense of other places, thus, place policies are expensive, ineffective and clumsy. He further pointed out that the US political system is behind pushing the place policies, but strongly believed that policies that target people have more chances to succeed although they are slow to show results. Theodos (2021) discusses eight core assumptions that underpin place prosperity initiatives and finds mixed evidence for them, especially in terms of their ability to resist national and global trends and the ability local champions to rally support in the community and to be impartial in administration. Unfortunately, finding fault with place prosperity does not mean that the alternative of people prosperity is necessarily the better choice. After all, people prosperity policies have one huge issue, and that is the much greater ability of firm mobility than people mobility. Some of this has to do with professional and occupational licensing issues that prevent some individuals from relocating because their licenses may not always be easily transferable between states (Goldhaber et al 2015; Hermansen 2019). There is also the issue that with dual family employment, locational moves may come at the cost of unemployment for the trailing spouse (Shaklee 2006). Even when people do move, they often do so at the expense of their social and familial networks. For the entrepreneur, there is an additional issue in that localized knowledge about the local labor, services, and goods markets is often necessary to become a successful entrepreneur. Finally, Bolton (1992) argues there is the concept of a "sense of place" that carries with it significant intangible capital such as a shared sense of community, identity, and concepts such as fairness that mean that individuals are inextricably linked to their locales in a way that capital is not. Thus, labor market mobility carries with it huge economic inefficiencies in its own right. To this end, Henderson (2002) argues that rural economic development capacity for potentially high-growth entrepreneurs (the top-down approach) needs to be emphasized while also recognizing that almost all entrepreneurs in rural areas are household-level entrepreneurs (the bottom-up approach) who are likely not going to be expanding their economic footprint.

The labor market itself can have a differential impact on which type of entrepreneur is prevalent. Makó, Illéssy and Borbély (2018) find that high numbers of creative workers are correlated with more opportunity entrepreneurship and less necessity entrepreneurship. Similarly, when an area already has ample labor in

relevant occupations, entrepreneurial activity in related industries tends to increase (Glaeser and Kerr 2009).

COVID-19 and its aftermath is also shaping the decisions of would-be entrepreneurs. Rattan (2020) suggests that COVID-19 may be altering not only work relationships but also has made more people amenable to entrepreneurship either through necessity or by choice. Yet, such endeavors still carry with it significant risks associated with firm size since the shutdowns associated with COVID-19 as well as the increased influence of high-tech knowledge-based firms, such as Amazon, Apple, Google, and Microsoft, in every aspect of our lives, disproportionately hurt smaller entrepreneurs. Larger firms increasingly make and lobby for rules that discriminate against smaller enterprises even as they themselves establish marketplaces in which smaller enterprises compete (Kuratko and Audretsch 2022). A firm that wants to sell its products needs to be on Amazon and in Walmart, needs to use web services provided by Microsoft, Apple, Amazon, or Google, and needs to be found using Google search queries. At the same time, when they sell goods or services, these tech giants end up gathering copious pieces of information that can be used to create products that compete directly with any potential rivals that appear on their marketplaces. In addition, this emphasis on fast-growing technology companies means that entrepreneurship can become a dual-edged sword for policymakers, as much of the economic benefits to regions that are widely distributed when firms are small or medium-sized tend to become more concentrated in the firms themselves when these firms become giants.

The maintenance of a low inflationary environment and a stable economy is an important precursor for successful entrepreneurial impacts since so much of entrepreneurship involves risk-taking and such economic uncertainties only exacerbate such risks (Skica, Bem and Zygadlo 2013). However, by 2022, the rapid expansion of monetary policy coupled with supply chain issues led to a stagflationary environment. This required significant interest rate hikes that affected small- and medium-sized businesses more than large enterprises (Bourletidis and Triantafyllopoulos 2014). One of the key problems is that rising economic inequality not only may lead to reductions in opportunity entrepreneurship due to a reduced inability to have the funds necessary to start a business, but also reductions in necessity entrepreneurship when there is a credit crunch that does not allow the tapping of alternative methods of financing (Aceytuno, Sánchez-López, and de Paz-Báñez 2020). This can make it more difficult to emerge out of a recessionary environment and points to a need to have organizations provide countercyclical financing for such smaller enterprises.

Other types of entrepreneurs, however, may flourish in a recessionary environment. Lifestyle entrepreneurship, where the entrepreneur is focused more on

work-life balance, freedom, and flexibility than on growing to become a large firm (Claire 2011). Spigal (2011) suggests lifestyle and other household-level entrepreneurship becomes more prevalent during economic downturns when venture capital is withdrawn, so the ultimate impact of the business cycle on entrepreneurial activity may depend more on the type of entrepreneurship examined.

Social entrepreneurship, which is the creation of an enterprise for social and economic change, is another type of entrepreneurship that seems to do well in a recessionary environment (Ng 2010; van Putten II and Green 2011). These types of enterprises tend to be created when there are high levels of economic inequality coupled with low levels of social mobility (Pathak and Muralidharan 2018). As these focus on affecting societal change, they can be a positive influence in economically distressed localities and can be complementary to other types of entrepreneurial efforts by increasing social and human capital in the region (Prasetyo and Kistanti 2020).

4. MEASURING ENTREPRENEURIAL ECOSYSTEMS AND THEIR EFFECTS

The fact that different types of entrepreneurship can be complementary to each other as well as the various mechanisms that can be present to support entrepreneurship suggest that there is an entrepreneurial ecosystem at work. The discussion of these ecosystems and their effectiveness is still nascent in the literature as its conception has only been around since its introduction by Isenberg (2011). Isenberg conceives of an entrepreneurial ecosystem as inherently distinct from the types of support mechanisms that we provide for small- and medium-sized enterprises or even for self-employment. It isn't even one designed to support all forms of entrepreneurship as discussed earlier but instead concentrates its efforts solely on opportunity entrepreneurs who seek to, one day, become large enterprises: "What you want is a system in which deserving ventures get resources, and no less important, in which non-deserving ventures have denied them" (Isenberg 2011: 4, emphasis as in original). To that end, he has little patience for sector-based development plans whether they are top-down in orientation with industrial targeting or bottom-up based on current comparative advantages. Isenberg (2014) continues the development of this idea by summarizing what entrepreneurial ecosystems are not, concluding that incubators, entrepreneurial education, and angel investment tax credits are irrelevant or unnecessary for the entrepreneurship ecosystem to work. What is important from his perspective is that the system be put together as a cohesive plan rather than piecemeal with everything working together towards the common aim of creating a few winners that will become large corporations. Such large

corporations can serve as customers and markets for other firms as well as a reservoir of executive talent who can be pouched by other firms or who will seek to launch their own companies.

In contrast, Audretsch et al. (2019) discuss entrepreneurial ecosystems not as something that are designed but rather something that is. They view it as inherently interdependent set of firms and markets that create and distribute value for their participants through cooperation and network effects as opposed to competition. In some ways, we can see this at work in the various market structures that have been created and that are managed by firms such as Apple, Google, Amazon, eBay, Uber, Steam, and Airbnb. While nominally firms and self-employed individuals are competing against one another on the various platforms, the value that is created by having these platforms in the first place benefits all participants.

Stam and van de Ven (2021) use a systems approach to study how individual elements of entrepreneurial ecosystems are interdependent with one other. They conceptualize such ecosystems as consisting of three separate components: "The institutional arrangements component is captured by the formal institutions, culture and network elements. The resource endowment component is captured by the physical infrastructure, finance, leadership, talent, knowledge, intermediate services and demand elements. The third component of the infrastructure, proprietary functions, consists of the entrepreneurial firms commercializing innovations." (Stan and van de Ven 2021, 813). When these three components work effectively together, the result will be high-growth companies.

Johnson et al. (2022) develop a framework for measuring entrepreneurial ecosystems using various publicly available and frequently updated databases to describe relationships between firms and government organizations, accelerators, and universities. They suggest that entrepreneurial ecosystems relate to a public-private partnership between government and entrepreneurs with government providing research grants and government contracts and entrepreneurs providing products and services. Both sides benefit from collaborative work on public policy. Entrepreneurs also work with research institutions and universities as well as with venture capitalists that provide them with seed money.

5. ACCESS TO FINANCE

Even though there is no clear-cut universal definition of an entrepreneurial ecosystem, access to financing is part of every entrepreneurial ecosystem regardless of its definition. Banks, venture capitalists, angel investors, government entities, and

community development financial institutions are integral vehicles that allow entrepreneurs to get the financial capital necessary to start and expand enterprises.

Robb and Robinson (2014) note an important source of financing for entrepreneurs in their startup year of operation –when professional investors do not have a track record on which to evaluate an investment prospect and thus are unlikely to invest– is their ability to borrow funds from banks based on their personal credit histories and their personal assets being pledged as collateral. This reliance on formal credit markets as opposed to sourcing funds from friends and family or by using credit cards means that wealthier individuals with strong credit histories are able to be found larger scaled enterprises than poorer ones, especially those with poor credit histories. This reliance on bank loans means that minority entrepreneurs start with a distinct disadvantage because they often have lower initial wealth levels than their white counterparts. It also means that when credit tightens, entrepreneurship levels fall, again suggesting that countercyclical government financing of startups might prove to be a useful method for supporting entrepreneurship. On the other hand, providing subsidized loans through government entities especially during booming times may not be the best mechanism to foster entrepreneurship since offering such loans could cause a reduction in the quality of entrepreneurial firms owing to marginal firms taking on more credit than they ought (Evans 2016).

Bai *et al*. (2022) suggest that early-stage financing from governments frequently involves collaboration with private entities with matching funds and joint equity investments. These are designed to address market under-provision of capital since there are greater social returns from innovation than are captured by the firms themselves. When the social return to capital exceeds the private return to capital, markets will systematically fail to provide sufficient capital due to these positive externalities. In addition, governments benefit from these collaborations because private entities have a vested interest in only placing market bets when entrepreneurs have a greater likelihood of eventual profitability. As such, private entities may be better able to discern which entities are less likely to succeed and which are more likely to succeed than governments that are less likely to focus on profitability as a benchmark for financing.

However, just because government is providing assistance does not necessarily lead to more entrepreneurship. With respect to angel investor tax credits that represent a significant portion of entrepreneurial development assistance at the state level, Denis et al (2021) find no evidence of a resulting increase in entrepreneurial activity and some evidence that the quality of investment may suffer as a result of its provision. Instead, direct firm support appears to be more conducive to such efforts.

Glücksman (2020) notes that there is a bilateral information asymmetry present in the case of venture capitalists owing to the fact that both the entrepreneur and the venture capitalist have hidden information that will affect the eventual outcome of the relationship. While obtaining financing from a bank or government is one where only the entrepreneur's hidden information may be problematic, owing to the fairly similar terms under which they will be offered financing and the fact that equity is not usually at stake, this is not the case with venture capitalists since they provide financial assistance in exchange for an equity position. This means that corporate valuation becomes important. Yet, it is not so simple as to take the equity position that values the firm at its highest level because the quality of the venture capitalist and the relationship between the venture capitalist and the entrepreneur also will greatly matter. As such, there are principal-agent problems from the standpoint of the venture capitalist that manifest in both moral hazard and adverse selection issues. But there is also a similar problem from the entrepreneur's perspective in being able to properly evaluate the quality of the non-financial assistance that will be provided by the venture capitalist as well as the venture capitalist's overall valuation of the entrepreneur's firm. Failing to properly mitigate this asymmetry can lead to dissatisfaction in the eventual relationship. Furthermore, while venture capitalists have well-honed tools to mitigate such issues, entrepreneurs need to rely upon networking with other entrepreneurs who have previously navigated this process to reduce information asymmetry risk. At the same time, as noted by Tian and Wang (2014), venture capitalists that are too risk-averse often pull the plug on risky, but potentially highly profitable, ventures too quickly. Thus, the risk tolerance of a venture capitalist is an important factor that entrepreneurs need to evaluate before partnering with a venture capitalist. Low risk tolerance is often associated with inexperienced venture capitalists, which may be one reason entrepreneurs place a premium on venture capitalists with a proven track record.

As an alternative to formal venture capitalists, informal networks of angel investors can be particularly useful but difficult to organize and maintain (Steier and Greenwood 2000). One issue is that these individual investors often lack the sophistication and knowledge that venture capitalists have, and they typically exercise less contractual control over the enterprises in which they invest. As a result, they back firms that end up having lower levels of eventual success in initial public offerings and angel investment does not appear to act as a strong signal for future funding from venture capitalists (Cumming and Zhang 2019). On the other hand, when angel investors do provide more than simple capital, their additional technical assistance does seem to contribute to overall success for the firms in which they invest. It appears as

though it is this factor rather than the financing that is the most helpful for new startups (Kerr, Lerner, and Schoar 2011).

As opposed to venture capitalists and angel investors, a relatively new phenomenon is the advent of crowdfunding, which entails utilizing the Internet to solicit funding through small denomination contributions in exchange for products, equity position, or as a simple gift to the business (Belleflame, Lambert, and Schweinbacher 2013). Belleflame, Lambert, and Schweinbacher (2014) note that entrepreneurs prefer to finance individual products when their financing needs represent a small proportion of the market potential, and to offer equity stakes when this is not the case. Crowdfunding is purely a financing vehicle with individuals who contribute to a venture having little to no input into the startup after funding is completed. When equity positions are provided in exchange for contributions, there are some protections that are afforded as these individuals become investors. However, the regulatory oversight is far less than for traditional initial public offerings, and the ability to transfer shares or provide for their impartial valuation is much more limited since there is no public trading platform, which tends to limit potential funding (Buttice and Vismara 2022).

Patrapron (2015) notes that, as an alternative to bank lending, community development financing institutions can be far more flexible and provide additional services that will assist entrepreneurs in their initial startup phase. Owing to their presence in the community and their greater commonalities in culture and language with the entrepreneurs that they support, they often can provide more favorable lending terms and greater technical assistance than banks with a higher degree of success after controlling for risk.

A final emerging choice for financing is initial coin offerings that utilize blockchain technology. In comparison to other forms of financing, this one is both newer and less research has been devoted to it, but it has the potential to be highly disruptive to the other forms of financing. One key issue with it is that it is unclear what exactly investors receive. They hold a digital currency, but that digital currency typically does not carry with it any promissory note nor equity stake in the company. Digital currency makes the entire transaction somewhat problematic from a contractual legal perspective and creates an issue with how its value is ultimately determined. What they receive instead is based on the smart contract that accompanies the initial coin offering and that can be traded on the blockchain that provides them with a right to a physical or digital asset, the right to use a service, or the right to perform work. But very few of them are securitized since that would trigger regulatory requirements that many of these entrepreneurs are wishing to avoid (Schukes and Gutmann 2021).

6. START-UP ACCELERATORS AND ANCHOR INSTITUTIONS

Along with financing, technical assistance, access to technology transfer, a well-positioned workforce, and institutions that can provide backward and forward linkages can be critical for successful entrepreneurship. Start-up accelerators and anchor institutions can provide many of these benefits. Hathaway (2016) notes several key differences between accelerators and traditional business incubators. Business incubators mostly just rent space to small businesses, allowing them to stay for lengthy periods of time and provide little in the way of mentorship and education. In contrast, accelerators take in cohorts of startups, selecting them through a competitive process, and provide ample training and mentoring, with a goal of having them leave the accelerator within three to six months. The result is a more professional business that is more likely to attract angle and venture capital investments and be successful in the long run. These benefits also spill over into other firms that benefit from the positive externalities that such successful enterprises provide to a region. However, this success tends to be limited to top accelerators, and some accelerators had poorer outcomes for their entrants than for companies that were not selected. Butz and Mrozewski (2021) point out that the competitive selection process is critical to determine which result will occur. Accelerators that emphasize commercial applicability are much more likely to develop successful outcomes for their cohorts than those that emphasize sustainable environmental and social goals in addition to profitability predominantly. This is so because there is less ability to effectively compete when one is attempting to fulfill three goals that may be at cross-purposes with another and, thus, such accelerators cannot be as selective.

Turning to anchor institutions, Cohen, Qurshi and Liu (2021) propose a definition of the concept that is otherwise lacking in the literature. This definition focuses on the large non-profit nature of such institutions that serve a social purpose that is in alignment with the needs of the communities that it serves, significant impacts said communities and is "relatively spatially immobile." These characteristics serve to anchor said institutions in the regions that they serve and mean that they are not likely to leave –unlike profit-seeking institutions that can and will move depending upon financial inducements and lack a core purpose to their communities beyond providing market-based goods, services, or jobs. To this end, anchor institutions need not be defined exclusively as universities, which are the classic representations of this archetype, but may include other large non-profit entities such as hospitals. At the same time, they ask whether for-profit organizations may also play a similar role and they create a new concept called "anchor businesses." Anchor businesses do just that with the differences being that such entities are for-profit institutions that are not likely to

move due to existing structural linkages with the surrounding community, such as a localized extensive supplier or customer base, have an extensive influence on the surrounding community, and invest in local community development for its own sake. A large retailer or service provider that has extensive control over a market would be a classic example of such an entity provided it engages in this last criterion since moving would destroy its existing customer base. Classical examples of such entities might include electric power companies, local telephone companies, local cable companies, and the proverbial general store in a lightly populated rural area. Manufacturing firms, such as Hanes Brands and RJ Reynolds in Winston-Salem, Ford and GM in Detroit, and IBM and Hewlett-Packard in Silicon Valley, all play this role regarding their corporate headquarters via their ongoing commitments to their local communities. The emphasis does need to be placed on relative spatial immobility rather than absolute spatial immobility because even non-profits with extensive ties to a community might move for the right rationale. For example, Wake Forest University relocated its entire campus from Wake Forest, North Carolina to Winston-Salem, North Carolina, a distance of a little over 100 miles, some 122 years after its founding.

Even still, universities, in particular, have traditionally fulfilled this role as the wholesale relocation of a university, despite the above example, is rare. They often are inextricably linked to the surrounding community, not simply in terms of physical presence but also because most universities tend to attract students from the local community, provide internship opportunities with local businesses, and have advisory boards composed of individuals from local businesses. Culkin (2016) argues that universities, acting as anchor institutions, can play a pivotal role in terms of creating an entrepreneurial culture for the region, providing significant networking opportunities, and creating secondary training opportunities for upskill development, especially since general skills training is often under provisioned by employers. Such skills can be taken to other firms when an employee leaves, thus denying the original employer some of the benefits of the skillset that has been imparted. Meanwhile, Schildt and Rubin (2015) discuss how universities can use their buying power to support necessity entrepreneurs, engage in workforce development strategies, and target industries for opportunity entrepreneurship.

Beyond providing such services to the surrounding community that allows for the building of an entrepreneurial ecosystem, research universities also are originators of technology that can be licensed to local startups. Gergorio and Shane (2003) note that there are four basic reasons based on which it is important to examine why some universities generate more startups than others. First, when a university researcher or team invents something, the invention can be licensed to generate revenues that can

provide significant income streams to universities that are always looking to expand endowments. By licensing inventions to startups and then investing in those same companies, universities can capture a lot of the potential profits with only a moderate risk exposure of their initial capital investment. Second, university entrepreneurship differs significantly from other university activities, and this can lead to changes in university culture that permeates throughout the institution. Third, since such startups are usually co-located near the universities that provide the inventions, these firms often employ graduates of the institution and allow for additional agglomeration economies to be produced that significantly enhance local economic development. Fourth, these inventions can generate knowledge spillovers that will provide a positive feedback loop to the university and surrounding community, creating a virtuous cycle. It is not coincidental that Silicon Valley is located near Stanford University and the University of California at Berkeley, that Triangle Research Park is located near the University of North Carolina at Chapel Hill, or that Route 128 in Boston is located near Harvard University and the Massachusetts Institute of Technology. At the same time, it is not without rationale that we have omitted the proximity of Duke University to Triangle Research Park in the aforementioned list because it has not spawned significant startups despite a large research portfolio. As Gregorio and Shane (2003: 209-210) note, in 1997, when Duke's sponsored research was within 10% of Stanford's, Stanford spawned 25 startups while Duke had none. Their reasoning for the wide disparity between research portfolios and startup creation comes down to the university's research reputation and the decision to invest rather than license their inventions, as well as the share of royalties going to the university with lower royalty amounts leading to more startups.

As for what leads to successful university startups –those being able to acquire venture capital and later successfully exit an initial public offering–, Shane and Stuart (2002) find that prior direct and indirect ties to venture capitalists significantly reduce moral hazard as well as increase the probability of venture capital investment, while obtaining venture capital financing is a key indicator of initial public offering success.

7. GEOGRAPHICALLY TARGETED DEVELOPMENT ZONES

As economic zones have been initiated in different formats since the last century, the literature on the impact of these zones can be divided into two categories: the impact on the economies in the last century and in this century. Also, some studies offer a conceptual framework for economic zones and others investigate the economic impact

of the zones with the help of empirical analysis. A majority of the studies fall into the latter category.

The literature on the impact of economic zones on the local economy from the last century shows mixed outcomes. For example, the following studies show that the incentive programs help communities to revitalize their economic well-being. From 1984 to 1993, in the U.S., the number of states that offered tax incentives went up from 22 to 44 (Chi 1994). Also, from 1992 to 1995, more than 60 percent of rural manufacturers in the country took advantage of these programs (Greenberg and Reeder 1998). Bartik (1991) and Buss (2001) examined the impact of the programs on the revitalization at the firm, industry, and regional levels. For example, enterprise zones and university research parks[1] led to job growth in metropolitan areas, but such zones were not affected by tax incentives (O'hUallachian and Satterthwaite 1992). Whereas state economic development expenditures exhibited a positive relationship with the growth of manufacturing industries (Bartolome and Spiegel 1997). These incentives positively affect firm location decisions, but do not affect the growth of current firms (Walker and Greenstreet 1991).

Ham et al. (2011) find that federal and state government programs in the form of subsidies and tax credits to boost employment in depressed areas lead to a positive impact on the labor market and wages. Sohn and Knapp (2002) studied pre and post impact of a tax credit program for the period of 1994 to 1998 in the State of Maryland that was initiated in 1996. Their analysis showed that transportation, communication, utilities, and services sectors responded favorably to the program whereas manufacturing, finance, and real estate sectors did not. Their model controlled for zip codes and years.

The following studies find that state economic development programs have little impact on local communities in terms of job creation, retention, expansion. For example, Mofidi and Stone (1990) analyzed the impact of tax incentives while controlling for variations in the treatment of expenditures by states and local governments, which, according to the study, explained the inconsistent results of tax studies. The paper employed a regression model on the net investment and employment in the manufacturing sector between 1962 and 1982 in the 50 states. It found that the impact of "state and local taxes were negative when revenues were devoted to the transfer-payment program and the impact of increases in expenditures on health, education and public infrastructure were positive."

[1] University research parks are locations that can generate, attract, and retain science and technology companies and talent in alignment with sponsoring research institutions such as universities, and public, private, and federal research laboratories.

Gabe and Kraybill (2002) report the outcomes of state economic development incentives on close to 400 manufacturing and non-manufacturing firms in Ohio from 1993 to 1995. They examined the impact of age and size on employment. They measured the growth of firms in terms of change in employment while controlling for regional and industry growth factors. Their empirical analysis revealed that the incentives have little effect on the growth of the firms, and that the firms that received the incentives overestimated their employment targets than the firms that did not receive any incentives. Hicks and LaFaive (2011) arrived at the same conclusion when they analyzed the impact of Michigan Growth Authority (MEGA) credit targeted tax incentives to businesses from 1995 to 2002. In their empirical analysis, they also control "for long-term trends in the economy, the business cycle, labor force participation rates, and the impact of adjoining counties on employment and income in each of Michigan's counties."

Kolko and Neumark (2009) studied the impact of enterprise zones on employment in California in regard to their "location, implementation, and administration." The analysis indicates that the zones do not lead to an increase in employment. However, the study also points out that zones with less manufacturing and more marketing and outreach activities exhibit a more positive impact on employment. They used a National Establishment Time-Series (NETS) data set. Jensen (2017) studied the effect of the Promoting Employment Across Kansas (PEAK) program on expansion of the firms by analyzing establishment-level data. The paper divided the data into two groups: firms that received the PEAK assistance and firms that did not. The study found that the received assistance from the program has "no discernable impact on firm expansion, measured by job creation."

Pope and Kuhle (1996) survey close to 300 firms in California to study the effect of wage-paid tax credits and tax credits for the cost of retaining employees. Their AVOVA analysis suggested that former program was effective in increasing employment at firms with the least resources. However, the later program was ineffective. In another regional study, Anderson and Wassmer (2000) investigated the impact of local tax incentives on Detroit. The study found that incentives resulted in a mismatch between job creation needs and the pool of available workers in an urban setting. It also noted that there was minimal evidence that the benefits of tax incentives were equal to or greater than their cost.

The following two studies focus on developing a framework for economic zones. Madjd-Sadjadi and Pagiavlas (2011) claim that, in order to take full advantage of a comparative advantage of a region, entrepreneurship and industrial targeting need to coincide with each other. Madjd-Sadjadi and Zeoli (2019) note that in order to uplift a

region economically, the local and state governments can adopt a "bottom-up approach" wherein the industries can spearhead the efforts for generating jobs, and citizens can be assisted in every possible way to fit for those jobs. However, Madjd-Sadjadi and Zeoli are against giving tax breaks and subsidies to businesses to attract them in the communities.

Xu (2021) argues that opportunity zone creation leads to lower levels of entrepreneurship since tax benefits disproportionately go to more established businesses from outside the area, which can make such investments less permanent and less likely to benefit the local populace. Much of this capital is only attracted by the tax benefits that coincide with the investment. Thus, when the tax benefits dissipate, the investment may be withdrawn, sometimes leaving the locale in a worse position than before the investment occurred.

Finally, we might consider the evaluation of such zones in the wider context of local economic development in general. Bartik and Bingham (1995) provided a framework for evaluations of economic development programs. They recommend use of social research methodologies such as "planning, monitoring, effectiveness, and efficiency" to investigate the impact on "health, education, welfare, and other human services programs." They also warned that the evaluations of the programs can be susceptible to export-oriented firms, in-migration, inflation, public service, and capital costs. Bartik (1994) feared that the evaluations of the economic programs that are based on surveys of firms "are unlikely" to convince the critics of the programs. Dewar (1998) suggested that the elected officials, who pursue economic development programs, use program administrators who want to see the programs alive and well. Also, there can be a disconnect between what the elected officials want to hear about the progress of the programs and what the reality is.

The promises of such zones thus have not been realized. Glaeser and Hausman (2020) argue that employment-based policies may not be cost-effective, and that targeting entrepreneurship instead could increase economic mobility. Many of these employment-based policies simply provide subsidies for investments that would have already occurred, or they attract marginally attached businesses that will be fleet-footed once they are courted by other areas that offer greater tax abatements. This "race to the bottom" is noteworthy because of the huge investments that are often undertaken simply to try to transfer wealth from one area of the country to another, thus, engaging in "share-enlarging" rather than "pie-enlarging" behavior. Such behavior is reminiscent of what occurs when nation states decline according to Olson (1984). Instead, Glaeser and Hausman (2020) suggest using targeted vocational training funds in distressed areas as a mechanism for uplifting local populations. Glaeser (2015) has promulgated the idea

of an "entrepreneurship zone" that would provide reduced regulatory burden for small entrepreneurs. The entrepreneurship zone is a concept that needs further studies and research because it is new and has not yet seen widespread implementation.

8. CONCLUSION

Entrepreneurship is considered as the driver of an economy. Yet, economic development efforts have typically ignored it in favor of chasing large corporate enterprises that can command huge tax abatements that are paid for by the resident business community. Such enterprises often do not provide jobs that match with local economic conditions and thus need to generate in-migration. In-migration can leave current residents in an even more precarious situation as land prices are bid up by new arrivals. It can also fundamentally change the political, social, and economic character of the region, which is not always a welcome sight to long-term residents. Although it makes a splash to welcome new businesses that will generate jobs, these new entities can substitute for existing employment, thus resulting in no net job creation, or can even depress overall economic activity despite promises of economic growth (Mitchell et al. 2020). Even when they do create jobs, the costs per job created are often staggering, which calls into question whether the use of public funds is appropriate (Bartik 2005). Instead, a closer examination needs to be made at incentivizing localized entrepreneurship by creating a culture that encourages risk, rewards innovation, and allows firms both the freedom to succeed but also, perhaps more importantly, the freedom to fail, not by picking individual winners and losers, but by creating an environment where the best ideas and innovations can rise to the top. Although job creation is an important by-product of such an ecosystem, it cannot be the sole metric by which success is judged. Instead, both necessity and opportunity entrepreneurs should feel as though their needs are addressed and success should be measured by how successful a locality meets these needs as well as the needs of the entire community.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 109 of 120
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0005

GENERATIVE AI AND PHD SUPERVISION – PERSONALISATION AND ALIENATION, BENEFITS AND RISKS

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Presented at EDEN Annual Conference PhD Symposium, Bologna 2025

Abstract: *Doctoral supervision is a primary factor when analysing the doctoral process completion and success. We expect more and more from doctoral graduates – good research, societal impact, policy advocacy and above all multidimensional, interdisciplinary and highly adaptive specialists. All these require an excellent supervision. In time, the doctoral mentoring evolved from having a unique supervisor to multiple possible structures – one supervisor and a guiding committee, two supervisors – cotutelles, more than two supervisors in joint programs with several institutions, one academic supervisor and one industry supervisor, etc. Lately, a very "special" PhD mentor joined the doctoral team – Generative Artificial Intelligence (AI). Friend or foe, for the doctoral student or the supervisor, or for both (the team), AI tools and models become more and more the new normal in doctoral research. Is this good for PhD supervision, can it add to the so much necessary personalisation of doctoral supervision, or is it just another factor contributing to the lack of real socialisation, leading to supplementary alienation? The present essay is an attempt to analyse the benefits and risks of using AI in doctoral supervision, based on the extant literature – still very scarce, due to the novelty of the subject. Our results will be presented based on the structure of a classical awareness-understanding matrix, with three sections – what we know, known unknowns and unknown unknowns. Findings could help reflect upon and design better policies in the field, answering to ethical dilemmas, to support and protect, at the same time, both doctoral researchers and their supervisors.*

Keywords: *doctoral supervision, generative artificial intelligence, personalized mentoring, higher education policy*

JEL Classification: *I23, I21, O33*

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1. WHAT WE KNOW ABOUT AI AND PHD SUPERVISION

1.1 Classical supervision

Doctoral education and research represents the most advanced mission of universities and societies, and doctoral students' success is strongly influenced by the quality of doctoral supervision. Models of doctoral education evolved in time, and the challenges of the present, especially our living in a poly-crisis world, require quick adjustments and the most efficient use of all available resources for research – including those offered by the exponential development of generative AI technologies. We move towards the so-called transformative education models, which "envision discipline-specific knowledge coupled with a broader interdisciplinary perspective and addresses the transferable skills necessary to successfully navigate an ever-changing workforce and global landscape. The overarching goal of TDEM is to transform the doctoral student into a multi-dimensional and adaptive scholar, so the students of today can effectively and meaningfully solve the problems of tomorrow." (Patterson et al, 2019).

Personalized doctoral supervision is seen as a necessity, and involves providing multiple types of support for PhD students, developing new core supervisor competencies, ensuring supportive institutional conditions, and measuring outcomes through established indicators. Extant literature (Antilla et al, 2023) describes distinct types of support – informational (advice on research problems, methodology, interpretation, planning etc.), emotional (encouragement, constructive feedback, care for PhDs' well-being), instrumental (research facilities, recommendations, access to networks) and co-constructional (brainstorming together, co-creating ideas, methods, solutions etc.) - with additional emphasis on autonomy, structure, and involvement (Devos et al, 2015).

Devos et al. (2015) and Kumar and Kaur (2019) stress that satisfying basic psychological needs through tailored approaches can boost students' intrinsic motivation and research self-efficacy, while Seeber and Horta (2021) observe that frequent, aligned meetings strengthen student satisfaction and motivation for research. The mentioned studies further indicate that supervisors' personalization ability is connected with a whole blend of core competencies.

Haley et al. (2024) and Kreber et al. (2021) point to the importance of five supervisor's competencies: domain knowledge, methodological expertise, pedagogical skills, relational skills, and reflective practice/functional aspects. Kahl et al. (2015) state that matching supervision styles to individual candidates and maintaining clear communication are central to effective personalization of doctoral supervision.

Institutional factors are also very important - such as optimized supervisor workload, diverse supervision teams, and structured selection processes – these also highly influence personalization outcomes. Proposed indicators for measuring supervisors' personalization ability include research self-efficacy (Overall et al. 2011) and convergent assessments of supervisory quality, including tools like a Graduate Supervision Inventory and models of completion mind-sets.

Synthesizing, the core supervisors' competencies related to personalization refer to:

Support types and their personalization

- Multiple support dimensions:
  - Anttila et al. (2023) identified four key types of support: informational, emotional, instrumental, and co-constructional.
  - Devos et al. (2015) emphasized autonomy support, structure, and involvement in supervision.
- Theoretical framing:
  - Kumar and Kaur (2019) used Self-Determination Theory, focusing on satisfying basic psychological needs for autonomy, competence, and relatedness in supervision.
- Balancing support types:
- Overall et al. (2011) found that combining high levels of autonomy and academic support leads to the highest research self-efficacy among doctoral students.

Supervisor needed competencies for personalization

- Key competencies:
  - Haley et al. (2024) identified five aspects of supervisors' competences:
    1. Domain knowledge
    2. Research methodology
    3. Pedagogical component
    4. Relationships
    5. Functional aspects
- Conceptual framework for supervision:
  - Kreber et al. (2021) identified six distinct areas of supervisors' roles:
    1. 'Enculturation'
    2. 'Functional'
    3. 'Emancipation'

4. 'Critical Thinking'
5. 'Care/relationship building'
6. 'Preparation for career/life'

Student-specific adaptation strategies

- Ongoing adaptation necessary to match styles and needs on stages:
  - Kahl et al. (2015) emphasized matching PhD candidates with supervisors and tailoring supervision styles to individual needs and phases of the PhD trajectory.
- Alignment and interaction :
  - Seeber and Horta (2021) highlighted the importance of aligning research interests between students and supervisors and the fact that frequent meetings (at least once per week) were associated with higher doctoral student satisfaction.

How can we train PhD supervisors to be better in terms of personalization? We need to consider first the enabling factors for personalization, followed by increased institutional support and resources:

- Reflective Practice: Kreber et al. (2021) emphasized the role of reflective practice in enabling supervisors to adapt their approach to individual student needs.
- Knowledge and Competency Development: Haley et al. (2024) recommended focusing more on developing supervisors' domain and methodological knowledge and providing professional support for working with marginalized groups.
- Structural institutional support and resources: Kahl et al. (2015) suggested the formation of diverse supervision teams, while Seeber and Horta (2021) found that a high number of PhD students per supervisor negatively impacted satisfaction, so workloads need to be carefully considered.

Apart from these, important influences exist inside national cultures and professional fields – differences related to countries, disciplinary variations, differences STEM-SSHA. Seeber and Horta (2021) found differences in satisfaction across disciplines, suggesting potential disciplinary influences on personalization strategies. Kreber et al. (2021) compared supervisors' understandings of doctoral supervision in Canadian and UK institutions and although they found more commonalities than variations across these contexts, differences still exist.

In order to assess supervisors' competencies for a better, personalized supervision, several studies suggested the following:

- Quality indicators: Overall et al. (2011) suggested research self-efficacy as an indicator of effective supervision, while Anttila et al. (2023) emphasized the alignment of perceptions between supervisors and supervisees regarding the quality and quantity of supervision.
- Evaluation frameworks/models: Kreber et al. (2021) suggested developing a Graduate Supervision Inventory, and Green and Bowden (2012) developed a model of completion mindset.
- Feedback mechanisms: Kumar and Kaur (2019) emphasized the role of constructive, positive, and timely feedback in supporting students' sense of competence, amd Seeber and Horta (2021) found that frequent meetings, which presumably involve regular feedback, were associated with higher student satisfaction.

1.2 AI assisted doctoral supervision

Studies show that AI tools can improve doctoral supervision, especially during the first steps of the doctoral journey, by handling routine tasks, helping with literature review, enhancing feedback quality, supporting specialized training, and balancing supervisory roles. GenAI will not replace the human supervisor. As Jensen et al (2025) found out, AI dialogues can support students, but the significant role belongs to the supervisor in doctoral supervision. "*A chatbot affords great agency for the student but it cannot replace supervision. However, the sector must emphasise further what supervisors – and educators more broadly – should be doing in feedback: contextual, relational interactions that adjust appropriately over time*." (Jensen et al, 2025).

Caillaud and Skec (2024) revealed the primary advantages of utilising GenAI tools for speeding up the discovery of pertinent literature, the extraction of its core concepts, and the acquisition of feedback, providing a strong basis for further improvement of technology-enabled supervision and potentially changing the interaction between supervisors and doctoral students. They also argue that "*rather than seeking to prevent PhD students from utilising such tools, supervisors should equip them with the knowledge to utilise these new GenAI resources effectively and ethically. However, as a prerequisite, supervisors themselves must become familiar with the diverse functionalities offered by GenAI research tools and attain proficiency in their application. This knowledge is essential for critically assessing the outputs generated by these tools and ensuring their responsible and ethical utilisation in research.*" (Caillaud and Skec, 2025).

Harding and Boyd (2024) note that sometimes GenAI is kept at a distance in the doctoral student – supervisor relationship, through fear, because "*supervisors worry*

about its detection, misuse and abuse, and PhD researcher fear the ramifications of being caught using the technology."

1.2.1 AI-Enhanced Supervision Efficiency

Extant studies highlight the potential of generative AI tools to enhance doctoral supervision efficiency:

- Dai et al. (2023) report that ChatGPT facilitated accelerated research progress and enhanced research quality.
- Mormul et al. (2024) note that AI tools can assist PhD candidates with various research tasks, including writing, proofreading, data visualization, simulating peer reviews, and preparing diagrams.

These findings relate to the challenge of time constraints affecting regular supervision meetings and reflective practice, as identified in the research question.

The broad range of AI applications suggests potential for alleviating some workload pressures on supervisors, allowing them to focus more on higher-level guidance and support.

1.2.2 Transformation of Supervisory Roles and Relationships

The previous studies suggest AI could transform roles in the doctoral supervision process. Dai et al. (2023) report a shift towards more autonomous student roles and more strategic supervisors.

This transformation could address challenges related to supervision quality, such as balancing different types of support and maintaining professional boundaries while providing emotional support.

Mormul et al. (2024) findings on deep penetration of AI tools into research workflows suggest similar potential for changing supervision dynamics.

These changes could potentially help address the challenge of high student-to-supervisor ratios by enabling more independent student work on certain tasks.

1.1.1. Quality Enhancement through AI Integration in PhD supervision

AI tools have the potential to enhance doctoral research and supervision quality:

- Dai et al. (2023) report improved scholarly development and enhanced research quality as outcomes of ChatGPT use. This suggests AI could help address the challenge of ensuring feedback is both constructive and timely.

- Mormul et al. (2024) highlight AI tools' capability to assist with various aspects of research, including technical computing and scripting.

These findings indicate AI could potentially help address challenges related to limited resources for specialized training, particularly in technical fields.

1.2.3 Ethical Considerations and Limitations

Previous studies acknowledge potential ethical concerns and limitations of AI use in doctoral supervision:

- Dai et al. (2023) mention the risk of over-reliance on AI and the need to balance AI use with traditional research methods.
- Mormul et al. (2024) note both opportunities and threats posed by AI in doctoral education.
- Subaveerapandiyan et al (2025) indicate that while AI tools enhance clarity, flow, and efficiency, they raise concerns about over-reliance, originality, and ethical transparency.

2. KNOWN UNKNOWNS (WHAT WE KNOW THAT WE DON'T KNOW)

There are many unintended and not enough studied yet consequences of using AI in doctoral education, in general, and for the personalization of supervision, in particular:

- Erosion of the supervisor-student relationship – overreliance on AI, weaken personal bonds, reduced mutual engagement, lost respect due to ethical dilemmas
- Lack of socialization and intellectual community engagement, supplementary intellectual isolation in an already tribal and silos based academic world
- Excessive dependence on AI at the expense of critical thinking, decreased ability for doctoral students to think independently and analyse critically, risk of reinforcing confirmation biases in research, especially in SSHA
- Ethical and academic integrity concerns, blurred lines between original work and AI generated content, difficulties in establishing comparable academic standards
- Psychological and emotional alienation, increased feelings of loneliness, frustration and disengagement
- Biases and inaccuracies in AI Guidance, due to hallucination, manipulations, myopic simplified views, and even when correct, excessive standardization
- Unequal access and heavy technological barriers, leading to uneven adoption and benefits, discrimination and putting students at a disadvantage

- Long-term devaluation of human expertise in doctoral education, reduced incentives for universities to invest in training and human mentorship, increased risk for the development of the future supervisors needed.

From all these, many other aspects arise, that need reflection, future research to find the appropriate answers, followed by the development of the necessary policies. A list of such reflections and questions, by no means exhaustive, includes the following:

- The impact of policy frameworks on personalization was not extensively discussed in the reviewed studies, suggesting a potential area for future research.
- How can we train supervisors (especially how do we motivate them to engage into this type of training) to offer better emotional support to PhD students, besides the classical scientific one?
- We want autonomous doctoral students, but should PhD be a lonely road? How can we better develop autonomy together with socialization and collaboration?
- For the mental health of PhDs, supplementary issues arise from the use of AI, in a long list of already documented challenges for PhD research. PhD is already an almost "solo" travel. Is AI fit to be an emotional supporter? Will this create new silos?
- The lack of socialisation could be aggravated by the use of AI, because of both supervisors' and PhD students' preference/ease of use.
- Significant biases can arise from generative AI – critical thinking is needed for protection.
- There are already hints that people start to develop emotional relationships with AI, even if we don't yet have studies on doctoral students – how can we balance this?
- Lack of university guidelines on how to use AI is an important issue – will we have common approaches quick enough, to keep the pace with developments in generative AI and prepare for the future agentic AI?
- Harmonisation is necessary – but how and how quick will we obtain it?
- How will we ensure that EU universities, and around the world, use the same approach into these AI generated challenges?
- How will we minimise the discrepancies between Higher education institutions?
- How can we develop policies quick enough so that we don't lag so much behind the AI developments?
- AI is the first technology capable to decide and generate ideas autonomously, which means that it can also create new realities. How and who needs to correct generative AI? Who has this capability (PhD student or the Supervisor should be the responsible?) What about cultural biases in this generated reality?
- The primary driver for the use of AI is efficiency, particularly in text generation for reports and articles, but there are different weights in the use of AI by

disciplines (Social Sciences and Humanities probably will focus more on generative AI, while STEM disciplines will look more at AI models and computational resources). Will this create supplementary biases, as well?

- Who and how will develop necessary guidelines and a review of an authorship definition in the AI era? AI's role in proposing new research questions and hypotheses raises the issue of due credit for discoveries (Hans Selye: "*The essence of scientific discovery is not in seeing something for the first time, but in establishing solid relationships between what was previously known and what we don't know yet. This process of creating connections leads to real understanding and progress*" If the researcher stops at the identification of new connections, with the help of AI, the credit belongs to AI; if he goes further and analyses those new connections and brings new data, than the credit goes to the researcher/the team doctoral student/supervisor, but with acknowledgment for the AI intervention.
- Creativity can be defined by the ability to identify patterns and then to break them. Human ingenuity is crucial. What happens if everything starts to look the same? Differences exist between STEM and SSHA, due to the different balance between positivism and constructivism/interpretivism, between rationality and emotion, objectivity and subjectivity etc.
- Should Universities/Countries (or the European Union) develop their own tools to be used by Higher Education institutions? Who should finance this? The EU? If so, how do we ensure consistent ethical and regulatory standards for AI use across disciplines?
- How many universities have already guidelines for supervisors and PhD students, concerning AI use? How many supervisors and students are able to use AI fully and correctly?
- What quick changes do we need for the Digital Basic Skills Plan or Eurobarometers on values?
- What new competencies do we need (supervisors, students, examinators, journal reviewers) and how should present guides and regulations change?
- Could the future agentic or agent type AI change the whole game in doctoral research and personalized supervision?

3. UNKNOWN UNKNOWNS (WHAT WE DON'T KNOW THAT WE DON'T KNOW)

These are the most complicated issues to address – because we don't know them, they cannot be estimated from previous data through prediction, we cannot address

them with a linear thinking approach, and we need a strong anticipation, systemic perspective and creative power. The list here could be really long, or short, with just a few capital, game changing and mind blowing issues. How can we deal with the unknown unknowns in doctoral education? By getting better (both supervisors and doctoral students) at:

- working interdisciplinary, with diverse people, disciplines and methods
- increase sharing of data, open science, free circulation of research results (5th freedom)
- challenging ourselves, our thinking, developing a stronger critical thinking competency
- increase our active listening and observation abilities
- developing non-linear thinking anilities, agility and fluidity in thinking
- prepare more for anticipation instead of prediction, adopt scenario planning approaches similar to those from economic and political intelligence
- permanently scrutinize GenAI and AI models' evolution, because patterns could change unexpectedly and without any signal, not even the weak signals type of hint
- learn how to focus more on questions, not answers, and learn how to ask really important questions.

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29. *** Elicit and ChatGPT were used for the structuring of the discussion points and as a mean of exemplifying the AI use in academia (*classic literature review was performed, documents uploaded, classical content analysis uploaded and AI tools asked to organize and structure the results*).

PhD Research

REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 123 of 146
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0006

PUBLIC ACCEPTANCE AND CHALLENGES IN INCREASING AFFORDABLE HOUSING IN GERMANY

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Abstract: *The continuing shortage and corresponding rise in demand for affordable housing in Germany has developed into a socio-political issue, intensified by escalating costs, stagnating construction rates, and public opposition. This study provides a comprehensive, data-driven examination of acceptance and opposition among the population, considering socio-economic, psychological, and ideological variables. A nationally representative online survey was conducted to evaluate five hypotheses. According to common belief, neither household income nor level of education significantly indicates support for affordable housing, although age indicates a small yet statistically significant positive link. Positive framing is statistically significant. The term "affordable housing" is met with more approval than "social housing", which emphasises the influence of strategic communication in shaping opinion. Consequently, the language implemented is a critical factor. The findings indicate that NIMBY phenomena influenced by stigmatisation as well as imagined neighbourhood risk factors remain. The findings possess significant implications for policy and recommend for focused framing techniques and dedicated participation by the public to minimise resistance and promote socially inclusive urban development, particularly in the contest of affordable housing. In the context of new affordable housing construction, the implementation of ambitious goals is unlikely to succeed if there is no redesign of public image, due to the prevalence of public opposition.*

Keywords: *Affordable housing in German; publicly social new rental housing; framing the issue of affordable housing; not-in-my-backyard, social acceptability*

JEL Classification: *M14; M38; R21; R23*

1. INTRODUCTION

The issue of housing has become increasingly urgent in recent years, particularly concerning the shortage of affordable housing in many German cities. The federal

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government has set an ambitious target of creating 400,000 housing units annually in order to mitigate the housing deficit. The latest data indicate a stagnation in construction completions, with only 252,000 units completed in 2024 (Destatis, 2025a). The feasibility of achieving these targets in the near future is questioned by experts. According to projections from the ifo Institute for Economic Research, the annual completion of new housing units is anticipated to decrease markedly, with estimates suggesting it could fall to as low as 175,000 units by the year 2025 (Dorffmeister, 2023). The decline in the number of building permits issued provides further evidence of this downward trend, with a 57.6% decrease in housing approvals observed in 2024 compared to the year 2021 (Destatis, 2025b).

The economic viability of affordable housing has been impacted by several factors, including rising construction costs, land prices, and interest rates. The challenge of establishing rental rates that are accessible to the majority of potential renters has become progressively more complex. Although Germany does not face an overall housing shortage, there is a marked discrepancy in terms of spatial distribution. Rural areas are experiencing a decline in available housing, while cities are confronted with soaring demand and escalating costs. The escalating costs of urban land and materials have been identified as a key factor contributing to the increase in expenses and rents, which has been observed to place a disproportionate financial burden on low- and middle-income households. In order to prevent displacement and to this end preserve social diversity, federal and state governments have introduced subsidies and incentives for private investment in affordable housing. The expectation among policymakers is that the expansion of subsidies will result in a shift in investment priorities. Despite the ongoing movement towards remunicipalisation and the provision of affordable housing, there remains a prevalence of resistance to the implementation of more rigorous policies. Beyond the economic concerns of investors, the prospect of such developments continues to encounter resistance from the populations in which they are proposed. Despite the recognition by society of the necessity for additional affordable housing to address existing shortages, concerns persist regarding the potential adverse effects on local communities. Such concerns are frequently captured in the phenomenon of the "not-in-my-backyard" mentality (NIMBY), whereby citizens acknowledge the necessity of housing projects but oppose their development in close proximity to their neighbourhoods. The extant literature indicates that there are two principal concerns associated with residential development. Firstly, new construction projects are often met with the concern that they could negatively impact the characteristics of a neighbourhood. This apprehension may be associated with concerns that the project could result in a reduction of green space, an increase in traffic, or the obstruction of

views. Secondly, there is a concern that the construction of affordable housing could place additional burdens on social infrastructure and lead to a deterioration in the quality of urban neighbourhoods. This assumes that affordable housing is associated with higher crime rates, poverty and falling property values (Scally, 2012).

Based on the literature review and the current state of research, five hypotheses will guide the analysis of the data. These hypotheses are intended to examine the interactions between residents, the dynamics of the community and politics in relation to affordable housing. The study therefore analyses the hypotheses that campaigns and public relations can be used to reformulate reservations about affordable housing and that the image of affordable housing can be confirmed. The findings of the survey, which incorporated 1,000 respondents (n = 1,000), demonstrate the extent of public acceptance of affordable housing. The study examines various aspects, including income considerations, perceptions of fairness and attitudes towards affordable housing in Germany. It provides comprehensive insights into individual perspectives and forms a valuable basis for decisions and future research in the field of affordable housing. The objective is to evaluate the hypotheses rigorously in order to verify their validity. The forthcoming sections will employ the methodology previously defined to address the objectives. The ensuing results of the data analysis, in conjunction with the ensuing discussions and the conclusions derived, are of particular interest.

2. RESEARCH METHODOLOGY

2.1 Statement of the Problem

Extensive research has been conducted on the subject of affordable housing, encompassing its general framework, development, and the evolution of affordable housing policies and practices. A multitude of studies have evaluated affordable housing within the contexts of urban redevelopment, socio-spatial segregation, and the privatisation of housing. While there are some studies that examine housing needs, individual behaviour and neighbourhood resistance to affordable housing projects, these studies largely refer to the American and European contexts in general. The German context has been comparatively neglected in research. As a consequence, there is an absence of a substantial empirical basis for understanding public acceptability, attitudes, and adoption of new affordable rental housing in Germany, nor the socio-economic factors that influence these perspectives.

The challenge of providing adequate and affordable housing in Germany is an urgent and complex issue shaped by interconnected social, economic, and political

factors. A growing imbalance between the supply of affordable rental housing and the increasing demand, caused by rising housing costs, stagnating incomes and demographic pressure, has exacerbated housing insecurity, particularly for low- to middle-income households. This shortage has been shown to limit access to basic services, increase residential segregation and contribute to the persistence of socio-economic disparities. A further challenge pertains to the social acceptance of affordable housing, to ensure that it is adopted and implemented. In consideration of the escalating urgency of the housing crisis in German cities, this research gap is of substantive importance. The development of affordable housing is of paramount significance in addressing shortages and fostering social diversity. The lack of understanding of how society responds to new affordable housing projects, particularly in relation to demographic variables, socioeconomic conditions and broader ideological and psychological influences, results in challenges for policymakers and planners in designing effective strategies and measures.

2.2 Objectives of the study

The purpose of the study is to address the critical gap between the increasing demand for affordable housing and the decreasing supply and stigmatisation, which has a disproportionately high impact on low- and middle-income households and increases social inequalities. The research seeks to understand how attitudinal perceptions, particularly NIMBY attitudes, influence public resistance to affordable housing initiatives. The objective is to undertake a critical evaluation of these perceptions, with a view to identifying the social, economic, and psychological dimensions that contribute to community resistance.

Based on the literature review and the current state of research, five hypotheses will guide the analysis of the data. These hypotheses are intended to examine the interactions between residents, the dynamics of the community and politics in relation to affordable housing. The study therefore analyses the hypotheses that campaigns and public relations can be used to reformulate reservations about affordable housing and that the image of affordable housing can be confirmed.

H.1: *Individuals with lower incomes are more likely than those with higher incomes to support the construction of affordable housing in their communities.*

Individuals with lower incomes are more likely than those with higher incomes to support the construction of affordable housing in their communities. Those from lower socio-economic backgrounds may view the construction of such housing as both

a potential opportunity and a necessity, whereas those from higher income backgrounds may fear a negative impact on property values and neighbourhoods.

H.2: *People with a higher level of education will show a more positive attitude towards affordable housing initiatives.*

Individuals with higher levels of educational qualification are predicted to demonstrate more favourable attitudes towards affordable housing initiatives. The assumption operates on the premise that enhanced levels of education are associated with greater social awareness and a more informed understanding of structural inequality.

H.3: *The younger a person is, the more likely they are to support initiatives for affordable housing.*

Age can be a key factor influencing the attitudes of people towards affordable housing. Younger people may be more supportive of initiatives to create or expand affordable housing than older people.

H.4: *Public support for affordable housing is increased by positive framing of affordable housing in media communications, for example using terms such as "affordable housing" instead of "social housing".*

The act of framing can have a substantial impact on attitudes and reduce the stigmatisation associated with affordable housing.

H.5: *The perception that affordable housing leads to higher crime rates has a negative impact on public acceptance of such projects and development plans.*

This hypothesis states that individuals who believe that the presence of affordable housing in a given neighbourhood is associated with an increase in criminal activity are less likely to be supportive of the development of affordable housing in their neighbourhood. In other words, the greater the fear of crime, the lower the acceptance.

The attitudes of individuals towards social housing are influenced by a variety of socio-economic, cultural, ideological, and psychological factors. Lower income, insecure residential status, and higher education levels are anticipated to amplify support, while individuals with higher incomes may exhibit resistance due to perceived threats to property values or the character of the neighbourhood. Psychological factors, particularly fear-based perceptions such as the correlation between affordable housing and crime, frequently serve as catalysts for opposition and are indicative of the NIMBY phenomenon. Given that such fears are frequently shaped by stigma and media rather than evidence, the use of strategic language, employing neutral or positive terms instead of "social housing", may improve public perception and reduce resistance.

2.3 Sample of study and data collection

The collection of standardised data allows for efficient and cost-effective analysis and comparison across a large population. Surveys, as a research method, are seen as formal and legitimate by participants and are relatively easy to understand and communicate (Saunders et al., 2016). In this context, quantitative data collection involves conducting surveys that consist of standardised questions and are delivered to households via an online platform. These surveys are designed to collect quantitative data on a range of aspects, including the socioeconomic status of the household, the condition of their housing, and their personal attitudes and perceptions regarding housing quality, living conditions, and views on affordable rental housing options. The collection of these opinions is systematically documented using structured questionnaires and rating scales. The utilisation of survey methodology determines how representative individual opinions and experiences are in relation to affordable housing. When implemented with the appropriate rigour, this approach provides reliable statistical insights into the perspectives and behaviours of respondents. This statistical data can then be used as a foundation for important decisions and as a guide for future studies in the field of affordable housing.

The quantitative data collection is conducted in the form of a survey with standardised questions that are made available to the households for answering via an online platform. In the design of the questionnaire, closed questions were used wherever possible in order to achieve a high degree of comparability of results and more objectivity in the evaluation (Scholl, 2003). The quantitative data collection includes household interviews on their socio-economic situation, housing situation, attitudes, and opinions on affordable new rental housing. The study predicts attitudes and behaviours related to affordable housing. This is done in response to the survey conducted. The study is based on a national survey of residents in Germany (n = 1,000). The survey comprised twenty-six questions designed to assess socio-economic circumstances, perspectives on the national housing market, and attitudes towards affordable housing. The survey was conducted from 23 January 2025 via an online platform. The survey reached its target of 1,000 participants on 22 February 2025, so the survey period ended. The dependent variable is thus presented in the form of behaviour and willingness towards affordable housing, while the independent variables refer to impacts, social and political opinions, including through the survey.

IBM SPSS Statistics was used to perform various statistical tests. Inferential statistics were used to analyse the data. To evaluate the five hypotheses, a series of correlation analyses were performed to determine the degree of influence between the variables. Descriptive statistics were initially applied to characterise the sample. The

investigation of potential correlations between categorical variables was facilitated by the implementation of chi-square tests for independence. The implementation of correlation analyses was instrumental in evaluating the strength and direction of relationships between continuous or ordinal variables. The calculation of both parametric (Pearson's r) and non-parametric (Spearman's ρ and Kendall's τ-b) coefficients was conducted. Linear regression analysis was used to determine the predictive value of attitude variables. One-way analyses of variance (ANOVA) were performed to further investigate the group differences.

3. RESULTS AND RESEARCH FINDINGS

3.1 Hypothesis test – H.1

A Pearson's Chi-Square test, as shown in Table 1, was conducted to investigate *H.1*, which states that individuals with lower incomes are more likely than those with higher incomes to support the construction of affordable housing in their communities. This test evaluated the correlation between the monthly net household income of the participants (independent variable) and their opinion on the expansion and promotion of affordable housing (dependent variable). The test yielded a chi-square statistic of χ^2 (10) = 14.035 and a p-value of 0.171. The significant value by Pearson's Chi-square analysis must be less than 0.05. Given that the p-value is > 0.05, this relationship cannot be considered statistically significant. As a result, there is an insufficient level of evidence to suggest that support for the expansion of affordable housing differs significantly between income groups. Although there are slight variances between the groups concerning substance, such as a marginally elevated support among low-income earners, these variations lack statistical significance and may therefore be ascribed to chance.

Table 1. *Analysis on monthly net income and affordable housing by using Chi-square test*

		Independent variable	**Asymp. Sig. (2-sided) ***	**df**	**X^2**
Significant	No 1	Monthly net income of the household	.171	10	14.035
N of valid cases	961				

X^2: Chi-square
df: Degree of freedom
* Asymptotic Significance (2-sided) at 0.05 probability level

An additional verification of H.1 was performed applying correlation analyses via three complementary statistical methods: Pearson's correlation coefficient (r),

Spearman's rho correlation coefficient (ρ), and Kendall's tau-b coefficient (τ). The reasons for selecting these methods were to ensure the robustness of the results across a range of measurement levels and to resolve any discrepancies from statistical parameters. The Pearson correlation coefficient, requiring continuous data and linearity, yielded a value of r = -0.050 with a p-value of 0.123 (N = 961). This result indicates a moderate negative correlation between monthly net income and the acceptance of affordable housing construction. The association did not reach statistical significance at the conventional α level of 0.05, suggesting that the association may be due to random variations (Table 2).

Table 2. *Correlation analysis on monthly net income and affordable housing by using Pearson correlation*

		Monthly net income of the household
Demand for affordable housing	Pearson Correlation	-.050
	Sig. (2-tailed)	.123
	N of valid cases	961

In order to consider, the ordinal nature of the income data, as well as the possibility of a non-normal distribution, non-parametric alternatives were also developed as illustrated in Table 3. The Spearman's rho was ρ = -0.032 (p = 0.321), and the Kendall's tau-b coefficient was τ = -0.028 (p = 0.322), both suggesting a negligible negative correlation between the variables. Like the Pearson outcome, none of the non-parametric correlations reached statistical significance.

Table 3. *Non-parametric correlation analysis on monthly net income and affordable housing by using Kendall's tau-b and Spearman's rho*

			Demand for affordable housing
Kendall's tau_b	Monthly net income of the household	Correlation Coefficient	-.028
		Sig. (2-tailed)	.322
		N of valid cases	961
Spearman's rho	Monthly net income of the household	Correlation Coefficient	-.032
		Sig. (2-tailed)	.321
		N of valid cases	961

In linear regression, the ANOVA (Analysis of Variance) in Table 4 assesses whether the overall regression model significantly predicts the dependent variable. The null hypothesis asserts that the model does not account for more variance in the outcome than what would occur by random chance. This is equal to the regression line not providing a superior fit to the data compared to a horizontal line at the mean of the dependent variable. The analysis of variance (ANOVA) reveals an F-statistic of 2.384, with degrees of freedom (df) of one for the regression model and 959 for the residual (error term). This causes a p-value of 0.123. For the calculation of the F-statistic, divide

the explained variance (mean square regression) by the unexplained variance (mean square residual). The capability of the model to explain a substantial portion of the variance in the dependent variable is indicated by a higher F-value. As a result, the F-value is comparatively low in this instance, implying that the model fails to significantly improve prediction over chance.

Table 4. *Analysis of variance for monthly net income and affordable housing by using ANOVA[a]*

Model		Sum of Squares	df	Mean Square	F	Sig.*
1	Regression	.827	1	.827	2.384	.123b
	Residual	332.509	959	.347		
	Total	333.336	960			

a. Dependent Variable: Demand for affordable housing
b. Predictors: (Constant), Monthly net income of the household
df: degree of freedom
F: f-value
* Significant at 0.05 probability level

Table 5. *Coefficients[a] for monthly net income and affordable housing*

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.784	.037		47.772	<.001
	Monthly net income of the household	-.020	.013	-.050	-1.544	.123

a. Dependent Variable: Demand for affordable housing
B: unstandardised regression coefficient
Std. Error: standard error
t: t-value

The regression output as shown in Table 5, not only assesses the model's overall significance but also presents specific coefficients for each predictor variable, such as monthly net household income, which reveal the direction, magnitude, and statistical significance of its individual impact on the outcome variable: encouragement of the development of affordable housing. The unstandardised regression coefficient (B) for income is -0.020. This value signifies the anticipated alteration in the dependent variable (support score) for a one-unit change in the income variable, while maintaining all other variables constant. The income variable, measured on a coded ordinal scale (from lower to higher income brackets), indicates that transitioning to the next higher income category correlates with a 0.020-point reduction in the support score for affordable housing on the outcome scale. The negative sign indicates an inverse correlation: as income rises, there is modest decrease in support for affordable housing.

Nonetheless, this reduction is negligible in practical terms. The value of 0.020 is well below what would be deemed a substantial effect in research. The statistical significance of this coefficient is assessed by its associated p-value, which is $p = 0.123$. The value surpasses the conventional threshold of $\alpha = 0.05$, rendering the result statistically insignificant. The observed correlation between income and support may be attributable to chance, and there is little evidence to indicate that income systematically influences public support for affordable housing within the sampled population. The standardised regression coefficient (Beta) offers an extra dimension of understanding. In this instance, $\beta = -0.050$, indicating the impact of income in standardised (z-score) units, facilitating direct comparisons among variables assessed on disparate scales. A Beta of -0.050 is regarded as a negligible effect, significantly lower than the established benchmarks for small ($\beta = 0.10$-0,29), medium ($\beta = 0.30$-0,49), or large ($\beta = 0.50$ or >) effects in the behavioural sciences (Cohen, 2013).

The findings of the regression analysis broadly align with those of the Chi-square test and correlation analyses, all of which demonstrate that the monthly net income of households is not significantly linked with support for the expansion of affordable housing. All statistical methods identified a small, negative, and statistically insignificant correlation between income and support. The results offer no empirical evidence for H.1, which predicted that persons with lower incomes are more likely to support affordable housing projects. Despite the observable negative trend indicating a potential minor decrease in support with rising income, this pattern lacks statistical strength and reliability. It is essential to recognise that although the hypothesis is theoretically viable, especially from a socio-economic or equity-focused viewpoint, the findings indicate that income alone is not a reliable indicator of attitudes towards affordable housing policy in the respondents. The absence of importance indicates that alternative factors, such as political ideology, regional housing market pressures, personal housing experiences, or value orientations, may exert a more substantial influence on public opinion in this domain.

3.2 Hypothesis test – H.2

H.2 posits that individuals with elevated levels of education will have a more favourable disposition towards affordable housing efforts. To assess this hypothesis, a series of statistical studies were conducted to examine the association between respondents' highest level of education and their views on the need for increasing affordable housing programs.

To evaluate the link between respondents' educational attainment and their endorsement of the extension and promotion of affordable housing, three correlation

analyses were performed: Pearson's r, Kendall's tau-b, and Spearman's rho. These methods offer contrasting perspectives by assessing relationships based on varying statistical assumptions. Pearson's correlation coefficient is a parametric test that quantifies the strength and direction of a linear association between two continuous variables. Pearson's r was computed = 0.008 with a p-value of 0.807 (N = 956) in this investigation. This coefficient is nearly zero, signifying an almost absent linear correlation between education level and attitudes towards the expansion of affordable housing. Additionally, the p-value exceeds the traditional significance level of 0.05, so affirming that this finding lacks statistical significance. Consequently, there is no indication of a significant linear correlation between the two variables.

Considering that the variables are ordinal or may not satisfy the normality assumptions necessary for Pearson's correlation, two non-parametric tests were performed: Kendall's tau-b and Spearman's rho. These tests are more suitable for ranked or ordinal data. Kendall's tau-b assesses the extent of coherence and divergence between pairs of observations, in contrast to Pearson's r, which implies linear and interval data. It is typically cautionary and less vulnerable to abnormal values, finding it appropriate for small or unbalanced samples. The value of Kendall's tau-b in the current research was $\tau = 0.030$ ($p = 0.286$). This coefficient indicates a not significant positive correlation; but the unimportant p-value suggests that the correlation lacks statistical significance. The probability of seeing such a correlation by chance is significant, so no dependable conclusion can be drawn regarding the association. Spearman's rho is a rank-based non-parametric test that determines correlation by utilising Pearson's formula on rank-transformed data. It quantifies the strength and direction of a linear link, keeping it responsive to any persistent upward or downward trend, regardless of linearity. In this scenario, Spearman's rho was $\rho = 0.035$ ($p = 0.285$). Similar to Kendall's tau-b, this likewise indicates a not significant positive association that lacks statistical significance. The resemblance of Spearman's rho to Kendall's tau-b further substantiates the validity of this conclusion across many non-parametric methodologies. Both coefficients are minimal, indicating weak positive correlations. Consistent with Pearson's r, neither of these findings is statistically significant. The p-values for both tests exceed 0.05, indicating that the observed relationships are probably attributable to chance. The correlation studies collectively indicate a lack of statistically meaningful association between the level of educational and support for the development of affordable housing. All three correlation coefficients, irrespective of the employed approach, are approximately zero and statistically non-significant. The results indicate that, in this sample, increasing education levels do not correlate with increased support for the extension and promotion of affordable housing.

To further assess the predictive ability of educational attainment on attitudes toward affordable housing expansion, an Analysis of Variance (ANOVA) was conducted as part of the linear regression model. The regression sum of squares is 0.021, while the residual sum of squares is 332.024, and the total sum of squares is 332.045. The total variance in the dependent variable (support for affordable housing) is overwhelmingly accounted for by residual error rather than the predictor variable (education level), as evidenced by the small proportion of regression sum of squares relative to total sum of squares.

The F-ratio, determined by dividing the mean square for regression by the mean square for the residuals = 0.060. The exceedingly low F-value indicates that the variation accounted for by the regression model is minimal relative to the unexplained variance. The p-value of 0.807 significantly exceeds the standard alpha criteria of 0.05, indicating that the model lacks statistical significance. Based on the results of the ANOVA test, it appears that the regression model lacks a statistically significant improvement in predicting whether individuals support the expansion and promotion of affordable housing when education level is included.

The regression coefficients table provides information on both the magnitude and statistical significance of the predictor variable within the model. The unstandardised regression coefficient (B) for education level is 0.003, with a standard error of 0.013 and a p-value of 0.807. The direct alteration in the dependent variable that corresponds to each one-unit increase in the independent variable is represented by this coefficient. Essentially, this means that the designated measurement scale shows a mere 0.003-point increase in support for affordable housing for each incremental increase in educational level (e.g., from high school graduation to a college degree or from a bachelor's degree to a doctoral). The extent of this effect is minimal and virtually irrelevant. Given the size of the dependent variable, a fluctuation of 0.003 is insignificant and unlikely to indicate any meaningful change in opinion or attitude. The standardised coefficient (β) for level of education is 0.008, enabling direct comparisons among variables by aligning all coefficients on a consistent standardised scale. A Beta of 0.008 signifies that a one standard deviation increases in education results in only a 0.008 standard deviation increase in support for affordable housing, indicating an almost minimal effect. The t-test evaluates whether the coefficient for the predictor is substantially distinct from zero. A p-value significantly exceeding the standard $\alpha = 0.05$. The observed correlation between education level and support for affordable housing lacks statistical significance and likely resulted from random variation within the sample. The regression results clearly confirm the findings from the correlation analyses. There is no meaningful or statistically significant relationship between the educational level and

support for affordable housing. The effect is virtually zero, and the model has no predictive power.

The results demonstrate that the level of education is neither a statistically significant nor a substantively useful predictor of support for the expansion and promotion of affordable housing in this group of individuals. The correlations were virtually non-existent, the regression model demonstrated minimal explanatory power, and the effect size of education was insignificant. As a result, the data does not support H.2. The hypothesis that individuals with a higher level of education exhibit increased social awareness by demonstrating stronger support for affordable housing expansion is not experimentally substantiated in this sample. Additional factors such as personal experience, political ideology, or regional housing pressures may serve as more pertinent determinants of attitude.

3.3 Hypothesis test – H.3

A correlation study was performed to assess the association between respondents' age and their opinions towards the expansion of affordable housing in *H.3*, employing three distinct statistical methods: Pearson's r, Spearman's rho, and Kendall's tau-b. Each approach fulfils a distinct analytical function and is suitable under varying assumptions regarding the data, therefore strengthening the validity of the results.

The Pearson correlation coefficient quantifies the linear association between two continuous, normally distributed variables; age and attitude towards housing expansion. A positive correlation coefficient of $r = 0.106$ signifies a minor positive linear relationship as age increases, respondents exhibit a modest tendency to show increased support for the expansion of affordable housing. The p-value <0.001 indicates that this link is statistically significant at the 0.01 level, signifying that the probability of this correlation arising by chance is less than 0.1%. A non-parametric metric for rank-order correlation, Spearman's rho is particularly suitable for ordinal variables, non-normally distributed data, or non-linear still linear relationships. The computed value of $\rho = 0.110$ indicates a weak but statistically significant positive correlation between age and support for affordable housing initiatives. This result shows that older people are more likely than younger people to support the expansion of affordable housing. The weak correlation, nevertheless, the statistical significance ($p < .001$) indicates that the observed pattern is unlikely to have arisen by random chance alone. The computed Kendall's tau-b value of $\tau = 0.088$ signifies a modest yet statistically significant positive association between age and support for affordable housing. Kendall's tau-b usually gives coefficients that are a little lower than Spearman's rho. However, the positive direction and statistical significance ($p < 0.001$) are in line with the results of the other

two correlation measures. All three methodologies consistently indicate that older respondents exhibit a marginally more positive perspective on the expansion of publicly subsidised housing in comparison to their younger counterparts. Although it is only feeble in strength, the statistical significance of the relationship indicates that it cannot be attributed to random chance.

In general, it may be said that support for affordable housing goes up a little as people get older. This could be because they are more conscious of social issues, have more life experience, or feel more responsible for their community as they get older. The relationship between age and support for the expansion of affordable housing was explored through the calculation of descriptive statistics across three levels of support: opposed ("no"), undecided ("maybe"), and supportive ("yes") as shown in Table 6. The respondents who expressed opposition to the proposed expansion (N = 73) had a mean age of M = 36.70 (SD = 9.52), with a 95% confidence interval ranging from 34.48 to 38.92. The participants who had not yet decided (n = 109) were marginally younger, with a mean age of M = 35.67 (SD = 11.02) and 95% confidence interval for mean from 33.58 to 37.76. In contrast, respondents who expressed support for the expansion (N = 779) constituted the oldest group, with a mean age of M = 39.90 (SD = 12.71) and a 95% confidence interval ranging from 39.00 to 40.79. The overall sample (N = 961) had a mean age of M = 39.18 (SD = 12.39). The results of the study indicate that respondents who expressed support for the expansion of affordable housing tended to be older than those who opposed it or were uncertain.

An investigation into the homogeneity of variances is hereby proposed in Table 7. In order to evaluate the assumption of equal variances, Levene's test for homogeneity of variances was conducted. The outcomes were statistically significant across all test variations. The mean value of the variable is the F-statistic for this data with 8.698, and the p-value is <0.001. The median is the midpoint of a dataset. The values to the left of the median are lower than the median, and those to the right of the median are higher than the median. The F-statistic for this data is 7.521, and the p-value is <0.001. The mean value was calculated using trimmed means. The F-statistic for this data is 8.751, and the p-value is <0.001. These findings indicate that the variances between the groups are not homogeneous, thus violating a fundamental assumption of the one-way ANOVA. However, given the considerable sample size and relative balance thereof, the ANOVA is considered to be robust against such deviations.

Table 6. *Descriptive statistics on user age and affordable housing*

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Minimum	Maximum	Between-Component Variance
no		73	36.70	9.519	1.114	34.48	38.92	19	72	
maybe		109	35.67	11.022	1.056	33.58	37.76	18	69	
yes		779	39.90	12.707	.455	39.00	40.79	18	77	
Total		961	39.18	12.394	.400	38.39	39.96	18	77	
Model	Fixed Effects			12.314	.397	38.40	39.96			
	Random Effects				2.064	30.30	48.06			6.070

In order to examine *H.3*, a one-way analysis of variance (ANOVA) was conducted as shown in Table 8. The employment of this inferential statistical test is appropriate when the means of a continuous variable (age) across three or more independent groups (levels of support: no, maybe, yes) are to be compared. The objective of the one-way analysis of variance (ANOVA) is to test the null hypothesis (H0), which posits the equality of the group means, against the alternative hypothesis (H1), which assumes that at least one group mean is different. The between-group sum of squares indicates the extent to which variations in age can be attributed to differences in support for housing expansion. The within-group sum of squares is indicative of residual variation that has not been explained by group membership. The F-statistic is calculated as the ratio of between-group variance to within-group variance, which in this case is 7.237. The result is statistically significant, with $F(2, 958) = 7.237$, $p < 0.001$.

Table 7. *Test of homogeneity of variances on user age and affordable housing*

		Levene Statistic	df1	df2	Sig.
User age	Based on Mean	8.698	2	958	<.001
	Based on Median	7.521	2	958	<.001
	Based on Median and with adjusted df	7.521	2	944.312	<.001
	Based on trimmed mean	8.751	2	958	<.001

df: degree of freedom

Table 8. *One-way analysis of variance (ANOVA) on user age and affordable housing*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2194.812	2	1097.406	7.237	<.001
Within Groups	145262.468	958	151.631		
Total	147457.280	960			

df: degree of freedom

The means plot displayed in Table 9 offers a visual representation of the average age of respondents across three distinct groups, categorised based on their stance regarding the expansion of affordable housing. Each data point on the graph is indicative of the mean age of respondents within a specific group, with the vertical bars denoting the 95% confidence intervals for these means.

The plot demonstrates an explicit ascending trend from left to right. The respondents who expressed opposition to the provision of affordable housing (Group: “No”) were, on average, younger. Those who have not yet decided (Group: “Maybe”) have a mean age that is marginally lower. A comparative analysis reveals that those who advocate for expansion (Group: “Yes”) are, on average, of a more advanced age. This progression suggests a positive relationship between age and support as age increases, so does support for the expansion of affordable housing. The vertical bars in the plot are indicative of the confidence intervals (typically at the 95% level). These reflect the precision of the estimated group means that narrower intervals (as seen in the “yes” group) are indicative of larger sample sizes (N = 779), which in turn produce more precise estimates. The wider intervals observed in the "no" and "maybe" groups are attributable to the reduced sample sizes, which in turn engender an elevated degree of uncertainty in the estimate of the group mean. Of particular significance is the fact that the intervals do not overlap fully, especially between the “yes” and “maybe” groups. This finding lends further support to the conclusion of the ANOVA, which demonstrated that these age differences are statistically significant.

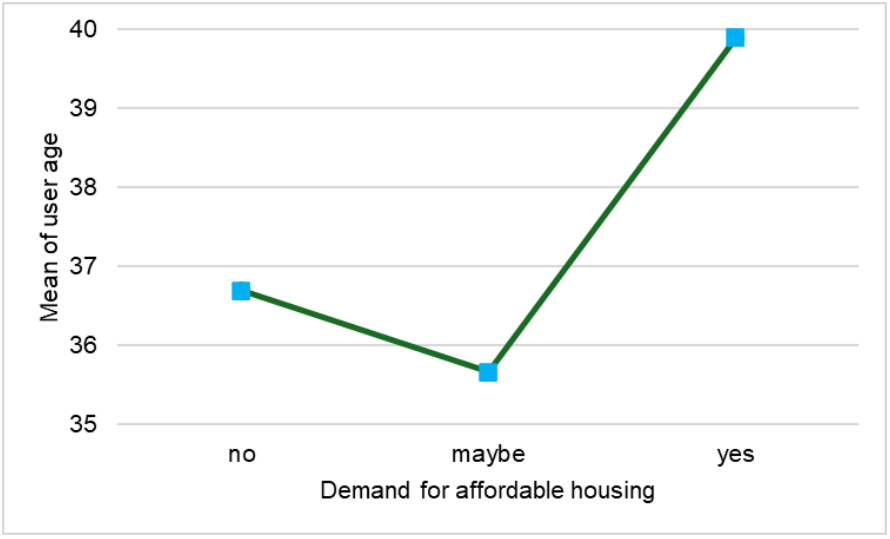


Table 9. *Means plot on user age and support for affordable housing*

The results indicate that older individuals tend to support the expansion of affordable housing more frequently than younger ones. While this relationship is statistically significant, its practical relevance is only minor. Thus, the hypothesis that awareness of affordable housing increases with age is supported but only to a limited extent.

3.4 Hypothesis test – H.4

In order to evaluate *H.4* that public acceptance of affordable housing rises when it is represented positively in the media, applying phrasing such as "affordable housing" instead of "social housing", descriptive statistics were calculated for essential variables. To explore the possible impact of language framing, respondents were asked to rate the terms "affordable housing" and "social housing". The answers were measured on a Likert scale ranging from 1 (very negative) to 5 (very positive) and these ratings were correlated with their assessment of whether further expansion is needed. The results reveal clear differences as illustrated in Table 12. The term "affordable housing" is evaluated more positively on average (M = 3.38; SD = 1.006) than the term "social housing" (M = 2.74; SD = 1.113). The difference indicates that "affordable housing" generally generates positive associations among the general population, reinforcing the notion that the terminology used to characterise publicly financed housing programs may affect the general public's opinion.

The urgent need to strengthen and promote for the development of affordable housing was the principal measure of widespread acceptance for an expansion of housing policy. Responses were documented using a Likert scale. The average value for this variable was M = 1.73 (SD = 0.589), indicating a strong general agreement among respondents about the expansion of affordable housing construction. The mean value indicates that most participants favour expanded investment and promotion in this policy domain, as lower values imply higher agreement.

Table 10. *Descriptive statistics on promotion and framing of affordable housing*

	Mean	Std. Deviation	N of valid cases
Is there a need to expand and promote affordable housing construction?	1.73	.589	961
How do you feel about and assess the term "affordable housing"?	3.38	1.006	1000
How do you feel about and assess the term "social housing"?	2.74	1.133	1000

To further evaluate *H.4*, correlation analyses were used to investigate the relationship between the perceived positivity of framing housing-related expressions

and the promotion of affordable housing expansion. In order to guarantee the reliability of the results across a variety of assumptions regarding Likert scale level and distribution, Pearson's correlation coefficients were determined, in addition to non-parametric alternatives such as Spearman's rho and Kendall's tau-b. The analysis showed that how people feel about the expression "affordable housing" is strongly and positively linked to how much they think more affordable housing should be built ($r = 0.331$, $p < 0.001$). This association is moderately strong and indicates that persons who have a more favourable attitude towards the term "affordable housing" are more likely to support for its development. The non-parametric correlation coefficients correspond this finding. Spearman's rho was $\rho = 0.318$ ($p < 0.001$), and Kendall's tau-b was $\tau = 0.289$ ($p < 0.001$). These consistent results demonstrate that the relationship remains regardless of assumptions concerning linearity or data distribution. In contrast, the term "social housing" additionally showed a statistically significant but substantially reduced correlation with support for expansion. The Pearson correlation coefficient was $r = 0.189$ ($p < 0.001$), while the non-parametric values were $\rho = 0.172$ and $\tau = 0.153$ (both $p < 0.001$). Although still positive, these reduced coefficients suggest that the term "social housing" generates a less favourable response to the engagement of support for the expansion of affordable housing policy. These findings indicate that the language framing of publicly subsidised housing concepts significantly influences public support for their development. The more favourable the initial impression of an expression, the greater possibility of public support for the increasing number of such housing forms. This effect is especially evident for expressions such as "affordable housing," but the term "social housing" may cause greater concerns or negative connotations. H.4 is clearly supported by the data. Public support for the expansion of affordable housing is improved by positive language framing, which involves the use of more neutral or contemporary terms, such as "affordable housing". This emphasises the substantial influence that media and political communication strategies can have on the social acceptance of proposals for social policy in the affordable housing industry.

A multiple linear regression was undertaken to further evaluate *H.4*. The dependent variable was support for the expansion of affordable housing, whereas the variables that predicted it were the respondents' opinions of the concepts of affordable housing and social housing. The model produced a multiple correlation coefficient of $R = 0.333$ and a $R^2 = 0.111$, indicating that around 11.1% of the variance in the dependent variable was explained by the model. The adjusted $R^2 = 0.109$ indicates that this explanatory ability is not increased by overfitting. The ANOVA table (Table 13) confirms the regression model is highly statistically significant, $F(2, 958) = 59.581$, p

<0.001. Demonstrating that the two predictors collectively accounted for variance in support for the expansion of affordable housing.

Table 11. *Analysis of variance for promotion and framing of affordable housing by using ANOVA*[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.876	2	18.438	59.581	<.001b
	Residual	296.460	958	.309		
	Total	333.336	960			

a. Dependent Variable: Is there a need to expand and promote affordable housing construction?
b. Predictors: (Constant), How do you feel about and assess the term "social housing"?, How do you feel about and assess the term "affordable housing"?
df: degree of freedom
F: F-value

The regression analysis confirms and clarifies on the findings gathered from the correlation data. The phrase "affordable housing" significantly influences public support for affordable housing development, whereas "social housing" does not have a considerable additional effect when both terms are analysed concurrently. This proves H.4 and emphasises the significance of supportive language framing in public discourse regarding housing policy. The findings indicate that older, more stigmatised terminology like "social housing" may be less effective in gaining support.

3.5 Hypothesis test – H.5

The hypothesis stated in *H.5* is that the perception that affordable housing leads to higher crime rates has a negative effect on public acceptance of such projects and development plans. This means the study is exploring whether people's fear of increased crime (linked to the construction of affordable housing) influences their attitudes toward the development of such housing projects. The analysis employed a fear index, a tool designed to assess concerns regarding affordable housing, in terms of two distinct facets: perception of stability and security, and subjective evaluations of affordable housing itself. In addition to these objective considerations, the index also drew upon psychological factors, namely emotional connection, and social engagement, to provide a more comprehensive evaluation of the subject. The analysis reveals significant differences in the fear index among respondents based on their attitudes toward the expansion of affordable housing.

The descriptive statistics of the normalised fear index in Table 14, clearly illustrate a correlation between the participant fear levels and their subjective opinions towards affordable housing. The individuals opposing the expansion of affordable

housing, designated as the "no" group, indicated the highest mean score on the fear measure (M = 0.7057, SD = 0.20477), with scores ranging from 0.19 to 1.00. The 95% confidence interval for the mean was between 0.6566 and 0.7548. This finding suggests that they regard the construction of such housing as a major source of concern, potentially attributable to anxieties surrounding increased crime or reduced stability. This is in contrast to those who support the expansion of social housing ("yes" group), whose mean value is the lowest (M = 0.5677, SD = 0.21217), with scores ranging from 0.00 to 1.00, indicating relatively low levels of concern. The 95% confidence interval for the mean was between 0.5526 and 0.5828. The respondents who were undecided, i.e. those who selected the "maybe" option, indicated an intermediate value (M = 0.6194, SD = 0.22090), suggesting moderate concerns regarding the potential risks associated with affordable housing. The 95% confidence interval for the mean was between 0.5758 and 0.6630. This pattern indicates that attitudes towards affordable housing, whether favourable, unfavourable, or undecided, are not simply neutral but are significantly influenced by fears or concerns regarding its potential impact on crime rates. The highest levels of fear are found among those who oppose affordable housing, while the lowest levels are found among those who support it.

Table 12. *Descriptive statistics on a fear index and support for affordable housing*

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
						Lower Bound	Upper Bound			
no		71	.7057	.20744	.02462	.6566	.7548	.19	1.00	
maybe		101	.6194	.22090	.02198	.5758	.6630	.05	1.00	
yes		762	.5677	.21217	.00769	.5526	.5828	.00	1.00	
Total		934	.5838	.21599	.00707	.5699	.5977	.00	1.00	
Model	Fixed Effects			.21277	.00696	.5701	.5975			
	Random Effects				.05499	.3472	.8204			.00436

Prior to executing the one-way analysis of variance (ANOVA), Levene's Test was administered to evaluate the assumption of homogeneity of variances, essential for the validity of ANOVA outcomes (see Table 15). Levene's Test assesses the equality of variations of the normalised fear index among the three groups: opponents, uncertain individuals, and supporters of affordable housing development. Levene's Test results demonstrated that the premise of homogeneity of variances was upheld. The Levene's statistic was 0.129, with degrees of freedom df1 = 2 and df2 = 931, and the p-value was 0.879. As the p-value above the conventional significance threshold of 0.05, the null hypothesis stating equal variances among the groups was not rejected. This indicates

that the variation in the normalised fear index is uniform across the groups, thus fulfilling the assumption of equal variances. The data substantiate the validity of the ensuing ANOVA, as the assumption of homogeneity of variances is an essential requirement for the appropriate implementation of this test. The one-way analysis of variance (ANOVA) indicated significant differences in the normalised fear index among the three groups: opponents of affordable housing growth, the undecided, and supporters. The F-statistic was 15.243, with F = 2, 931, and the p-value was <0.001, signifying that the observed differences across the groups were statistically significant and improbable to have occurred by chance as shown in Table 16.

Table 13. *Test of homogeneity of variances on a fear index and affordable housing*

		Levene Statistic	df1	df2	Sig.
Fear index	Based on Mean	.129	2	931	.879
	Based on Median	.055	2	931	.946
	Based on Median and with adjusted df	.055	2	925.055	.946
	Based on trimmed mean	.110	2	931	.896

df: degree of freedom

Table 14. *One-way analysis of variance (ANOVA) on a fear index and affordable housing*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.380	2	.690	15.243	<.001
Within Groups	42.147	931	.045		
Total	43.528	933			

df: degree of freedom

A means plot was created to visually illustrate the variations in the normalised fear index across the three groups according to their positions on the development of affordable housing, illustrated in Table 17. The graphic illustrates the mean values of the normalised fear index for each group: opponents (no), undecided individuals (maybe), and supporters (yes) of affordable housing growth. The means plot demonstrates a distinct variation in perceived fear among the groups. The faction opposing the extension of affordable housing reveals the highest mean value for the normalised fear index (M = 0.7057), signifying the greatest degree of anxiety or imagined risk. The indecisive group follows, exhibiting a mean value of M = 0.6194, indicative of a modest level of concern. The faction advocating for the extension of affordable housing exhibits the lowest mean value (M = 0.5677), indicating a substantially lower level of anxiety or imagined risk. The plot visually confirms the idea that persons who showed heightened anxiety regarding the potential adverse effects of affordable housing, such as crime, are more likely to oppose its growth. In contrast,

individuals with reduced concern or an awareness of reduced risks are more likely to encourage its progress.

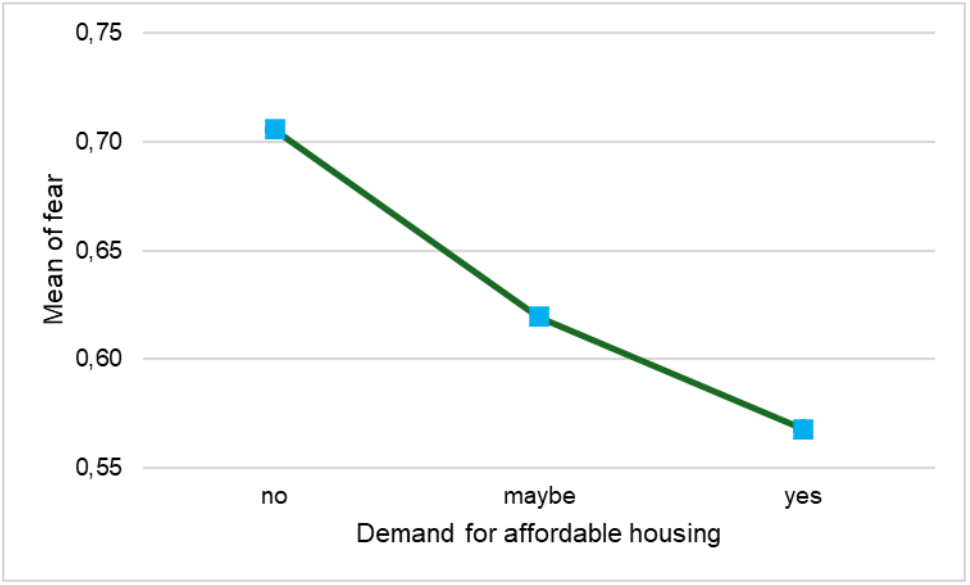


Table 15. *Means plot on a fear index and support for affordable housing*

The present study investigated the factors that influence public support for affordable housing in Germany. Contrary to predictions, income and education exhibited no statistically significant influence, while age demonstrated only a marginal positive effect. The most significant result was obtained from the analysis of language framing: The concept of "affordable housing" was found to be more appealing than that of "social housing" across the majority of federal states. Concerns regarding safety, stability, and neighbourhood change were found to be pivotal in this regard, with those expressing fewer such concerns demonstrating a significantly higher level of support. In general, socio-demographic factors are found to be explicable only to a limited extent; communication, risk perception and emotions are found to be significantly more important. This prompts the question of whether housing debates are more concerned with words, trust, and fears than with hard data.

4. CONCLUSION

The results collectively suggest the general acceptance of affordable housing in Germany is influenced more by opinions, beliefs, and language framing than by ordinary socio-economic status indices. The research indicates that public support for

affordable housing in Germany is influenced more by attitudes, framing, and contextual elements than by socio-economic status. Household income and educational level showed no significant effects across statistical models, rejecting the assumptions that economic self-interest or civic awareness shape attitudes. Housing shortage is collectively constructed, surpassing income-based distinctions. The sole socio-demographic predictor of importance was age: older respondents shown marginally more acceptance, potentially attributable to stable housing circumstances, values orientated towards solidarity, or familiarity with effective public housing initiatives.

The impact of linguistic framing was significant. The phrase "affordable housing" garnered greater acceptance than "social housing," which in Germany is associated with historical implications of welfare dependency, poverty, and crime. The framing effect exhibited regional variation, demonstrating a more pronounced influence in high-pressure settings. Perceptions associating affordable housing with crime consistently diminished support, affirming the endurance of stigmatisation and fear-based narratives. The policy implications are evident, acceptance cannot be presumed based on socio-economic factors, and engagement programs must encompass all demographics. Communication must prioritise inclusivity and communal advantage, steering clear of stigmatising language. Clear planning, showcasing exemplary initiatives, and proactive dispelling of myths are essential for countering opposition. Senior citizens can function as supporting stakeholders, whereas the discontent of younger generations necessitates ways to transform unhappiness into productive involvement.

Future research needs to examine causality in framing effects through experimental methodologies, monitor longitudinal changes in acceptance, and perform cross-national analyses. The findings emphasise that effective housing policy relies more on strategic communication, contextual flexibility and perception control than on socio-economic factors.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 147 of 175
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0007

WHAT SHAPES PUBLIC OPINION IN ROMANIA? AN ANALYSIS OF THE FACTORS INFLUENCING THE PERCEPTION OF THE EURO CURRENCY ADOPTION AND EUROPEAN UNION

ANA-MARIA GIURGI[i]

Abstract: *This study examines the demographic factors that influence public opinion in Romania regarding the adoption of the euro and trust in the European Union. This study use data from Eurobarometer surveys (Standard and Flash) for the period 2004–2024. The research uses descriptive analysis and machine learning (Random Forest and CART) to show both long-term trends and socio-demographic characteristics related to support or not. The results indicate that occupational status and gender are the main determinants of attitudes, followed by residential environment (urban-rural) and age, but education level has a minimal and inconsistent influence. The CART analyses validate that lack of trust in the EU and opinions against the adoption of the euro are mainly found among economically and socially disadvantaged demographics. The research also shows that public opinion is more sensitive to external events (e.g.the COVID-19 pandemic, the war in Ukraine and economic difficulties). The data underline that Romanians' perspectives are largely influenced by direct economic and social experiences, rather than by their level of education, necessitating communication tactics and government policies tailored to distinct socio-demographic groups. The study develops understanding of the mechanisms influencing public support for European integration and offers pragmatic recommendations for strengthening the legitimacy of the European initiative.*

Keywords: *euro, European Union, euro adoption, Random Forest, CART analysis*

JEL Classification: *B23, C01, C12, F02, O52*

1. INTRODUCTION

The trust in the European Union (EU) and the process of adopting the euro play a role in defining the legitimacy of European institutions and the sustainability of the integration project. In a monetary union, that includes the submission of economic policy instruments. Public support is not only a symbolic element, but also a practical condition for stability and political compliance. The economic, health and geopolitical

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crises of the last two decades have shown those citizens' attitudes can fluctuate. This has an influence in both decision-making processes at European level and the capacity of national governments to implement policies.

Romania is a particularly interesting case in this debate. Although it has been a member of the European Union since 2007 and has undertaken the commitment to adopt the euro, the process has been repeatedly postponed, within delays in meeting the convergence criteria and internal debates on the advantages and risks of monetary integration. At the same time, Eurobarometer surveys show that Romanians are among the European citizens with the most favourable opinions about EU membership and the adoption of the euro. However, these perceptions are not uniform; they vary according to demographic factors, occupational status, region or economic context.

This paper investigates specifically these socio-demographic factors that shape Romanians' opinions towards European integration, using data from Eurobarometer surveys (standard and Flash) for the period 2004 - 2024. The analysis combines descriptive with classification models (Random Forest and CART), in order to identify both general trends and specific profiles of scepticism. At the heart of the research question is: What shapes Romanians' opinions towards the European Union and the adoption of the euro? By answering this question, the study contributes to the literature on the public legitimacy of the European project and offers practical recommendations for communication and information policies.

2. LITERATURE REVIEW

2.1 Importance of Public Opinion on the EU and the Euro

People's support for the European Union (EU) and the euro is important for institutions to be seen as legitimate. Also, has an effect on policy conformity and economic stability. Public opinion influences the legitimacy of the EU and the euro, especially during economic crises. The global financial crisis and the euro area crisis that followed have made public legitimacy even more important. This is because decisions taken in Brussels have become more important and redistributive. Even with these problems, support for the euro has stayed rather strong in the euro area. This is because people are starting to think about the euro in terms of how useful it is, instead of how it relates to their country (Hobolt and Wratil, 2015). The evidence indicates that trust in the European Central Bank (ECB) and support for the euro are shaped by citizens' assessments of their individual economic circumstances and the overall economic environment, rather than socio-demographic variables (Bergbauer et al.,

2020). In Austria and Finland, support for the euro has stayed consistent. However, in Sweden, the euro crisis caused support to drop, showing how the economy affects public opinion (Roth and Jonung, 2020). The economic crisis caused a little drop in support for the euro and a bigger drop in faith in the ECB. This means that the euro is still a good way to exchange money, but the ECB's credibility has been called into question (Roth and Jonung, 2019). Moreover, citizens' validation of the euro is influenced by their overall perceptions of the EU and the perceived robustness of their national currency (Banducci et al., 2003). Trust in EU institutions is another factor. People who trust the EU are more likely to follow policy from Brussels, which can boost support for EU policies (Mikulaschek, 2023). Even if the financial crisis has happened, the euro has kept its credibility outside of the institutional framework. This is because public support for the euro has only slightly dropped, but faith in the ECB has dropped a lot (Roth et al., 2012). In general, understanding what people think is important for the EU to be seen as legitimate, for people to follow the rules, and for the economy to stay stable.

Romania's importance within Central and Eastern European nations regarding euro adoption is complex, starting from its distinct historical, economic, and political development. Romania joined the EU in 2007. This change is a good example of the bigger changes in the region after communism (Tanasie and Fratostiteanu, 2007). Romania is not part of the Eurozone even though it is a member of the EU. This shows that it is still on its way to full economic integration. The country is clearly committed to joining the EU since it strongly supports EU membership, which is considered as a way to promote economic progress and stability (Oehler-Șincai, 2023). Romania, on the other hand, has a lot of work to do to meet the requirements for adopting the euro, especially when it comes to real and nominal convergence. Its GDP per capita is still far lower than the EU average, and the country has structural economic problems, such as too many workers in agriculture and not enough of a service sector to contribute to GDP (Dragan and Pascariu, 2008). Public opinion in Romania is also quite important. The people there are glad about joining the EU, but they are also worried about how that will affect their economy and their ability to choose their own monetary policy (Schipor, 2020). Romania's situation exemplifies the how complicated is the euro adoption in a post-communist framework, characterised by historical legacies, economic inequalities, and aspirations for integration (Soproni, 2013).

2.2 Theoretical Model Explaining Support for EU and the Euro

The utilitarian perspective on support for European integration suggests that individuals assess their level of support by evaluating the advantages and disadvantages

of the situation. Some studies show the influence of economic variables on attitudes of the EU. For example, McLaren (2006) affirms that utilitarianism assumes that specific groups obtain larger advantages from integration. However, the experience of gain or loss is necessary for understanding the dynamics of support. Hernández and Pannico (2020) affirm that support for the EU often relies on a calculation of costs and benefits. Verhaegen et al. (2014) show that people who think that European integration will help the economy is more likely to support it. This suggests that attitudes are as important as objective economic data. Fernández and Teney (2023) underline that subjective financial uncertainty may diminish support for higher unity, since persons experiencing financial instability are more inclined to observed economic losses. These studies show the importance of utilitarian variables in influencing support for European integration, while also identifying the impact of subjective framework and national settings.

In Romania, income level and education function as determinants of utilitarian reasoning about support for European integration, as they shape individuals' perceptions of the economic advantages and disadvantages linked to EU membership. High-income levels are frequently linked to perceived economic security and the prospective advantages of integration, including improved market access and employment scenarios (McLaren, 2006). On the other hand, education gives individuals the analytical tools they need to better balance the benefits and disadvantages of these economic gains (Hakhverdian et al., 2013). People in Romania, like people in other EU member states, are more likely to support European integration if they have more education because they can understand the overall economic benefits of EU membership (Banducci et al., 2003). The imbalanced distribution of integration benefits among various social categories indicates that individuals with elevated income and educational attainment are more inclined to perceive themselves as benefactors of the integration process, therefore increasing their likelihood of supporting the EU (Mau, 2005). This perception is important, as subjective economic assessments affect public opinion about EU issues, with those who view financial stability demonstrating heightened support for further integration (Fernández and Teney, 2023). In Romania, income and education not only reflect utilitarian perspectives but also form the prevalent public discourse on the benefits of European integration, showing the significance of socio-economic factors in influencing attitudes towards the EU.

2.3 Empirical Evidence on Demographic Predictors

In literature, education is linked to increased trust in the EU and more support for euro adoption, owing to its dual function in improving economic comprehension and cultivating a universal character. The structural account posits that education results

in elevated wages and upper-class professions, fostering pro-European sentiments, as such persons are more inclined to profit from the economic integration and opportunities afforded by the EU (Fernández et al., 2023). Moreover, education increases analytical abilities, essential for having high trust in institutions, such as the EU. In addition, by strengthening reading and numeracy skills that enable informed decision-making (Borgonovi and Burns, 2015). The cultural perspective, where education confers universalistic and non-traditional attitudes, thus aligning individuals with the multicultural ideals of the EU (Fernández et al., 2023). Education also influences people's support for the euro currency, which is a symbol of European integration. This is because it teaches people to think about economic factors like the strength of their country's currency and the performance of their own economy, which makes their support more in line with their own economic interests (Banducci et al., 2003). During times of economic recovery, educated people are more likely to see the benefits of the euro, which makes them even more likely to embrace it (Roth et al., 2019). So, education not only gives people the economic knowledge they need to comprehend the benefits of EU membership and the euro, but it also helps them develop a cosmopolitan identity that accords with the EU's principles.

Age is seen in the literature as another demographic predictor. Generational differences have a significant effect on people’s support for the EU and the euro. Younger generations tend to have more positive views than older generations. This trend is largely due to cohort effects. Younger people are more likely to support the EU because they grew up in a more globalized world and see it as a way to gain more benefits from globalization (Rekker, 2018). Older generations, who have experienced historical events such as World War II and its aftermath, often see the EU from a more idealistic perspective, leading to a nuanced mix of emotional involvement and skepticism (Paradés, 2024). Generational differences in support for the EU are largely because younger generations grew up in a pro-European atmosphere; this shows how important cohort effects are in shaping these beliefs.

Studies examining gender as a predictor indicate a complex interaction of factors, including risk aversion, economic vulnerability, and social roles, with findings differing across research. For example, women tend to be more risk-averse than men, which affect their economic choices and views on policies like EU integration and the euro's adoption (Eckel and Grossman, 2008). This gender disparity is elucidated by women's heightened concern for economic security and the perceived jeopardy to national welfare states, which amplifies their cynicism towards integration (Nelsen et al., 1999). Conversely, men's attitudes are more shaped by political interests, conventional norms, and working-class position (Nelsen and Guth, 2000). In Central and Eastern European nations like

Poland, well-educated women have demonstrated more support for EU integration compared to men, indicating that education and personal cost-benefit evaluations influence opinions (Favero, 2019). There are clear difference between men and women in their opinions about the EU and the euro. But these differences are caused by several things, such as economic security, education, and social roles. This makes the results of different research and circumstances inconsistent (Fernández and Teney, 2023).

There are variances in trust in the EU and support for the euro in Romania based on geographical location. For example, in literature people in the West have more trust in the EU and support for the euro than people in the East. This is because the two regions are more economically integrated and people can move more easily across borders. There are clear economic and social differences between areas in Romania. The West is usually more economically developed and connected into the EU than the East. This is partly because the West is closer to the EU's borders, which makes it easier for people to move about and do business, which makes them more likely to have a good view of the EU (Resmini, 2002). On the other hand, border areas are often more Eurosceptic since they feel like national institutions do not care about them, which lead to scepticism of the EU (Nasr and Rieger, 2023). People in both rich and poor places tend to trust the EU more than people in middle-income areas. This suggests that Euroscepticism may be fuelled by economic stagnation in middle-income areas (Vasilopoulou and Talving, 2023). Romania continues to be a supporter of EU integration; yet, the absence of advantages associated with full membership may exacerbate regional inequalities in EU support (Oehler-Șincai, 2023). These regional variances show how economic situations, where people live, and trust in institutions all work together to shape public opinion about the EU and the euro in Romania.

2.4 Hypotheses of the study

Based on the literature reviewed, the hypotheses of this study will be delineated below, along by their corresponding justifications.

H1: *Individuals possessing higher education are more inclined to trust the EU and endorse Romania's adoption of the euro.*

People with higher education have the economic knowledge they need to weigh the pros and cons of integration. This also supports principles that are more global and universal, which is what the EU wants. This means that those who are better educated are likely to trust EU institutions more and be more willing to use the euro.

H2: *Younger individuals are more likely to endorse the EU and the use of the euro.*

People's feelings regarding European integration are affected by their generation. Because Romania joined the EU, younger people there are more open to the EU and the euro. They grew up in a Europeanized environment.

H3: *People who work and are involved in the economy are more likely to support the EU and the euro.*

The ones that are unemployed, retired, or not working are more likely to be against them. Occupational status reflects the extent to which individuals perceive economic stability and the potential to benefit from market integration. People who have occupations may gain directly from European integration, such as having more job possibilities. Conversely, susceptible demographics, including the unemployed, retirees, or stay-at-home parents, may have a diminished propensity for change due to heightened risk aversion.

H4: *Men and women have different feelings on the EU and the euro in a systematic way.*

It is expected that men will be slightly more supportive than women will. The literature indicates that women are generally more risk-averse and often more focused on economic security, which may lead to reduced support for integration. Men's attitudes are frequently shaped by political interests and professional obligations, which may make them supportive.

H5: *Citizens from urban are are more likely to trust the EU and the euro than persons who live in the countryside.*

People who live in cities have better access to European markets and are more likely to benefit from opportunities to relocate, travel, and invest. People who live in rural areas could not perceive as many apparent benefits, which could make them less likely to embrace the idea.

H6: *People in Romania's Western and more developed parts are more inclined to favour the EU and the euro than people in the Eastern or less integrated areas.*

People from western areas, which are closer to EU borders and have more foreign investment and trade, will show more support. People in the East and in less developed places may be more suspicious since their economies are weaker and they grow more slowly.

3. DATA AND METHODOLOGY

3.1 Data Source and Sample

The empirical analysis relies on two complementary Eurobarometer datasets covering the period 2004–2024. The first part of the study uses Flash Eurobarometer surveys dedicated to the introduction of the euro in non-Eurozone EU Member States. Between May 2006 and 2024, 24 waves (official codes of datasets range: ZA4532–ZA8824).Over time, the questionnaires expanded from around 85 variables in 2006 to more than 140 variables in the mid-2010s, reflecting a broader coverage of issues such as information about the euro, perceived benefits and risks, trust in the EU, and expectations regarding national and individual impacts. In this analysis, the key outcome variable is citizens' support for euro adoption, measured through the direct question "Generally speaking, are you personally more in favour or against the idea of introducing the euro in (OUR COUNTRY)?". Responses were recoded into a binary variable (In favour and Against), while "Don't know" answers were excluded (see Annex 1).

The second part of the study use Standard Eurobarometer surveys, which include questions on institutional trust, for the period from 2004 to 2024. For Romania, the target variable is trust in the EU, having two categories (Trust and No trust). Annual sample sizes typically range between 1,000 and 1,500 respondents.

To ensure population representativeness, both datasets were analysed using the official post-stratification weights. This weighting corrects for differences in sample composition across age, gender, region, and type of locality, aligning the survey results with the socio-demographic structure of the country population.

Independent variables consist of a set of harmonised socio-demographic indicators that were systematically recoded to ensure comparability across waves. The method of transforming variables can be seen in Annex 1. All variables were transformed into categorical factors in R to ensure correct handling within classification models.

3.2 Descriptive Statistics

The descriptive analysis provides an overview of public opinion trends regarding euro adoption and trust in the EU. For euro adoption, weighted percentages were computed for each survey year between 2011 and 2024, focusing on the share of respondents in favour versus against. In addition, weighted averages were plotted separately for the perceived national and personal effect of adopting the euro (see figure

1). Regional differences were also examined through a regional map at NUTS2 level, illustrating geographical differences in attitudes in Romania.

For trust in the EU, weighted time series graphs covering the period 2004 - 2024 were produced. To provide a more robust interpretation, trends were analysed in distinct phases: pre-accession and accession (2004–2007), the global financial crisis (2008–2010), the post-crisis recovery (2011–2015), the migration crisis and Brexit period (2016–2020) and the post-pandemic years (2021–2024). Confidence intervals were calculated for each annual estimate to illustrate the precision of the survey-based proportions. In both analyses, weighting ensured that the descriptive results reflected the underlying population structure, rather than unadjusted sample distributions.

3.3 Random Forest algorithm

When training, Random Forest makes decision trees and uses their class modes for classification tasks or their mean prediction for regression tasks. It is a good choice for machine learning since it is strong, efficient, and easy to use (Zhang et al., 2013). The approach works well with data that is not linear or is hard to understand. This is evident in its efficacy with multi-classification problems, significantly enhancing prediction accuracy and stability (Zhao et al., 2024). In bioinformatics, Random Forest is favoured for its nonparametric nature, interpretability, and improved prediction accuracy, especially with small sample sizes and high-dimensional datasets (Qi, 2012). The method is better than simple ensembles of trees since it uses bootstrap samples and small sets of attributes. This means it performs well even when predictor variables are noisy (Manilich et al., 2011). Random Forest also offers a high rate of right classifications, a new technique to find out how important each variable is. Also has the capacity to simulate complex interactions between predictor variables (Cutler et al., 2007). Traditional implementations have several problems, like memory restrictions. This is why optimised frameworks were made that make computations faster without losing accuracy (Manilich et al., 2011). The fact that Random Forest is still frequently utilised and vital in data analysis shows that it is quite valuable and works well in many different domains.

For the analysis of euro adoption (2011–2024), Random Forest classifiers were estimated separately for each survey year, using support for the euro (in favour vs against) as the dependent variable. The demographic predictors included sex, age group, education group, activity status, and type of locality, all coded as categorical factors. To ensure that the results reflect the structure of the country population, survey weights (w1 or w4) were incorporated as case weights in the models. Variable importance was measured using the Mean Decrease in Gini index, which quantifies how much each

predictor contributes to improving classification homogeneity. Running models year by year allows capturing temporal variation in the relevance of predictors.

For the analysis of trust in the EU (2004–2024), Random Forest models were also applied annually, but with a different structure. Here, the target variable was trust in the EU (trust vs no trust), and the predictors included sex, age, education, occupation, social class, and type of community. Because the Standard Eurobarometer datasets do not always contain the same variables across waves, models were flexibly adapted to the available predictors in each year. Unlike the euro adoption analysis, weights were not always provided at the same level of detail, so the models primarily relied on harmonised survey files. As with the euro models, variable importance was extracted through the Gini index, and accuracy was assessed annually.

3.4 Classification and Regression Trees (CART)

Classification and Regression Trees (CARTs) is a statistical learning tool that connects traditional regression approaches to more advanced machine learning methods. Their individual significance has diminished, although they continue to be important to numerous statistical learning methodologies (Berk, 2008). CARTs create a binary tree where each node is a decision point based on a certain input variable and the leaves are the output variable, which can be either continuous or categorical (Daniya et al., 2020). In CARTs, the process of making a choice is like consulting a field guide to figure out what plants are, where a series of questions leads to a final categorisation (Fearn, 2006). CARTs are usually made with a greedy algorithm that quickly finds the optimal split at each node. However, this method may not always give the most accurate results when compared to other cutting-edge methods. To enhance performance, other methodologies have been suggested, including optimum decision trees and randomised trees, which employ continuous optimisation and random decisions at each node, respectively, to augment classification accuracy and regulate misclassification rates (Blanquero et al., 2021). In addition, the Gini index is widely utilised as a dividing criteria to make the CART algorithm work better by quickly identifying decision points (Daniya et al., 2020). Even though CART may not always be the best method, it is a useful tool for data analysis because it can be used to make the profile of the respondents.

For the analysis of euro adoption (2021–2023), CART models were estimated to identify demographic profiles associated with support or opposition to the euro. We make sure that the variable importance results show stable patterns in the population, not just changes that happen in one year, by combining data from 2021 to 2023 and using survey weights. There are both methodological and contextual considerations for

choosing this time span. First, each of the annual subsamples has about 1,000 respondents, which is not enough for CART analysis if you look at them separately. By combining the data, you have more statistical power and better segmentation. Second, these years encompass the post-pandemic era, during which public perceptions of the EU and the euro were transformed by emerging economic and geopolitical concerns (e.g., inflation, energy crisis, and the war in Ukraine). Therefore, the chosen period gives us enough data for strong modelling and a very relevant setting for understanding how people feel about things today.

The dependent variable was euro_favour_binary (In favour and Against), and the predictors included age group, sex, type of locality, and development region (NUTS2). The dataset was split into training (70%) and testing (30%) subsets. Because of the class imbalance in target variable was used resampling methods (ROSE). Survey weights were put in model estimation to ensure representativeness. The models were pruned based on complexity parameter (see Annex 2) to avoid overfitting, and visualized using decision-tree plots with labelled splits. This approach allows for a profiling of respondents, showing how demographic factors combine to shape attitudes towards euro adoption. Model evaluation relied on confusion matrices for both training and test sets, complemented by accuracy, sensitivity, and specificity indicators. As expected for subjective data (Kozitsin, 2022), predictive performance remained modest, with accuracies around 53–59% and stronger classification for the majority class (In favour). However, CART proved useful in profiling subgroups.

For the examination of trust in the EU, CART models were utilised on a dataset comprising three Standard Eurobarometer waves for 2023 year. The target variable was trust in the EU (Trust or No Trust), while the predictors were age group, education, occupation, and social status. The data were split again into training (70%) and test (30%) sets. No resampling method was used. Model diagnostics showed that the accuracy and other indicator values were low, which shows how hard it is to predict complicated attitudes from demographic variables alone. The "Trust" class had a higher sensitivity, whereas the "No Trust" class had a lower specificity. This means that trust is easier to anticipate than distrust. Even with these restrictions, CART segmentation showed useful profiles.

4. RESULTS AND DISCUSSIONS

4.1 Public Opinion on Euro Adoption in Romania (2006–2024)

4.1.1 Descriptive trends

Figure 1 highlights two dimensions, the perceived impact on the country and the individual. Romania have a high level of support, indicating a stable positive attitude towards the common currency. In the case of the national impact, almost 77% of Romanians believed in 2007 that adopting the euro would bring benefits to the country. However, this perception decreased to around 52% in 2012, because the financial crisis and difficulties in the euro area. After 2015, the trend reversed, and in 2024, two-thirds of Romanians again assessed the impact as positive.

Regarding the personal impact, the level of support was consistently higher than that for the national dimension. Already in 2007, over 77% of respondents stated that the euro would have beneficial effects on their own lives. Although here to a decline was observed during the crisis (minimum of 58% in 2012), the recovery was fast and clear, reaching 72% in 2024. The constant difference of 5–7 percentage points between the individual and the collective perception shows that Romanians more easily anticipate direct advantages, such as the elimination of currency conversions, easier travel and price stability, than macroeconomic ones. Overall, Romania is among the states with the most favourable opinion, clearly surpassing countries such as Bulgaria, Hungary or the Czech Republic, where perceptions were more volatile.

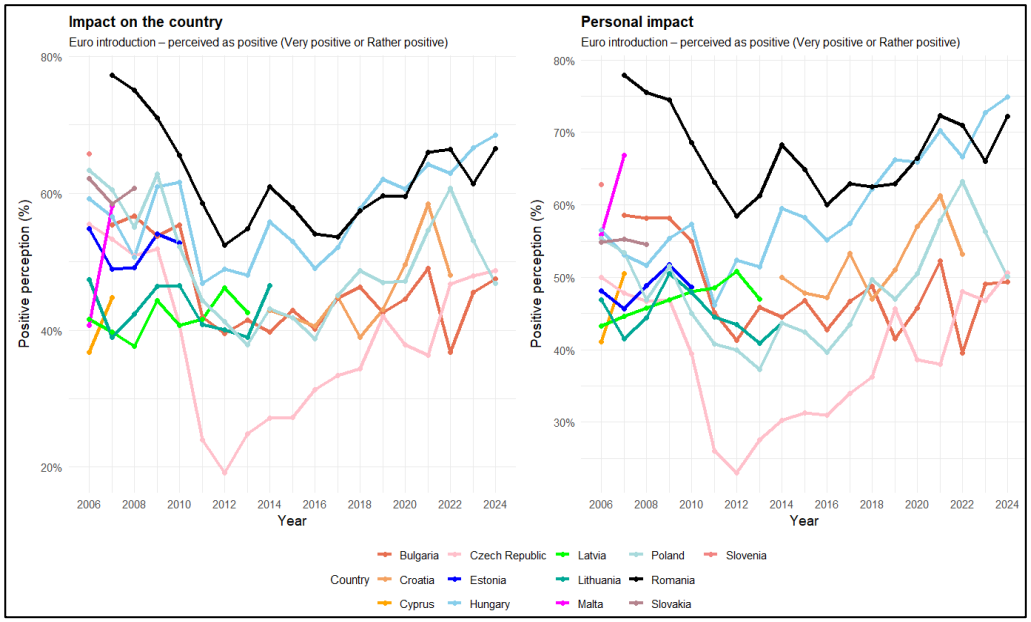


Figure 1. *Perceptions of Euro introduction, positive impact on the country and on the individual (2006–2024, % of respondents)*

Source: author processing in Rstudio, using Flash Eurobarometer data

Table 1 shows the evolution of support for the introduction of the euro in Romania between 2011 and 2024. The data show a constant majority support, but with variations in intensity. In the first years observed (2011–2013), approximately half of Romanians declared themselves in favour, but the percentages of "Somewhat against" and "Strongly against" were also high, reflecting the period of economic crisis and uncertainties in the euro area. In the following years, support experienced a gradual recovery, the categories "Strongly in favour" and "Somewhat in favour" constantly increasing, reaching in 2024 almost 60% of all respondents, while opposition stabilized below 40%. The increase in the share of "Strongly in favour" after 2020 is large, signaling a consolidation of firm support for monetary integration.

This question was selected for detailed analysis because it best captures direct personal attitudes towards the euro, being a spontaneous and affective measure of perception. The variable is suitable for linking with demographic factors such as age, gender, educational level or occupational status, which can explain differences in attitudes.

Table 1. *Weighted distribution of public opinion in Romania regarding euro adoption (2011–2024)*

Year	Strongly in favour	Somewhat in favour	Somewhat against	Strongly against	Don't know
2011	705 (10.5%)	2513 (37.5%)	2142 (32%)	1333 (19.9%)	0 (0%)
2012	784 (11.7%)	2454 (36.6%)	2152 (32.1%)	1306 (19.5%)	0 (0%)
2013	733 (10.9%)	2367 (35.3%)	2166 (32.3%)	1437 (21.4%)	0 (0%)
2014	857 (12.7%)	2679 (39.9%)	2040 (30.3%)	1145 (17%)	0 (0%)
2015	786 (11.6%)	2637 (39%)	2014 (29.8%)	1325 (19.6%)	0 (0%)
2016	735 (10.9%)	2435 (36.1%)	2045 (30.3%)	1537 (22.8%)	0 (0%)
2017	930 (13.8%)	2355 (35%)	2037 (30.2%)	1416 (21%)	0 (0%)
2018	887 (13.1%)	2569 (38.1%)	1909 (28.3%)	1379 (20.4%)	0 (0%)
2019	961 (14.3%)	2494 (37.2%)	1909 (28.4%)	1347 (20.1%)	0 (0%)
2020	900 (13.3%)	2614 (38.5%)	1957 (28.8%)	1313 (19.4%)	0 (0%)
2021	1210 (17.6%)	2728 (39.6%)	1822 (26.4%)	1133 (16.4%)	0 (0%)
2022	1322 (19.1%)	2645 (38.3%)	1721 (24.9%)	1220 (17.7%)	0 (0%)
2023	1359 (22.8%)	2136 (35.9%)	1298 (21.8%)	1160 (19.5%)	0 (0%)
2024	1383 (23.2%)	2190 (36.7%)	1186 (19.9%)	1209 (20.3%)	0 (0%)

Source: author processing in Rstudio, using Flash Eurobarometer data

Unlike questions regarding the impact on the national economy, the individual-centred formulation allows for the capture of clearer and more differentiated motivations. However, it must be acknowledged that the variable can be influenced by biases such as nationalism or fear of change, which makes it more subjective. However, it is personal and has direct character justifies its use as the focus of the analysis.

4.1.2 Random Forest findings

As we can see in figure 2, between 2011 and 2024, the Random Forest analysis clearly shows that the most consistent predictors of support for euro adoption in Romania were gender and occupational status. The high contribution of these variables, often over 30% of the total importance, reflects structural differences between men and women, respectively between socio-professional groups (employed, retired, unemployed). These results can be explained by the fact that perceptions of the euro are closely linked to personal economic security and the way individuals relate to economic changes (Bergbauer et al., 2020). For example, retired or unemployed people may perceive risks more strongly than people active in the labour market, and gender differences may be associated with different levels of risk aversion (Banducci et al., 2003).

In contrast, education had a modest influence, rarely exceeding 10%, suggesting that the level of formal schooling is not a major determinant of perceptions of the euro, at least in the aggregate form used here. Locality type had a variable importance, with an increase in 2024 (41.3%), which may signal a recent impact of rural-urban in public opinion. Age had a constant but moderate relevance, decreasing after 2020, possibly due to a convergence between generations (Bergbauer et al., 2020).

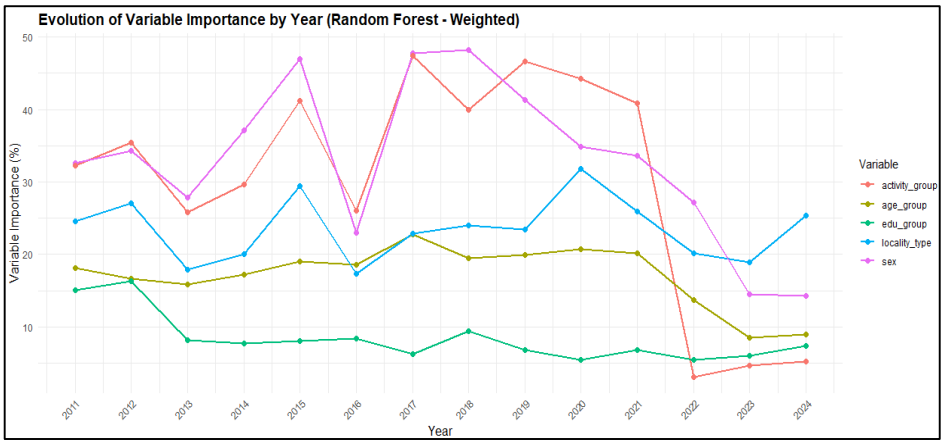


Figure 2. *Evolution of demographic predictors' importance in explaining support for euro adoption in Romania (2011–2024, Random Forest, weighted results)*

Source: author processing in Rstudio, using Flash Eurobarometer data

These findings show that perceptions of the euro are influenced by practical socio-demographic profiles (gender and occupation) rather than by structural factors such as education, with direct implications for communication policies and information campaigns.

4.1.3 CART profiles

Figure 3 shows the regional distribution of support for the adoption of the euro in Romania, based on aggregated and weighted data from 2021–2023. The results show a high and homogeneous level of support at the national level, with all regions exceeding the 73% threshold. However, moderate differences can be distinguished between regions: the South and Centre regions reach values of around 77%, indicating a more pronounced support, while the West and North-West are at 73–74%, suggesting a somewhat more restrained attitude.

These variations can be explained by economic and structural differences. Regions that are more dynamic and those more integrated into European trade and

investment flows (e.g. the South and Centre) are likely to perceive more direct benefits from the adoption of the euro. Overall, the map show regional differences that may be relevant for communication strategies and accession preparation (Dragan and Pascariu, 2008).

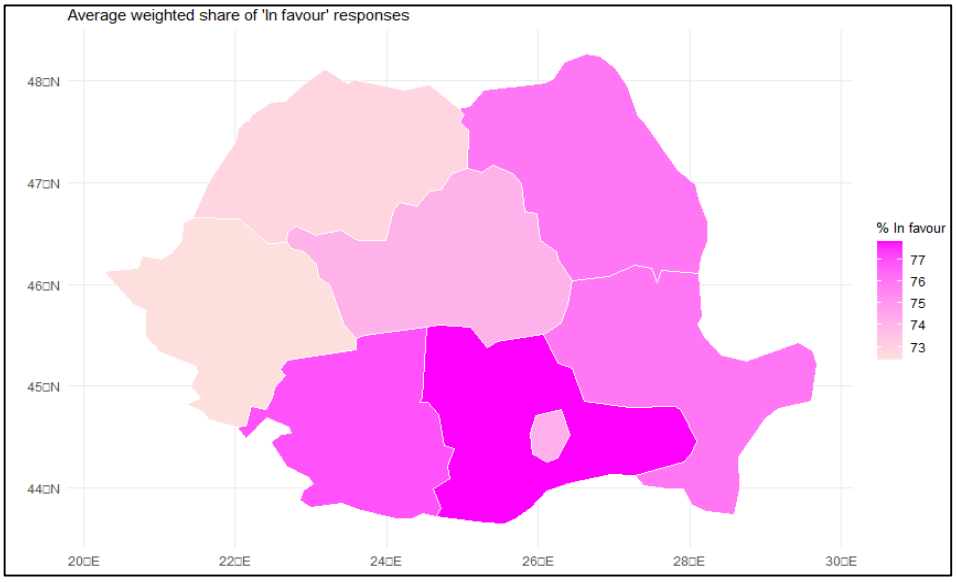


Figure 3. *Regional support for euro adoption in Romania (average weighted share of "In favour" responses, 2021–2023)*

Source: author processing in Rstudio, using Flash Eurobarometer data

The high proportion of favourable ones implies a problem of class imbalance when the variable is used in classification models. In such a context, standard models, such as CART, tend to favor the dominant class, reducing the ability to identify minority profiles of the "Against". To correct this imbalance and ensure a more robust analysis, we used the ROSE (Random Over-Sampling Examples) method, which generates an artificially balanced training set by combining oversampling and undersampling. Thus, the conditions are created for the decision tree to distinguish more clearly between population segments and to provide relevant interpretative profiles, even for less numerous groups.

In figure 4 are the results obtained through the CART model highlight some clear profiles of respondents who are more likely to be against the adoption of the euro. The first major profile is that of young men, under 35, living in urban areas (small, medium or large cities) and coming from the South-East, South, South-West and North-West regions. They show a higher level of opposition (63% "Against"), which suggests a

scepticism fuelled by regional socio-economic difficulties and the lack of directly perceived benefits. For young people in these areas, European integration can be seen as a promise insufficiently materialized in real job opportunities or economic stability.

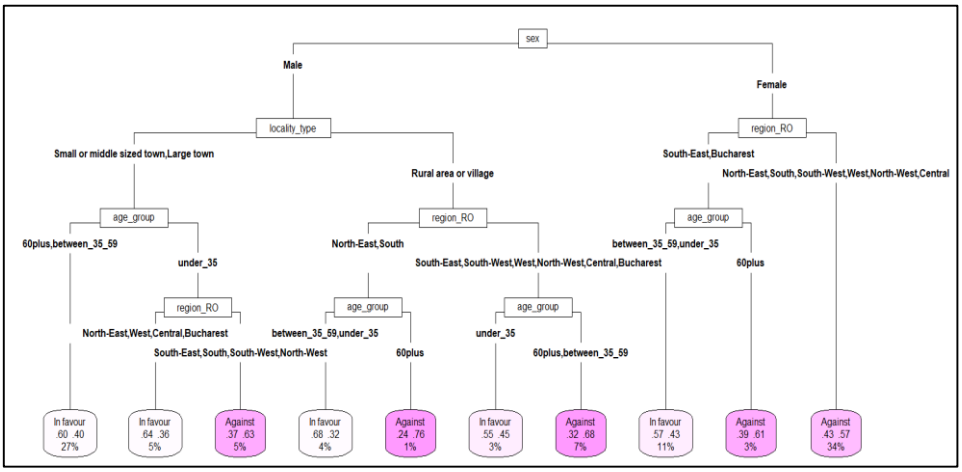


Figure 4. *Decision Tree Profiles of Public Attitudes towards Euro Adoption in Romania (CART, 2021–2023)*

Source: author processing in Rstudio, using Flash Eurobarometer data

A second distinct profile is represented by older men, over 60, living in rural areas, especially in the South-East, South, South-West, North-West, West, North-East and Centre regions. They are overwhelmingly opposed to the adoption of the euro (76%), reflecting a conservative attitude and reluctance to major economic changes. In this case, the fear of losing income stability and the perception of risks associated with possible price increases are central explanatory factors.

As for women, the opposition is significant in two segments. On the one hand, women aged between 35 and 59 in the South-East and Bucharest regions show a high level of distrust (68% "Against"). This result can be associated with the cost of living pressure in these areas, where wages and household expenses can generate critical perceptions of a possible transition to the euro (Favero, 2019). On the other hand, women over 60, coming from the North-East, South, South-West, West, North-West and Central regions, are also highly opposed (61%). For this segment, caution and sensitivity to economic risks are explained by previous experiences and age-specific vulnerability. Overall, opposition to the adoption of the euro is concentrated in two main categories: young people from peripheral areas, skeptical of the concrete benefits of

integration, and older people, especially women, who view the single currency through the lens of economic risks and uncertainties.

4.2 Trust in the European Union (2004–2024)

4.2.1 Descriptive trends

Figure 5 shows the weighted evolution of Romanians' trust in the EU between 2004 and 2024, highlighting both the opinions expressed and the effect of undecidedness, the actual values can be seen in Annex 4. The pink line reflects declarative responses (excluding "I don't know"), while the dotted black line assimilates non-responses with lack of trust. This differentiation is essential, as it shows the extent to which apparent support for the EU is affected by a part of the population avoiding expressing its position, a recurring phenomenon in surveys on sensitive political issues.

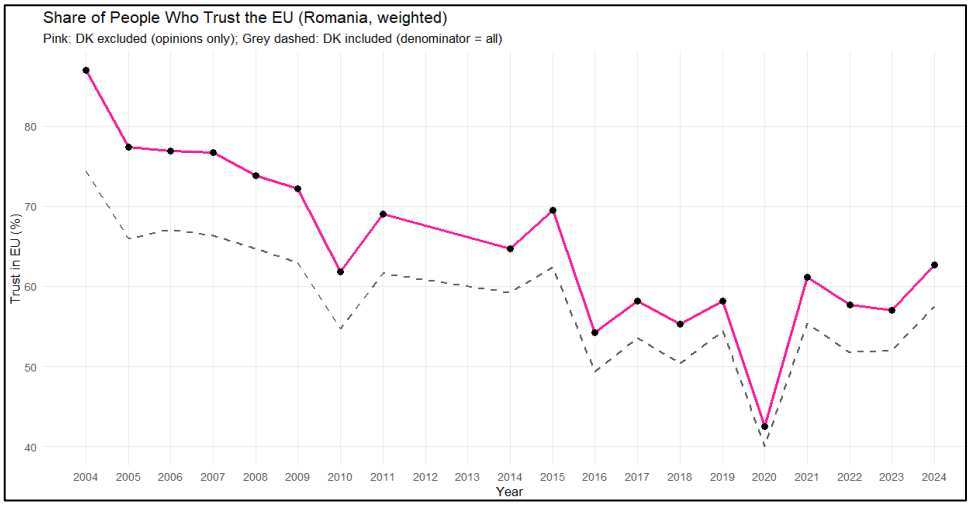


Figure 5. *Evolution of Trust in the European Union in Romania, 2004–2024 (weighted results, DK included vs. excluded)*

Source: author processing in Rstudio, using Standard Eurobarometer data

In the period 2004–2007, the high level of trust (over 75% of respondents with an opinion) is justified by the context of accession, perceived as a promise of development and stability. However, including undecideds reduces support to around 67%, suggesting that a part of the population was not yet informed or convinced of the implications of integration. Between 2008 and 2010, the global financial crisis led to a

drop in trust to 55–62%. This can be explained by the effects of the recession and the perception that the EU had failed to sufficiently protect member states.

The period 2011–2015 brings a partial recovery, associated with economic stabilization and greater visibility of European funds. In contrast, the declines in 2016 and 2020 are justified by major political and social factors: the migration crisis, Brexit and, subsequently, the COVID-19 pandemic, which called into question the EU's response capacity.

After 2021, trust returns to moderate values (57–63%), against the backdrop of EU support in the energy crisis and the war in Ukraine. However, the level reached before accession is no longer reached, which shows that public perception has become more critical and conditional on concrete institutional performance.

4.2.2 Random Forest findings

Figure 6 shows the evolution of the importance of demographic variables in explaining Romanians' trust in the EU between 2004 and 2024, using Mean Decrease Gini scores (% of total). The results highlight a remarkable consistency: gender (gender) and occupational status (occup) are the dominant predictors throughout the period. Gender maintains high values (50–60% in most years), suggesting the existence of persistent structural differences between men and women in the perception of the EU, probably related to different levels of risk aversion and distinct socio-economic roles. Occupational status also plays a major role, reflecting the impact of economic security and professional integration on attitudes: people active in the labour market tend to have higher trust, while unemployed or inactive people show more scepticism.

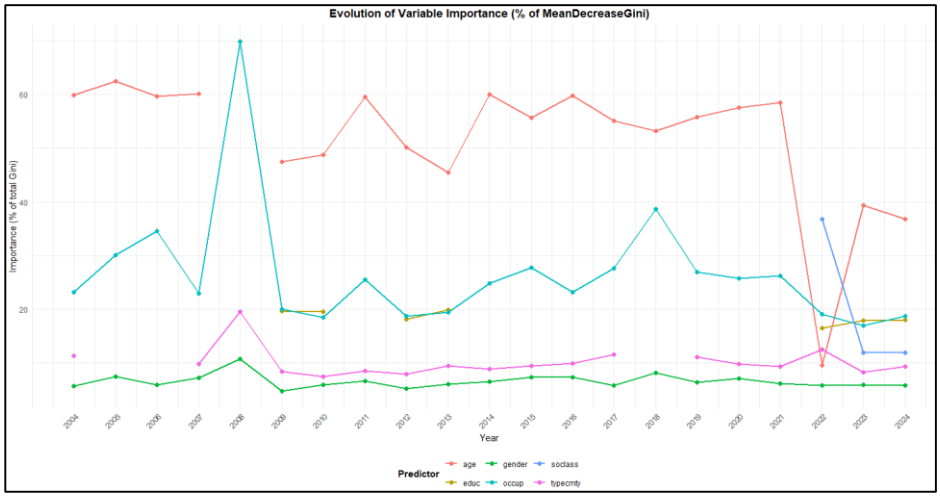


Figure 6. *Evolution of Importance Predictors of Trust in the EU in Romania (2004–2024, Random Forest, weighted results)*

Source: author processing in Rstudio, using Standard Eurobarometer data

Age and community type (typecmty) show moderate variations, but with fluctuations (e.g. 2008, 2015, 2019), indicating a context-dependent influence, economic crises and migration have affected certain age ranges and residential areas more strongly. Education (educ), although traditionally considered an important predictor of pro-European attitudes, has a consistently low contribution (<10%), suggesting that in Romania the level of formal schooling only marginally explains differences in trust. Subjective social class (soclass) has a very low relevance, probably due to the inconsistency of self-assessment and variable coding. In conclusion, the analysis confirms that trust in the EU is mainly determined by identity and occupational factors, while education and social class play secondary roles. This finding indicates that perceptions are anchored in concrete socio-economic experiences rather than in abstract cognitive resources.

4.2.3 CART profiles

Figure 7 presents the socio-demographic profiles associated with trust and no trust in the EU, identified by a CART model on aggregated data from 2021–2023. The tree highlights several population segments where the probability of no trust exceeds 50%, indicating stronger opposition to the EU.

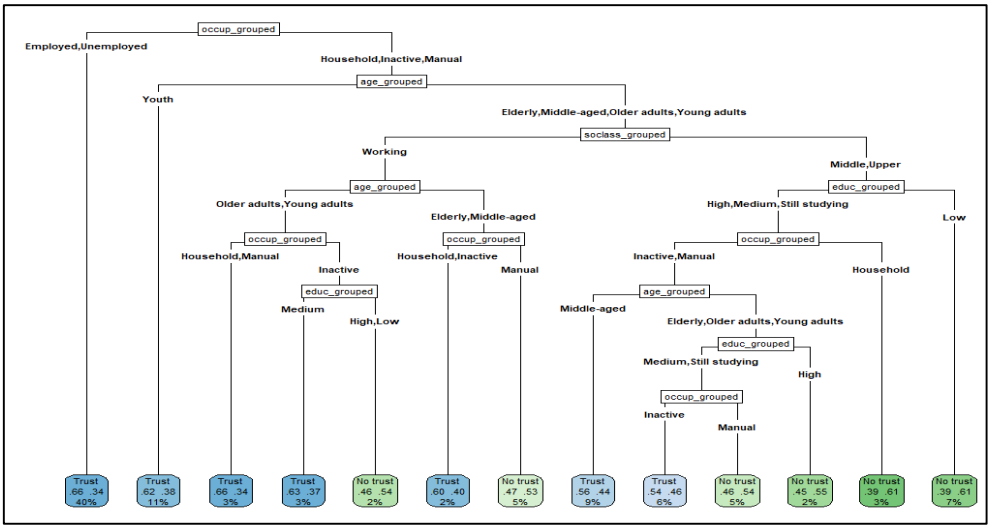


Figure 7. *CART Decision Tree Profiles of Trust and No trust in the European Union (Romania, 2021–2023)*

Source: author processing in Rstudio, using Standard Eurobarometer data

A first negative profile is that of inactive young people with high or low educational levels, where 54% of respondents declare that they have no trust. This combination can be explained by the socio-economic insecurity of young people outside the labour market, even when they have a high level of education. In the absence of professional integration, the benefits of belonging to the EU may be perceived as more abstract and less tangible.

A second profile is that of inactive or manual middle-aged people, where lack of trust reaches 54 - 55%. This category may feel more directly the economic precariousness and job insecurity, being more vulnerable to the effects of recent crises (pandemic, rising cost of living, geopolitical uncertainties). In addition, housewives with low education are among the most critical groups, with 61% "No trust". This segment is traditionally less connected to the labour market and European mobility, which may limit the perception of the direct benefits of integration. Similarly, people from lower social classes, inactive or manual, even with secondary education, show high levels of scepticism.

These profiles indicate that the lack of trust is concentrated among economically and socially vulnerable groups, for whom membership in the EU does not generate clear and instant benefits. By contrast, categories integrated into the labour market and with secondary education are more likely to express trust.

The CART model for the "Trust in EU" variable recorded an accuracy of approximately 59% on the test set, indicating a modest performance, but comparable to other applications on attitudinal data. The sensitivity for the "No trust" class was high (79%), showing that the model effectively identifies critical respondents. However, the specificity is low (31%), meaning that there is a tendency to overestimate distrust. The balance between the two classes is reflected by a balanced accuracy of 55%, suggesting that the tree has more value for profiling and interpretation than for strict prediction. For all indicators see Annex 3.

5. CONCLUSIONS

The results only partially confirm the hypotheses formulated and show that support for the adoption of the euro and trust in the European Union are complex phenomena, in which economic and social experiences weigh more than formal education. H1 (education) was not supported: the level of schooling has a low and inconsistent role, which suggests that support is not primarily explained by cognitive capital. H2 (age) was partially confirmed: young people remain somewhat more favourable, but the differences between generations have narrowed. H3 (occupational status) is the strongest result – active people support the EU and the euro more, while the unemployed, retired and inactive are more skeptical. H4 (gender) was confirmed: women are generally more reserved, probably due to higher risk aversion. H5 (urban-rural) was confirmed especially recently, support is higher in urban areas. H6 (regions) is partially confirmed: developed areas connected to European flows are more favourable, but the level of support remains high in all regions.

Based on these results, communication policies should be adapted to socio-demographic profiles. For the unemployed, retired and inactive, it is necessary to emphasize the direct benefits of integration (price stability, pension protection, social support). For women, messages can emphasize economic security, education and health. In rural areas, campaigns need to be more visible and bring concrete examples of local investments made with European funds. Young people are more open to integration, can be involved, as "ambassadors of change" in educational and European projects, and for the elderly, messages should convey more stability. Regional differences require more intense communication in less developed areas, to show the concrete benefits of integration. Although education was not a strong predictor, it remains essential in the long term: expanding financial and European education programs can contribute to a more informed and less emotional perception.

A major limitation is related to the data: Eurobarometer surveys, although standardized, include differences in question wording and coding between years, which affects strict comparability. The small sample size (approx. 1,000–1,500 people/year) required the aggregation of several years for the CART models. Support for the euro and trust in the EU reflect volatile perceptions, influenced by crises or media campaigns, which makes it difficult to identify firm causalities. In addition, economic variables such as income, migration or direct access to European funds are missing in some waves, reducing the complexity of the explanations. The predictive performance of the models is modest (53–59%), which shows that attitudes cannot be explained by demographic factors alone.

Future studies should include economic and contextual variables (inflation, unemployment, regional growth, access to EU funds), in order to better capture the interaction between economic realities and subjective perceptions. A comparison between Romania and other non-euro states (Bulgaria, Hungary, Poland) would help identify structural similarities and differences. Other machine learning methods can be used (XGBoost, Bayesian models) Also, the integration of qualitative data (interviews, focus groups) would bring understanding of the emotional and motivational dimension of support or opposition to the EU and the euro, difficult to capture only through standardized surveys.

Acknowledgement

An earlier version of this paper was awarded at the Costin Murgescu Essay Contest for Economic Research, organized by the Bank Deposit Guarantee Fund (FGDB) in 2025.

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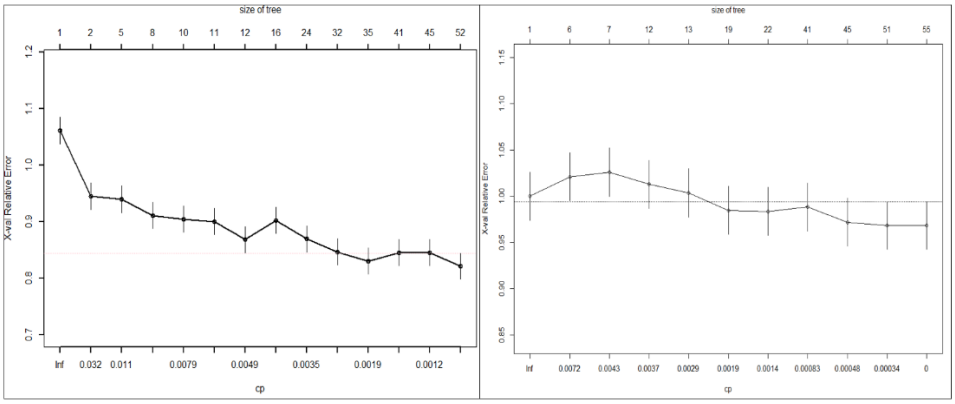
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ANNEX 1. DEMOGRAPHIC VARIABLES AND TRANSFORMATIONS APPLIED IN THE ANALYSES

Variable (original)	Recoded variable	Transformation / Grouping	Used in analysis
age (**numeric**, **years**) / d1	age_group / age_grouped	Euro: <35 = *under_35*, 35–59 = *between_35_59*, 60+ = *60plus* Trust: <25 = *Youth*, 25–39 = *Young adults*, 40–59 = *Middle-aged*, 60–74 = *Older adults*, 75+ = *Elderly*	Euro adoption and Trust EU
age_educ (**years of education**) / d8r1	edu_group / educ_grouped	Euro: ≤8 years = *low*, 9–13 years = *medium*, ≥14 years = *high* Trust: codes 1–3 = *Low*, 4–6 = *Medium*, 7–9 = *High*, 10 = *Still studying*	Euro adoption and Trust EU
activity / d15a	activity_group / occup_grouped	Euro: 1–6 = *self-employed*, 7–13 = *employee*, 14–16 = *manual*, 17 = *home*, 18 = *student*, 19 = *retired*, 20 = *unemployed* Trust: 1 = *Household*, 2,4 = *Inactive*, 3 = *Unemployed*, 5,6,17,18 = *Manual*, 7–16 = *Employed*	Euro adoption and Trust EU
sex / d10	sex	Re-coded into *Male* / *Female*	Euro adoption and Trust EU
locality_type / d25	locality_type	Euro: recoded as urban vs rural (depending on survey coding) Trust: 1 = *Rural/village*, 2 = *Small/medium* town, 3 = *Large town*, 8 = *DK*	Euro adoption and Trust EU
region_RO / d12ro	region_RO	NUTS2 classification: *North-East*, *South-East*, *South*, *South-West*, *West*, *North-West*, *Central*, *Bucharest*	Euro adoption only
subjective social class / d63	soclass_grouped	1 = *Working*, 2–3 = *Middle*, 4–5 = *Upper*, 6–9 = *NA* (excluded)	Trust EU only
euro_favour (**1–4 scale**) / **q14**	euro_favour_binary	1–2 = *In favour*, 3–4 = *Against*, Don't know excluded	Dependent variable – Euro adoption
treu (**trust in EU**)	treu_binary	1 = *Trust*, 2 = *Don't trust* (after filtering)	Dependent variable – Trust EU

ANNEX 2. COMPLEXITY PARAMETER PLOTS



For euro introduction For EU trust

ANNEX 3. PERFORMANCE OF CART DECISION TREES

Target variable	**Euro introduction**		**Euro introduction**	
Metric	Training Set	Test Set	Training Set	Test Set
Accuracy	0.5487	0.5330	0.6135	0.5882
Sensitivity (Recall - class *Against/Not trust*)	0.5445	0.5253	0.8157	0.7904
Specificity	0.5501	0.5356	0.3361	0.3115
Positive Predictive Value (Precision)	0.2882	0.2751	0.6277	0.6111
Negative Predictive Value	0.7831	0.7707	0.5706	0.5205
Balanced Accuracy	0.5473	0.5304	0.5759	0.5509

ANNEX 4. TRUST IN EU, OVER THE PERIOD 2004 - 2024

Year	**Trust EU (%) DK excluded**	**CI Low**	**CI High**	**Trust EU (%) DK included**	**CI Low**	**CI High**
2004	87.0	84.7	89.3	74.4	71.7	77.1
2005	77.4	75.3	79.4	66.0	63.8	68.1
2006	77.0	74.9	79.0	67.1	65.0	69.2
2007	76.7	74.7	78.8	66.4	64.3	68.5
2008	73.8	71.8	75.9	64.7	62.6	66.9
2009	72.2	70.1	74.4	63.0	60.9	65.2
2010	61.8	59.5	64.1	54.7	52.5	56.9
2011	69.0	66.0	72.1	61.7	58.6	64.7

Year	Trust EU (%) DK excluded	CI Low	CI High	Trust EU (%) DK included	CI Low	CI High
2014	64.7	62.5	66.9	59.2	57.1	61.4
2015	69.5	67.3	71.7	62.4	60.2	64.6
2016	54.2	51.8	56.6	49.4	47.1	51.6
2017	58.2	55.9	60.5	53.6	51.3	55.9
2018	55.2	52.9	57.6	50.4	48.1	52.6
2019	58.2	55.9	60.5	54.4	52.2	56.6
2020	42.5	40.3	44.7	40.0	37.9	42.1
2021	61.1	58.8	63.4	55.4	53.2	57.7
2022	57.7	55.3	60.1	51.7	49.4	54.0
2023	57.0	55.1	58.9	52.1	50.2	53.9
2024	62.7	59.5	65.8	57.5	54.4	60.6

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 177 of 202
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0008

FROM SAVING TO THE "EUTHANASIA OF THE RENTIER": THE ENTREPRENEUR BETWEEN THE CLASSICAL CATECHISM AND KEYNESIAN THERAPY

ALEXANDRU CORDUNEANU [i]

Abstract: *We start from the idea – hardly new yet persistently neglected – that economic dynamics cannot be understood without placing the entrepreneur in the position of initiator of the economic process, rather than treating him as a mere technical parameter. Along this guiding thread, the article brings into dialogue the classical tradition and the Austrian School of Economics, in contrast to the Keynesian paradigm that overturns the natural order of production and consumption. Forgotten notions are thus brought back into focus: the initial subsistence fund, advances of capital, the "roundabout" structure of production, and the organic limitation of investment imposed by scarcity. Within this framework, the non-neutrality of money and the Cantillon effects are re-examined, with emphasis on why newly created money reaches entrepreneurs first and how this process distorts economic calculation. The critique of Hayekian ambivalences and Keynesian "miracles," such as the socialization of investment and the euthanasia of the rentier, leads to the conclusion that rehabilitating the classical catechism and the entrepreneurial role offers a coherent understanding of the business cycle in a monetary economy still marked by scarcity. The article further argues the role of the state as discretionary monetary policy erodes the entrepreneurial spirit.*

Keywords: *entrepreneurship; monetary non-neutrality; business cycle; economic calculation; Austrian School of Economics.*

JEL Classification: *B53; E32; B12; E42.*

1. INTRODUCTION

The major ideas that capture the essence of the entrepreneurial spirit are well known, widely acknowledged, and academically confirmed – or, more simply, evident even to a lay contemplation of reality. Nearly all minds have been exercised on this subject, adding and subtracting, in turn, whatever proved useful for

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understanding economic phenomena. What is certain – or should be – is that the equation of economic dynamics is defined by, and begins with, the entrepreneur. This fact requires no further justification, since dynamics itself implies change, and change, mechanistically speaking, must start somewhere. In a domain of such particular significance as the business cycle, the very term is self-explanatory for the simple reason that the world it describes is not populated by omniscient angels, but by flesh-and-blood individuals who act.

To capture or reiterate the entrepreneurial function and, implicitly, the roles it performs from the perspective of the Austrian School of Economics requires acknowledging that the lens through which entrepreneurial action is approached is not monolithic or uniform. Rather, it is finely attuned to its undeniable importance, logically and organically linked to the subjectivist vision from which it derives its essence. More precisely, once differences are set aside, what remains immutable is the presence of the entrepreneur and of the entrepreneurial spirit itself. This presence is neither an absolute novelty nor a wholly idiosyncratic construction, since it is well known that pre-classical and classical thinkers abundantly articulated the logic of economic dynamics, complementing one another where necessary and leaving behind compelling motives and fertile ideas upon which sound theoretical structures may be built. Within an analytical framework that captures both real and nominal dimensions, the entrepreneurial spirit is not absent; on the contrary, it animates explanations and motivations alike.

It lies beyond the scope and purpose of the present inquiry to engage in an exhaustive discussion of the analytical achievements that preceded the Austrian School. For present purposes, it suffices to emphasize that the classical natural processual order is defined by the "primacy" of production over consumption, by accumulation (in the Adamist sense) prior to investment, and by a clear causal relationship whose point of departure is deliberate individual action. From this standpoint, the Austrian paradigm does not stand outside classical logic. On the contrary, the formation, through saving, of an initial reserve fund from which those engaged in production receive their incomes – or which, entrepreneurially, sustains their waiting until the completion of a profit-yielding production process – is one of the defining features of a healthy, self-sustaining classical dynamic.

Recourse to banking – whose limits are revealed through the Ricardian message – is useful only until the reserve generated by the sale of production for consumption is formed, organically linking, à la Say, the act of selling to that of buying. Within the logic of things, the notions of deficient demand or general overproduction are excluded, all understood within a competitive context of complexity impossible for the human

mind to fully grasp, yet inherent to the market process itself. In essence, laissez faire et laissez passer, le monde va de lui-même.

Up to a point, even the central banking authority enjoys a degree of freedom – or a so-called independence. Reality, however, does not confirm this status. What such an authority generates, willingly or not, and even when declaratively motivated by inflation targets or stability, stands in discord with the preferences of those who finance it through saving. By effecting saving without consent, it transfers purchasing power to consumers and investment power to entrepreneurs. It does so not out of academic scrupulousness or instinct of self-preservation, but because its operational trajectory is not supervised by any prospect of bankruptcy. If the entrepreneurial spirit, in its traversal of productive stages, requires means of exchange and monetary injections, what – or who – could prevent their provision?

2. THE ENTREPRENEUR AS "STARTER"

It is evident that the entrepreneur – and the activity or function he performs – represents one of the essential keys for understanding the Austrian vision of economic theory and, consequently, of the economic reality that calls for explanation. In principle, the entrepreneurial idea is the corollary proposed by Austrian theory to the understanding and explanation of the motives of human action under conditions of uncertainty, involving the adaptation of means to ends that are subjectively, individually appraised and estimated. In its dynamics, the economy – or economic activity – does not merely represent a relatively simplifying passage, aggregation, or augmentation of states aimed at perpetual growth. What remains perpetual, ultimately, is the scarcity of the constitutive elements of the process and the actions undertaken to ameliorate the most important identified needs. The result is an intentional–teleological structure, both at the individual level, lato sensu, and especially at the entrepreneurial level, stricto sensu, with regard to the structure of production.

The continuous dynamization of the structure of production stems precisely from the constant change in the needs it addresses and from the necessity of continual adaptation and adjustment, which adds to its inherent complexity. It falls to the entrepreneur, as a result of his actions, to fulfill – through decisions concerning the allocation of scarce resources – the "mandate" received from consumers (Mises, 2018). This is not done disinterestedly, but by anchoring consumer preferences to the profit expectations of one's own enterprise, competing and speculating with the imprint of individual judgments about the future. What motivates the entrepreneur, in an egoistic and material sense, in the exercise of the specifically entrepreneurial

function – Misesian or Rothbardian, for example, namely the determination of the use of factors of production – is the pursuit of profit, including the expectation of loss, insofar as the chosen course of action is ultimately "approved" or invalidated by consumers (Mises, 2018).

It should nevertheless be noted that, within Mises's explanation of the emergence of entrepreneurial profits and losses, the degree of technological knowledge possessed by the entrepreneur is not considered to have a direct effect on the profits or losses generated, but merely to contribute to income as remuneration for labor performed. Losses caused by technological deficiencies are either avoidable, insofar as production could have been more judiciously managed, or inevitable, due to the "state of technological knowledge," both dimensions being reflected in the prices of factors of production, which thus mirror a given level of technological deficiency (Mises, 2018).

In our assessment, leaving to the market the selection of entrepreneurs with a higher degree of technological adequacy to consumer-directed production is salutary. However, to maintain that entrepreneurial profits and losses are not influenced by the quantity of physical output and that "equipment efficiency is reflected in higher physical yields per unit of cost, as a corollary of a larger physical output" (Mises, 2018), suggests that cost reductions brought about by technological progress and their impact on entrepreneurial profitability are of little importance. According to this view, all that matters – the existence of profit or loss – is the extent to which the entrepreneur anticipates the future, uncertain configuration of the market. Such a position is difficult to defend, since future market configurations may also be shaped by lower prices achieved through cost reductions and by higher physical output better synchronized with consumer preferences.

With or without technological progress (although relativizing its absence – or more precisely, its importance – introduces a certain detachment from reality into the analytical framework and redirects explanations of economic dynamics), the idea of the specific entrepreneurial function, together with explanations of the emergence and existence of profits and losses under the umbrella of consumer desires and their satisfaction, clarifies the role of the "Austrian" entrepreneur as the initiator of economic dynamics within its logical sequence: the consumer desires, the entrepreneur anticipates and produces. Even if the process begins with the consumer, who determines the ex ante direction of production, the decision to initiate a specific productive process and to bid for factors of production belongs to the entrepreneur, who is ex post rewarded – or not – according to the accuracy of his anticipations. In a certain sense, one may speak of a necessarily logical connection between production and consumption, one of an "harmony of interests" à la Bastiat (Bastiat, 2007). We further maintain that the classical

logic placing production prior to consumption is not inverted, but refined and strengthened within a circular explanation in which the dynamizing force unquestionably belongs to the entrepreneur and the entrepreneurial spirit.

In essence, the entire functioning of the market process depends fundamentally on entrepreneurial action. The entrepreneurial spirit is intrinsic to it and may emanate from the actions of any individual, because, as Mises notes, the entrepreneur in economic theory does not designate a person but a function – not a trait of a group of individuals, but a characteristic of every human action (Mises, 2018). Moreover, the entrepreneurial spirit is defined by the natural or acquired abilities of individuals to correctly anticipate market data, by their willingness and decisiveness in assuming risk and the uncertainty inherent in action.

In the correct logic of things, placing the entrepreneur in the position of initiator of economic dynamics with prosperity as its intended outcome leads Austrian theory to position saving and capital accumulation as the first step toward progress, forming the basis for initiating productive processes through investment. The engagement in the "roundabout" method of production is conditioned by the formation of supporting reserves during the time required for production and its subsequent consumption. In a broader sense, and in full accordance with the classical paradigm, saving and capital accumulation are immutably found "at the beginning of every attempt to improve mankind's material conditions; they represent the foundation of human civilization" (Mises, 2018, p. 264).

On these grounds, the importance of entrepreneurial economic calculation in monetary terms must be reiterated, particularly with regard to the saving–investment relationship. As already observed, this presupposes, in Austrian terms, an intertemporal allocation of scarce resources through entrepreneurial action, determined by individuals' time preference. When the entrepreneur's investment appetite is satisfied through voluntary saving, the process bears the mark of naturalness. Within a monetary system that reflects individual time preference and generates a corresponding market rate of interest, the coordination imposed by the saving–investment relationship functions smoothly, since those who save need not be the same as those who engage entrepreneurially, thereby placing economic logic within a healthy, classical framework.

By contrast, with "monetary injections" and a market rate of interest detached from individual time preference, the process ultimately departs from the bounds of normality, leading inexorably to depression and crisis. From such a perspective, the role of the entrepreneur as "starter" and of his profit estimations is usurped by lax monetary policy and the artificial manipulation of the interest rate.

3. WHY "FRESHLY" PRINTED MONEY SHOULD REACH ENTREPRENEURS "FIRST"

The Kuhnian idea of the (r)evolution of scientific knowledge – by no means necessarily and obligatorily oriented toward progress, but quite the contrary – cannot be emphasized strongly enough. Nor can the claim of absolute novelty in the field be fully sustained, at least from a historical standpoint, once one attains an intimate and profound understanding of the intellectual lineage. For example, monetary influences on prices, the accumulation or consumption of capital, the production and distribution of that capital – or, in other words, wealth in general – were part of the explanations offered by the founders of economic science, with differences, to be sure. More important, we believe, is the fact that some of these insights were partially ignored along the ideational trajectory that followed.

What should have remained available for continual renewal are issues of overwhelming importance and explanatory power: the intertwined real–nominal movement, hence its corollaries – the measure of the nominal domain or the non-neutrality of money; the canonical and strictly ordinal sequence whose point of departure lies in accumulation and production and whose terminus is consumption. A minimal synthesis of these ideas requires, by way of example, an appeal to Richard Cantillon, whose unequivocal conclusion is that a doubling of the quantity of money does not lead to a doubling of prices (Cantillon, 1931) or to Adam Smith, when he observes that any additional quantity of money in circulation "overflows" beyond the bed of its own channel (Currot, 2016; Smith, 1776). In other words, the message is clear: the demand for money is bounded by the limits of the real economy, and any "miraculous" modification of the money supply does not bring about a higher degree of prosperity. Subject to immutable scarcity, humanity does not desire more money, but more goods at its disposal.

Moreover, by distinguishing between an aggregate level of prices and another – of far greater importance – of relative prices, Cantillon observes and explains the differentiated monetary effects on these levels depending on the point at which money enters circulation. In other words, he distinguishes between increases in the relative prices of goods purchased according to the "judgment of those who receive the money" (Cantillon, 1931). He further notes that it is impossible to measure the extent of the effects through which an increase in the quantity of money affects the structure of consumption and production; that some prices will rise before others; and that the velocity of circulation changes in intensity (Cantillon, 1931). It seems important and salutary to him that money should originate from a positive trade balance – meaning that the point of entry of money into the economy should belong to the entrepreneur.

Although entrepreneurs will augment their own consumption, because they have enlarged their capital without needing to resort to borrowing, the interest rate on loans will fall. An increase in the supply of credit, arising also through entrepreneurial saving, and a lower interest rate will positively influence entrepreneurial investment spirit and the future composition of production (Cantillon, 1931). Following the ultimate consequences of the price-increase trajectory induced by monetary changes, Cantillon sees the end of the road not in an increase of domestic production but in a waste of resources, as individuals substitute the rising prices of domestically produced goods with relatively less costly imports. In other words, what initially appears to bring prosperity ultimately contains the seeds of general impoverishment.

J.-B. Say will observe that the act of consumption is organically linked to that of production, and that in order to consume one must first produce (Say, 1971). Money bears the intermediary role that comes to it by genesis. To reinforce Say's argument, J. S. Mill will argue – cryptically, yet through a clarifying circular relation of causality – that the total production of an economy finds its limits in the quantity of available capital, and that capital can be born only from saving – saving that is itself "consumed," including in the sense of being invested in the formation of capital (Mill, 1921). To understand Mill fully, one must realize that to save means not to consume everything that is produced; that what is produced does not consist only of consumer goods but also of capital goods; that saving invested entrepreneurially will produce capital goods which, intertemporally, will raise the production of consumer goods – so that such production does not depend ex ante on the demand for consumer goods or on labor employed in production, but on the accumulation of capital, on saving and investment (Kates, 2015; Mill, 1921). In other words, the wages of the person who manufactures a given good are not paid by the one who purchases that good; they are advanced entrepreneurially along the sequence saving–accumulation–investment–production–consumption. What matters is that money should be found where it most fittingly fulfills the purpose for which it emerged and evolved: to reward productive labor (Pohoață et al., 2022).

T. R. Malthus does not miss the importance of the problem when he notes, in an Adamian spirit, that the medium of circulation distributed equally across the whole of society would destroy its productive capacities; whereas if monetary distribution tilts toward the productive class, then an augmentation of capital will lead to an increase in income and production (Malthus, 1811). Brief and comprehensive, the message indicates the most appropriate point through which money should make its way into the world of goods that it moves and measures.

Having correctly identified the issue, Malthus further observes that productive labor rewarded entrepreneurially will materialize only within the sphere of production, leaving demand behind – including the demand of the unproductive. In other words, the incomes of the latter no longer constitute demand for the goods and services produced by Say's productive workers, but an occasion for Keynes's public expenditures. In this context, no increase in saving – and, consequently, no reduction in the consumption of those engaged in production – appears to either of them (Malthus and Keynes) as a path to follow, since the problem they perceived in the reality they inhabited seemed to be one of underconsumption or overproduction.

It only seemed so, we believe, because entrusting the regulating force to entrepreneurial action, within the complexity and splendid qualities of a free and competitive market process, constituted the essence of Say's message. And we further understand that what Say sought to demonstrate was not the impossibility of particular disruptions in dynamics, but the impossibility of an overall deficiency of demand or a general surplus of supply.

In principle, Ricardo will support Say and will remark that people err in production; there is no deficiency of demand (Ricardo, 2001), even along the relationship – canonical yet fragile – of accumulation, distribution, exchange, and consumption, economically harmful only if any term is removed, ordinally, from the place the founders assigned it. We refer here not to Ricardo in the intimacy of his message, but to his "interpreters" who made of the assumed theme of the Ricardian system the alpha and omega of explanations of the principal economic causal relation. In other words, we do not understand Ricardo in a descriptive note whereby the starting point of the aforementioned relation would lie in distribution, but as a "logician" of the school who considered the problem of successive order in canonical logic as resolved, and for whom what still called for solutions was only the sequence of distribution.

In any case, it is not possible either to distribute or to consume what has not yet been produced – entrepreneurially. Normality and naturalness require that money be "spent" "first" entrepreneurially. The problem arises when one wishes to identify who triggers the process: the consumer or the entrepreneur. Ultimately, does not the consumer's purchasing power also come from wage income received from the entrepreneur, for whom wages affect calculations on the cost side? A less natural ground, and one in contradiction with normality – at least from this classical perspective – resides in the idea of encouraging consumption prior to production, since, à la Say and Smith, the release of the two planes demand–supply occurs almost "at the same moment." Moreover, Cantillon himself recognized that there is no reason for alarm in

the fact that purchasing power first settles in the consumer's pocket, since it is the entrepreneur who must respond to the augmented demand.

Situated on such an ideational foundation, L. v. Mises thinks through and demonstrates that a change in the money supply available in an economy will affect certain prices differently, both in extent and in temporal sequence. He begins his demonstration with the issuance of an additional quantity of fiduciary money by the governmental authority, without being matched by a reduction in money in circulation through increased taxation and thus reduced consumption by taxpayers – something that causes the prices of goods and services purchased by public authorities to rise faster than those faced by consumers, the simple taxpayers. Once the process is triggered, entrepreneurs who are in the position to bring and sell the goods in question to the market, since they enjoy higher incomes, will be placed in a position to consume more themselves, thereby initiating a chain reaction and an asynchronous rise in prices (Mises, 2018).

Along the path of monetary injection, "the additional quantity of money is not, from the outset, found in everyone's pockets; not all who benefit initially receive the same amount, and not all react in the same way to such an increase" (Mises, 1990). The non-neutrality of monetary influences translates into an arbitrary and artificial distribution of individual incomes, a "revolution" of prices that leaves behind market systems completely different from the initial ones in terms of exchange ratios among different goods – above all one that facilitates gains for the first recipients of "freshly printed" money, who will be able to buy at prices not yet raised and to enjoy increased incomes from selling goods whose demand has risen, while the losers are those who must pay higher prices not supported by increases in the prices of the goods they themselves sell: "For the former, the progressive rise of prices is a boon; for the latter, a calamity" (Mises, 2018).

Furthermore, given the importance of entrepreneurial calculation in economic dynamics, the use of monetary price expressions becomes the only way to allocate resources rationally and efficiently. Once they emerged, money created its own market, exerting its dynamizing force upon all goods it is called to move. The perpetual modification of the "monetary relation" – that is, money demand and money supply – is the reflection of momentary and transitory changes in the structure of monetary prices, thus pointing to a permanent relation of interdependence between money demand and supply and the demand and supply of goods: nothing can occur in the orbit of vendible goods without affecting the orbit of money, and everything that occurs in the orbit of money affects the orbit of goods (Mises, 2018).

The fundamental and organic characteristic of market processes is change – the constant and interdependent adjustment of plans. Intertemporal entrepreneurial calculations will always have a monetary expression, hence the logical conclusion of money's non-neutrality. Thus, with an active (non-neutral) money by its very nature, for Mises any attempt by monetary policy to stabilize the purchasing power of money is doomed to fail. Starting from the idea of neutral money, such stabilization policies propose measures to diminish or increase purchasing power either through inflation or through deflation. Yet both methods, in fact, produce cumulative social consequences and not diametrically opposite ones in the sense of eliminating or counteracting the negative social effects of inflation through potential gains from deflationary policies (Mises, 1990). Hence Mises's clear and explicit opposition to establishing monetary neutrality as an objective of monetary policy and to assigning the economist the task of showing the politician the operative method. The Misesian conclusion is unequivocal: "in a living world subject to change, a world of action, there is no room for neutral money. Money is non-neutral or it does not exist" (Mises, 1990).

From such a perspective, the immunization of the monetary system is given by "sound" money – money protected from the interventionism of the monetary authority, insofar as governmental interference translates into the distortion of entrepreneurial economic calculation. The falsification of entrepreneurial calculation materializes in two ways: (1) the increase of the money stock constitutes a means of financing budget deficits and public expenditures, whose end-point is hyperinflationary – chaotic resource allocation and the disintegration of the capital structure; (2) monetary expansion leads to the reduction of the monetary interest rate below the natural rate – the expression of individuals' time preference and of the voluntary consumption/saving ratio – hence all the consequences traced by the "Austrian" business-cycle path.

A less unequivocal position on monetary neutrality is found in F. A. Hayek. Although, like Mises, he sees in the concept of neutral money nothing that should be used as a norm for economic policy, Hayek considers the problem of neutrality only from the standpoint of the theoretical analytical instrument it offers. In other words, he aims for the analysis of the subject to identify and isolate monetary influences on economic processes and to establish the conditions of their real determination with respect to relative prices (Hayek, 1984). Put differently, if for Mises the separation between real and nominal in order to identify the point of monetary neutrality cannot be encompassed within theoretical explanations and has no relevance for economic calculation, Hayek considers in his explanations the "monetary veil" that overlays the real economy and distorts its equilibrium, through the monetary volume in circulation

which does not provoke a reciprocal adjustment in the economic activity of different individuals (Hayek, 1933).

For Hayek, a constant volume of the money stock should constitute the norm of an ideal monetary policy, with all the deflationary implications it entails, arising, for example, from an increase in productivity or in the demand for money holdings. He later modifies his position and redefines the money stock in terms different from those used in his earliest statements. In *Monetary Theory and the Trade Cycle* he understands the quantity of money as a flow, a notion he adopts as well in *Prices and Production* (Hayek, 2017).

The departure from pure quantity-theory thinking and the additions explanations receive via the velocity of circulation did not lead him to different conclusions regarding the maintenance of constancy – or at least the avoidance of increases – in monetary volume or flow when the entrepreneur's liquidity needs demand it. Nor does an increased volume of production via engaging the "roundabout" method constitute a reason for accepting variation in monetary flow. For Hayek, the only way to avoid the recurrence of the business cycle is to accept falling prices (deflation in the "Austrian" sense).

A conclusion pleasing to the consumer, but not equally friendly to the entrepreneur and to the ignition of profit motivation guiding the entrepreneurial spirit. Moreover, the invariability of the money stock under conditions of a "capitalist" intensification of the production structure leads to a reduction in nominal income (as the price of labor). Yet, taking into account that Hayek admits and recognizes the "notorious rigidity of wages," what remains of the growth of entrepreneurial profitability? He nonetheless admits that the erroneous arrangement of the structure of production could be avoided if "it were possible to inject into the economic system the surplus money required to maintain the relation between the demand for consumer goods and the demand for producer goods. Evidently, we are faced with an impossible task" (Hayek, 2017). But is it not among the roles and functions of the natural rate of interest precisely to reconcile the entrepreneur's decision to invest with the consumer's decision to consume? The Wicksellian condition is implied: the subordination of the bank rate to the natural rate (via entrepreneurially estimated profit).

Seeking exceptions to the rule of maintaining a constant money stock, Hayek proposes to study the reasons that require variations in the quantity of money such that it might be completely neutral with respect to the economic process (Hayek, 1931). He is forced to abandon the hypothesis of a constant ratio between the total flow of goods and the part exchanged via money, to observe that changes in the velocity with which transactions are carried out – generated by movements in the

sphere of the real economy – can be explained by variations in monetary volume. Then, Hayek notes, the necessary quantity of money in circulation may also change due to the transition from one production stage to another. In other words, the transition toward a more capital-intensive production structure may also imply a variation in the quantity of money. A final exception to the norm is given by changes in the velocity of money, long considered equivalent to a variation in the quantity of money in circulation (Hayek, 2017), which leads him to accept the principle of an inversely proportional modification of the money stock relative to velocity, under conditions of maintaining money's neutrality.

Thus, for Hayek the neutrality of monetary influences on prices and the structure of production is not merely a problem solvable by a monetary policy that adapts demand to the supply of money. He considers "legitimate" the satisfaction of money demand arising from that part of the system in which changes in the organization of economic activities or payment habits have manifested. The only reason monetary flow should vary is given by the "transaction motive" and not the "investment motive," because, for Hayek, such a situation represents "another formulation, probably clearer, of the old distinction between legitimate demand for additional money and unjustified demand for additional money" (Hayek, 2017). Yet, disarmed, even satisfying only this demand – which does not modify the money stock but only the "transactions coefficient" – does not appeal to him as a principle of monetary policy. And this is because he considers it impossible to discover that natural rate that would reconcile the demand and supply of capital. How useful Wicksellian "tâtonnement" would have been in the face of such a conclusion!

Hence the conclusion: "the mere increase of production and of the volume of exchanges provides no justification for a credit expansion" (Hayek, 2017). The problem of production being harmed by a constant money supply might find solutions that could be "attempted" only at the level of a "world monetary authority." But to direct one's thought toward central omniscience resonates little, if at all, with the ideas of decentralization and denationalization deeply rooted in the liberal philosophy from which the Austrian paradigm draws nourishment. Only at the national level does Hayek place upon banks the task of resisting pressures to "combat depression with a little inflation." He nevertheless notes the danger of replacing the gold standard with another system administered "more or less arbitrarily," with far greater risks implied by such a reconstruction of the monetary system – a system whose practical applicability he himself considers a "utopian dream," leaving unclear the ambivalence with which he treats the gold standard: "even if it does not produce a rational regulation of the quantity

of money, in any case it tends to manifest itself along generally predictable lines, which is a fact of greater importance" (Hayek, 2017; White, 1999).

With yet another change of opinion in *Denationalisation of Money* (Hayek, 1990), Hayek abandons the norm of a constant monetary flow and replaces it with the idea of stabilizing the prices of consumer goods together with the much-supported free banking competition. The problem of the stability of certain prices was not new to Hayek's vision. The explanations he offers from such a perspective lead him to show the importance of predictability of inflation and of the stability of purchasing power, and, from the standpoint of free banking competition, to reconsider the unrealizable ideal of any banking policy in terms akin to those by which, elsewhere, he treated the realism of central planning (White, 1999). Even so, his explanations lead him to consider the idea of low practicability that monetary excesses are due to the need to stabilize prices and maintain the fragile balance between saving and investment (Hayek, 1990).

Moreover, yet another repositioning of Hayekian thought (Hayek, 1939) confronts those seeking consistency in his theoretical explanations, insofar as they must juxtapose the principal culprit in *Prices and Production* – found in credit expansion and forced saving – with what he notes in *Profits, Interest and Investment*: "in a society in which population and capital are increasing, credit expansion could be avoided only at the price of a constant reduction not only in the prices of consumer goods but also of the factors of production, of incomes for example, which will undoubtedly create serious frictions" (Hayek, 1939). From such a perspective, to grant productivity growth the status of a motive for monetary relaxation, to encourage the entrepreneur to invest by expanding credit beyond voluntary saving, is an idea not far removed from the dominant Keynesian doctrine against which the Austrian paradigm deliberately positions itself.

Faced with such ideational transformations, the burden of reconciling the importance assigned to accepting variations in the quantity of money required to maintain a stable level of consumer-goods prices with a theory of recurrent business cycles in which the norm of non-variation of the money stock represented the explanatory center of gravity – where negative monetary effects on relative prices were the key to understanding the phenomenon, and constant aversion to "means" in detriment to far more important individual prices marked the difference from dominant theories – falls upon the new generations of "better informed economists."

The fact remains that such a wavering between "to be and not to be," with fears, less categorical positions, and exceptions to the rule, does not place Hayek in a posture of being understood and accepted – if there was anything to accept from the political

side. Nor did the new generations of economists support his solutions. With far greater ease, and with all the negative consequences that followed, the Keynesian message of exiting crisis through increased public expenditure, control of investment, manipulation of the interest rate, and so forth, was accepted and understood.

When Hayek employs the Cantillon effects he perceives them in a particular way. Like Cantillon (Cantillon, 1931), Hayek constructs his early ideas regarding cyclical dynamics by considering the endogenous character of monetary influences on the price system, yet not only through individuals' reactions to an "abundance of money," but also through the fact that the price mechanism, inflationarily distorted, transmits falsifying signals to the entrepreneur. Monetary theory of the business cycle describes a process whose recurrence has a permanent character given by the organization and functioning of the credit system; in other words, it is marked by the inherent tendency not to equate the natural rate with the credit rate. Maintaining such a gap may also arise from changes in entrepreneurs' profit expectations or from a reduction in saving – changes to which the banking system does not respond by raising the credit rate.

Indeed, for Hayek, the expansion of credit beyond real saving is the starting point of economic fluctuations, thus exonerating, along the explanatory path, the central bank from exclusive blame, as Mises considered it to be the ultimate cause of recurrent crises. He does recognize that inflationist ideological pressures upon the central bank may constitute the cause of credit expansion, but the situation appears to him as one of "special circumstances," not "a necessary consequence of an inherent tendency of our credit system" (Hayek, 1933). The monetary creation arising from the functioning of commercial credit is what Hayek sought to identify as the defining element by which the system is subscribed to permanent fluctuations. Yet even the quarrel with commercial credit has little chance of success, since "an immanent characteristic of our economic system" (Hayek, 1933) is precisely that it offers credit beyond the supply of savings – either from banks' lack of interest in maintaining equilibrium between credit and saving, or, disarmingly, from their inability to act in such equilibrating terms.

With a critique directed at those who consider monetary influences on fluctuations to be exogenous – among whom L. v. Mises is also found – Hayek finds it "inevitably suspicious" to accept "a theory that must appeal to a deus ex machina false step by bankers" (Hayek, 1933). In other words, the gap between the natural rate and the credit rate should not be explained in terms of any deliberate inflationary failure of monetary policy. Yet the explanations he offers in *Prices and Production* begin with an artificial reduction of the credit rate and conclude regarding the danger of inflationary policies. Contrary to what he believed in *Monetary Theory and the Trade Cycle*, the exogenous modification – this time – of the money supply becomes the ultimate cause

of artificially prolonging an unhealthy "boom". With such oscillations, Hayek does not add constancy to the nature of his explanations. Moreover, one is the path an economy takes when the natural rate (via estimated profit as a consequence of technological progress, for example) lies above the credit rate, thereby giving a natural impulse to growth; another is the path in which "forced saving" (via deliberate manipulation of the credit rate, held too low for too long) leads to crisis and the liquidation of misguided investments.

Hayek's different interpretation of the Cantillon effects is also captured by the fact that, whereas for Cantillon (and for L. v. Mises as well) the monetary injection matters when new money is effectively "spent" by those who successively come into its possession, for Hayek the process begins when money is invested in new productive processes. Money newly created through the credit system is nothing other than "fictitious capital," which, sooner or later, will generate a shortage of circulating capital necessary to maintain the profitability of fixed capital (Hayek, 2017). He also considers it important to analyze where the monetary injection is "spent": "everything depends on the point at which the additional money enters (or leaves) circulation, and the effects may be opposite if the additional money reaches first the hands of merchants and industrialists or reaches directly the hands of public-sector wage earners" (Hayek, 2017).

It is true that formal economic policy did not retain and did not consider inviolable the legality of the classical sequentiality that placed production first. But with Keynes opening the door of politics to monetary injection in any direction, the confrontation of ideas should have appealed precisely to what should not have been demolished in the wake of the so-called "revolution" that followed. In other words, through an interpretation removed from its original context, Say's Law no longer represented the norm, while along the way the unintended consequences noted by Bastiat were forgotten. Hayek's argument could have been far more convincing with such allies beside him. In essence, Hayek transmits that the logic of normality is the classical one, in which money reaches entrepreneurs through credit channels. Yet a business credit rate held too long below the natural rate represents the sure path to crisis, since newly printed money will again be spent out of the incomes of those who receive it. But since the "reserve fund" no longer functions as it did for J.-B. Say, the self-sustaining principles are absent.

Indeed, the immediate interests of politics are secured by monetary injections into the hands of public officials, but Hayek's suggestion becomes hard for formal policy to digest. It could have been made more convincing by noting the reality that once in the hands of public officials, money will be spent along pathways where

entrepreneurs undoubtedly intervene. Yet the idea escapes him, leaving the impression that money reaching public employees simply does no good. Perhaps more fertile would have been the condemnation of monetary injection not with the final destination in the pockets of "wage earners," as initiators of the business cycle, but in the budgets of public institutions at odds with the logic of the free market – or, why not, to emphasize the nocivity or arbitrariness of public investments, drawing attention to Keynesian therapies that propose the "socialization" of these investments (Hazlitt, 1959). Moreover, even if such an idea would not have increased political attractiveness, highlighting that public investments especially assume uninspired or unproductive forms – yet are sheltered by salvation coming from so-called "public money," with the complicity of the central bank – would have clothed the explanations in the texture of reality. Yet, ultimately, economic theory should not be constructed to please the politician nor to serve narrow and immediate interests. Without doubt, on this chapter the "Austrians" score seriously and soundly.

From such a perspective, the interest that formal policy grants the Keynesian paradigm finds its explanations with ease. It attracts, first, by centering explanations around the problem of employing "labor power." Money and monetary changes are the systematic solutions. Keynes notes that "the importance of money essentially arises from the fact that it is a link between the present and the future […] Money with its significant attributes is, above all, a subtle link between the present and the future" (Keynes, 2009). The link he sees between money and uncertainty is found in the interest rate: "the necessary condition [for money as a store of wealth] is the existence of uncertainty as to the future rate of interest" (Keynes, 2009). Thus, the demand for money or money holdings (explained in psychological categories such as "liquidity preference" or "propensity to hoard") is functionally linked to the interest rate. In other words, liquidity preference is nothing but an impediment to investment, regardless of whether the spending of money is directed toward current consumption goods or toward potential income-bearing goods in the future. Thus, the demand for money no longer communicates anything about the consumption/investment relation, about the relation between present and future goods prices, or about the discount of the latter in favor of the former.

As for money supply, Keynes holds that monetary theory could be explained starting from the relation between changes in the volume of employment and proportional changes in the quantity of money; under conditions of full employment, prices will change in the same proportion as the quantity of money (Keynes, 2018). We can agree with him up to a point: an additional quantity of money evidently leads to rising prices, including nominal wages; a reduction in unemployment would occur only

if wage rates rose at a different pace than the goods engaged in production, thereby giving entrepreneurs a chance at potential gain. With real wages diminished, even the potential labor force will not be more encouraged. Moreover, among the things omitted by Keynes is that the employment problem could have found solutions in the free operation of markets – including the labor market – through acceptance of falling nominal wages. Yet such a perspective finds its way with difficulty into the discourse and implementation of formal policy.

Furthermore, with a systematic impact upon unemployment, incomes, and interest rates through money and through money alone, Keynes sees the interest rate as a purely monetary phenomenon: "it is the price which equilibrates the desire to hold wealth in the form of cash with the available quantity of liquidity" (Keynes, 2009). With liquidity preference and the quantity of money as determinants of the interest rate, and with the marginal efficiency of capital and the propensity to consume as determined by the interest rate, Keynes, in a typical circular explanation, identifies connections that begin and end with an increase in the quantity of money, through the interest rate, the profit–investment–employment relation, all governed by liquidity preference and propensity to consume.

Although a certain logical inconsistency runs through the explanation, the attractiveness of stimulating employment through perpetually inflationary monetary injections at the disposal of governing authorities – unconcerned with logical inadequacy – is evident: on the one hand, a decrease in liquidity preference decreases the interest rate and increases investment volume; on the other hand, a decrease in the interest rate increases the demand for liquidity and the propensity to consume, thereby reducing investment volume. In other words, lowering the interest rate increases and decreases investment at the same time (Hoppe, 1992).

Then, since "there is no special virtue in the pre-existing rate of interest, and the new money is not 'forced' on anyone" (Keynes, 2018), monetary policy is freed from the restrictions that a natural rate – as an expression of time preference – would naturally impose. In addition, maintaining any link with gold-standard reserves becomes for Keynes a "barbarous relic" that hinders him. It troubles the paradigm because a sufficiently inflated money stock would bring the interest rate close to zero. Keynes is not troubled by such a possibility, which translates into an abundance of capital. On the contrary, he even forecasts that the marginal efficiency of capital will approach zero if society is well managed and technologically equipped (Keynes, 2018). Moreover, he considers relatively easy to implement the idea of an abundance of capital goods as a rational way to eliminate one of the criticizable features of capitalism (Keynes, 2018). And all this because he finds "no intrinsic reason for the scarcity of capital," for, why

not, "it will still be possible for the savings of society to be maintained by the actions of the State at a level which will allow the growth of capital until it ceases to be scarce" (Keynes, 2018). What motive more attractive to formal policy could economic theory advance than the promise of reaching the paradisiacal landscape of the disappearance of so "inconvenient" a scarcity?

From the seemingly insoluble equation that implies the illogical simultaneity of increasing and diminishing investment volume, Keynes seeks the solution in "the average rate of interest which will allow a reasonable average level of employment […] unacceptable to the holders of wealth" (Keynes, 2018). In other words, what should be economically sought is "the minimum rate of interest acceptable to the majority of wealth-holders." If these latter – driven by "animal spirits" and "speculative instincts" – refuse to invest at an interest rate set in such a way that entry into the paradise of abundance is no longer possible, the solution lies in "the euthanasia of the rentier, and, consequently, the euthanasia of the cumulative oppressive power of the capitalist to exploit the scarcity-value of capital" (Keynes, 2018). For Keynes, such a prefigured fate of the capitalist derives from the fact that the very world in which the capitalist entrepreneur acts is uncontrollable and psychologically disobedient, in which investment markets lie "under the influence of ignorant buyers and of speculators concerned with forecasting market fluctuations." Thus, with an entrepreneurial spirit reduced to "nerves and hysteria," the only solution is that investments should no longer be left in "private hands".

For the governors of formal policy after the appearance of the General Theory, such a proposal of "socializing" investment is irresistible. Besides the fact that the mere utterance of such an idea would have provoked classical thinkers either into immediate critical response or into complete disregard – on the ground that such a vision had already been dismantled abundantly by the formative corpus – the implementation of the "revolutionary" paradigm of the "new economics" no longer offered the occasion of returning to the values proposed by individualism.

In other words, to attain the goal of full employment almost everything had to be sacrificed, providing academic ground for the existence of the Leviathan Moloch, with little chance left for any anti-statist remedy. Would the free market and its capabilities have been incapable of resolving the employment problem? In the end, the capitalist splendor of the entire market process by which the classical tradition (and not only it) understood the world loses explanatory force in the Keynesian paradigm.

First, since economic trajectories are defined by and begin with holders of capital – whom we are told are ignorant of what they buy and who desire the maintenance of capital scarcity for narrow and speculative ends – capitalism has its fate sealed by the

chaotic recurrence of crises. Nor do entrepreneurs guided by optimism or pessimism, in turn determined by a world and psychology uncontrollable and disobedient, provide salvific notes to economic cyclicality, which Keynes explains in terms of a phenomenology belonging to the domain of "mass psychology." This is a chapter in which praxeological explanations give the Austrian paradigm the upper hand. The real world is one in which individuals act, allocate and arrange scarce resources, and assign means to ends. Human action is not arbitrary, as Keynes suggests, but always subject to scarcity – a scarcity with no relation to psychological factors.

Second, the reversal of the classical legality of the primacy of production over consumption is linked to the inherent tendency toward crisis and stagnation that Keynes associates with capitalism. The underconsumption thesis – dismantled by the correct understanding of Say's Law or of Mill's "postulates" – is coupled with the fundamental psychological law that consumption increases with income, but not by the same amount by which income increases (Keynes, 2018). The principle is acceptable and correct, presenting no difficulty for the normal functioning of the economic process: rising saving along with rising income not only does not hinder, but gives substantial chances for progress. Moreover, since saving and investment are identical notions, and "at the aggregate level the excess of income over consumption, which we call saving, cannot differ from the addition to capital equipment which we call investment" (Keynes, 2018), it does not appear problematic that an initial reduction in consumption would translate into an increase in saving and investment, which would in turn lead to higher income and, according to the same fundamental law, to higher consumption – and, why not, to a subsequent increase in saving and investment.

et for Keynes the limits of production are given by consumption, and the very fact of not consuming more when incomes rise must be blamed, because it means that production does not rise either. Hence Keynes's conviction that richer societies, with their naturally larger saving, are the first to suffer the disease of stagnation. Yet he should have asked for the explanation of how they became richer. The correct answer never lay in consumption before production. The Keynesian solution, in addition to socializing investment, lies in stimulating consumption – more precisely, in redistributing income from those whose propensity to consume is low toward those whose propensity is high; what better support could political populism find than Robin Hood-like promises to redistribute from rich savers to poor spenders?

The impossible made possible – indeed a necessity – presupposing the miraculous transformation of stones into bread (Mises, 1974), requires nothing less than stimulating both investment and consumption, resulting in the simultaneous increase of incomes. The "miraculous" achievement occurs within the logic of definitions that

themselves do not allow such slippage: how could income (a sum of investment and consumption) rise, given that saving and investment represent a difference between income and consumption, other than through an artificial – specifically inflationary – increase in income? The incoherence stems from the impossibility, at least mathematically, of increasing both consumption and investment out of a given income – an income which Keynes omits to see as coming from production, a production upon whose existence consumption, saving, and investment depend. But since saving is no longer unconsumed income but merely hoarding, with a negative connotation of not spending money either for consumption or for investment, the magic of Keynesian therapies takes shape. In other words, the problem arises when not everything that is saved is invested, due to "a chronic tendency throughout human history for the propensity to save to be stronger than the inducement to invest" (Keynes, 2018). Leaving aside that his own equality between saving and investment disappears under such conditions, the result is the negativity of investment and consumption not keeping pace with the undesired saving. The solution lies in nothing less than the fact that saving can also be printed.

With saving understood as unspent money, the need for saving to ensure an increase in investment and consumption can be met through injections and monetary creation, in order to counteract the "baneful" tendency of saving to rise with income. Yet the danger arises that these "new savings" may also remain unspent, because an increase in saving lowers the interest rate, and the latter increases the liquidity preference of those wealth-holders proposed for euthanasia, in their desire to perpetuate the unpleasant scarcity of capital. This is why investments should not be left at their disposal; money must be spent, which will lead to the disappearance of capital scarcity, and the apparently insoluble problem of increasing expenditures, savings, and investments simultaneously with income is resolved. With newly created money in everyone's pockets, not "forced" on anyone, the absence of real saving no longer represents an insufficiency of the system – a system whose righteousness is secured by a providential state that fights "capitalist exploitation," stagnation, and crisis through perpetual inflation. And once the stagnation problem is solved, even more inflation will solve the scarcity problem (Keynes, 2018). Indeed, a significant part of the political discourse following the "revolution" of the new economics contains such "miraculous" promises.

4. CONCLUSION

The entrepreneur's "starter" role, as conceived by the Austrians, cannot be understood outside the classical catechism which, in fact, sketched its first contours. Adam Smith did portray the entrepreneur more as a prudent administrator of capital, endowed with caution and the capacity to calculate; yet Jean-Baptiste Say goes infinitely further, describing the entrepreneur as the one who combines the factors of production, anticipates consumers' wants, and organizes scarce resources. The law of markets, as he formulated it, is the expression of this role: production creates demand because only real production opens the road to consumption. Keynes would later confuse this principle, reducing it to a banal tautology and accusing it of ignoring the possibility of crises born of an "insufficiency of demand." Nothing could be more false. Say and the classics never denied the existence of recessions; they merely explained that their source is not some "mystical" lack of demand, but institutional blockages, unfortunate interventions, and – later – monetary distortions. The Keynesian slippage, by dressing the entrepreneur in the caricaturing garments of a straw man and by unjustly criticizing Say's Law, diverts and deforms the scaffolding of economic theory built from the formidable classical effort – whose corollary should have been understood, in fact, as the discovery of the dynamic principles of market coordination, not as a sterile optimism to be overturned. The entrepreneur is, by the nature of his function, the genuine initiator of the economic process. Without him, Keynesian consumption remains suspended in a logical void: there is nothing to consume if nothing is first produced. And it is not the state, with its politically commanded investments, that can substitute for this role, but only the one who, by assuming risk and uncertainty, gives life to production.

Let us nonetheless acknowledge the truth to its end. Keynes himself – paradoxically for interpretations that are far too dogmatic – also begins from the entrepreneur. He does not treat credit as a deviation, but as the normal mechanism, and the bank as the actor that calibrates the game through the interest rate. Here the Wicksellian bridge intervenes: the natural rate – understood by Keynes in the same registers (anticipated profit, the saving–investment equilibrium, and the degree of employment) – becomes the reference to which the bank must relate its market rate. When the market rate falls below the natural rate, the boom is predictable; conversely, when it exceeds it, the deflation of profits and the retreat of investment are inevitable. What matters is that, in his intention, inflation is not an end in itself, but at most a tolerable collateral effect up to the threshold of full employment; beyond that point, stimulation through cheap money loses its justification. In other words, what should have been recognized is that Keynes contains a measure of things: intervention makes

sense only insofar as it aims at equalizing saving with investment and maintaining employment, not perpetuating expansion artificially.

At this point, the Austrians and the classics stand on the same line: the entrepreneur's role is central, and the saving–investment coordination is the natural condition of prosperity. What the Austrians demonstrate is that it is precisely the state's manipulation of interest that breaks this mechanism and transforms a natural process into a succession of artificial expansions and crises. Yet if the Austrians placed the emphasis on time preference and on economic calculation, the classics preserved an additional healthy intuition: the state has a role as guarantor of the rules of the game, as "guardian of order," as we might say today. Beyond this measure, intervention becomes harmful. Modern history shows that, by exceeding this limit, the state has turned into an obese Leviathan, difficult to control, whose "slimming cures" further pervert the entrepreneurial spirit. If in the nineteenth century the state could be thought of as an umpire, in the twenty-first we see it as an omnipresent player that diverts the very process of entrepreneurial discovery.

One point on which the Austrians may have been too reserved is the role of technological progress. Mises maintained that innovation matters only marginally for entrepreneurial profit, which ultimately depends on anticipating consumers' preferences. A Schumpeterian "creative destruction" would provide an unavoidable completion: technological progress is the real engine of capitalism, the force that dynamizes the structure of production and radically alters the landscape of opportunities. The entrepreneur is not merely an arbiter between means and ends, but also an innovator, a disruptor of old equilibria. For this reason, it would be too simple to reduce the entrepreneurial function to the anticipation of the market's future configuration. The configuration itself can be transformed through innovation, technical progress, and the courage to break old forms. The entrepreneur not only anticipates demand; he shapes it through technological advance. To place, in a Misesian manner, the emphasis on calculation and anticipation should not have led him to leave, in an implied background, a dynamic of capitalism inseparable from innovators – from those who overturn old equilibria. From this perspective, technological progress is not a mere "detail," but a structural force. And yet, paradoxically, even here the state can deviate the natural logic: genuine innovation is born of competition and risk, not financed by "public money" and rescued by arbitrary industrial policies.

In the end, the harmony of interests about which Bastiat wrote proves to be the result of this delicate game between saving, investment, innovation, and market freedom. The consumer "votes" with his preferences, the entrepreneur initiates productive processes, technology amplifies or diminishes the chances of success, and

the state should watch only over the correctness of the rules, not seize the helm. Where it exceeds this measure, the market's natural order collapses, and the place of entrepreneurial spirit is occupied by a conglomerate of rentiers, "zombie" firms, and bureaucrats who decide what should be produced, and for whom.

Thus, the history of economic ideas – from Cantillon to Hayek – reveals rather a Kuhnian "continuity" than a "revolution." As such, what should have changed is not the deep logic of an economic process moved by money, but only the vocabulary by which it is described. Cantillon first understood what we today call "effects": new money does not enter the economy uniformly, and its point of entry alters the distribution of relative prices, producing winners and losers. Smith completed the picture with the analogy of water that "overflows the bed of the channel," stressing that money is not wealth, but only its vehicle. And Say synthesized, in the formula that became famous – and so wrongly interpreted by Keynes – that production creates its own demand: there is no consumption without production and no incomes without entrepreneurially advanced capital.

We thus find ourselves, once again, in the gravitational core of classical thought: consumption is limited by production, and production is limited by capital – that is, by saving. Mill would state it plainly: wages are not paid out of future receipts, but advanced out of accumulated capital. Keynes, by contrast, overturned the logic, reducing saving to "hoarding" and presenting it as a danger when in fact it is the premise of any real accumulation. This detour of Say's Law became politically convenient: if recession is merely a "lack of demand," then the state can "create" it through spending and credit, becoming the conductor of the entire economic orchestra.

This became, in the hands of a political class eager to find theoretical justification for what already defined its measures, the interpretation in which Keynes's logic was poorly understood. His observation remains, without doubt, valid and too rarely used: the lag between the movement of the natural rate and the reaction of the market rate explains much of oscillation; the bank does not immediately detect changes in anticipated profitability and in the saving–investment relation, and in this interval tensions accumulate. Here another idea is also tied in – too rarely retained and fruitfully exploited by both registers, positive and normative – that a reduction of the interest rate must precede the accommodation of saving, since production processes consume time. In other words, the equilibrium between saving and investment is not merely a matter of simultaneous levels, but also of temporal sequence. The entrepreneur decides today whether to initiate a project based on the cost of credit, but the real means resulting from additional saving appear only later. In this sense, Keynes approaches, surprisingly closely, the Böhm-Bawerkian intuition: every productive "detour" requires a

preexisting reserve of consumer goods to sustain labor during the process. If interest does not fall beforehand, the entrepreneur does not launch the project; if it falls too much and without real support in saving, the project proves illusory. The causal order of the process cannot be reduced to the accounting equality of investment and saving; it presupposes durations and real advances. Hence his insistence on the rate maneuver rather than the mirage of "money through any channel": when the market rate follows the natural rate (even with some lag), prices and profits tend to move coherently; when it deliberately undermines it, the drift becomes policy and the correction – painful.

The disagreements and corrections that follow, embodied in crises, are in no sense spontaneous defects of capitalism, but the result of artificial credit expansion. In Misesian terms, money is by its nature non-neutral: every injection modifies exchange ratios and distorts entrepreneurial calculation. Hayek nuances this and attempts to salvage the concept of "neutral money" as an analytical instrument, but not as a reality. In the end, both Mises and Hayek admitted that the attempt to stabilize through monetary policy leads to the recurrence of cycles. What the classics intuited – that money must remain in productive hands, with the entrepreneur, and not in the budgets of an obese state – the Austrians demonstrated with praxeological precision.

We should not forget, however, that the classics also assigned the state a role: not as conductor, but as guardian. Smith recognized the functions of ensuring justice, defense, and a few public works that could not be realized voluntarily. Say and Bastiat were not anarchists, but liberals who understood that without a firm institutional framework – property protection, contract security, a stable currency – the entrepreneurial spirit cannot flourish. Beyond this measure, the state becomes what we see today: a heavy Moloch, nourished by inflation and debt, that perverts private initiative and transforms it into a hunt for rents.

A "red thread" unites Cantillon, Smith, and Say, passing through Mill and Ricardo to Mises and Hayek. It always indicates the same truth: there is no miraculous way to circumvent scarcity. New money does not create new resources. What can create prosperity is only the entrepreneurial spirit, sustained by real saving and institutional discipline. Keynes, by contrast, proposed the dream of abolishing scarcity through the printing press and through the "euthanasia of the rentier." Politics followed him because it was easier to sell the public the promise of "perpetual prosperity" than the austerity of capital discipline. But reality did not allow itself to be fooled: today we see the outcome – unsustainable sovereign debts, politically captured central banks, firms fed on cheap credit, and an entrepreneurial spirit increasingly suffocated.

Ignoring the classical canonical sequence production–capital–consumption transformed saving from a virtue into a guilt. A more attentive reading of Smith and

Say, a serious understanding of Cantillon's observations on the non-neutral "effects" of money, or Bastiat's lessons about what is unseen, would have led to the opposite of Keynesian solutions: demand need not be "created"; the framework must be preserved so that entrepreneurs can produce it. Instead, preference was given to the easy miracle of monetary injections – a return to old mercantilist illusions dressed in new clothes.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 203 of 213
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0009

THE ROLE OF DIVERSITY IN HRM: THEORETICAL PERSPECTIVES

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Abstract: *This paper examines how workforce diversity influences human resource management (HRM) practices, arguing that employee diversity has complex implications for how HRM manages them (how they are integrated and advanced). The study considers diversity considers diversity management as a strategic direction, and human resource management as an operational mechanism to implement it. The research has a theoretical and applicable purpose and is founded on an exhaustive review of the literature that has been recently published on the connection between diversity, human resource management and organizational performance. The results show that diversity generates dual advantages (creativity, innovation, adaptability) and uncertainty (conflicts, prejudices, communication difficulties), and its impact depends on the operationalization of inclusive human resource management practices. The article presents a conceptual framework in which diversity management shapes the vision of an organization, and HRM achieves it through inclusive recruitment, fair evaluation, diverse leadership and the advancement of an inclusive culture. HRM facilitates mediate the performance and diversity of an organization. Encouraging inclusion can redefine diversity into a competitive advantage. The study provides guidelines for future empirical research alongside managerial suggestions for implementing diversity integration strategies.*

Keywords: *organizational diversity; human resource management; inclusion; workforce integration; organizational culture.*

JEL Classification: *M12.*

1. INTRODUCTION

One of the most influential transformations of the contemporary organizational environment is the diversity of the workforce. The professional context in which workers engage in daily interaction, include people with different values, identities, values, and experiences, due to globalization, demographic changes, and accelerating digitalization. Following these changes, companies must rethink their management

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strategies to respond to the complexity created by employee diversity and to benefit from the strategic potential of diversity.

In the literature, diversity is defined as the existence of relevant differences among employees, regardless of gender, age ethnicity, culture, educational level, or professional experience. Among the most frequently analysed concepts in relation to organizational performance is workforce diversity (Rafaqat et al., 2022). Diversity can stimulate a company‘s inventiveness, innovation, adaptability, and ability to adapt to diverse markets (Chung, 2024). Diversity, at the same time, create an enabling environment in which all members of social groups are more equitable represented in organizations.

However, the literature also highlights issues related to diversity, such as communication difficulties, tensions between generations, intercultural conflicts and subtle exclusionary mechanism (Hossain, 2023). For example, studies show that age and cultural differences can lead to different perceptions of authority, roles or work styles, which has an impact on team cohesion and efficiency (Tazmimur et al., 2024). Thus, diversity is not an automatic phenomenon that leads to good results; rather, it is a phenomenon with ambivalent effects, conditioned by the way in which organizations manage it.

In this context, diversity management provides strategic direction by establishing objectives for inclusion, equity, and valuing differences, while human resource management serves as the instrument to achieve these goals. Inclusive policies, fair hiring procedures, cross-cultural training programs, fair evaluation systems, and retention strategies adapted to the needs of diverse employee categories (Kaur & Singh, 2025). Therefore, HRM not only manages diversity, but also how it relates to organizational effectiveness, influencing how disparities between employees are transformed into additional value.

Although the literature on diversity is substantial, there are still significant gaps in the understanding of how dimensions of diversity interact with human resource management practices. Many studies analysed only one aspect of diversity, such as gender or age, or examine the direct impact of diversity on performance without considering the role of HRM as an intermediary. This fragmentation justifies the need for an integrative conceptual analysis to elucidate the relationship between workforce diversity, HRM practices, and organizational outcomes.

The personal contribution aims to provide an integrative conceptual framework in which human resource management is positioned as a key mediating mechanism between organizational performance and workforce diversity. The study provides a coherent perspective on how organization can overcome the difficulties associated with

heterogeneity by using diversity to achieve long-term competitive advantage. This is achieved by synthesizing the most recent and important theoretical contributions.

2. LITERATURE REVIEW

2.1 Conceptualizing workforce diversity

Workforce diversity is a complex and multidimensional construct that represents differences among employees in terms of demographics, social, cultural, and professional backgrounds. The literature defines diversity as "the presence of relevant differences among members of an organization", which includes variables such a gender, ethnicity, age, culture, educational level, and professional experience (Rafaqat et al., 2022). This definition is reinforced by numerous recent studies, emphasizing that diversity is not limited to visible characteristics. It also includes cognitive differences, work style, values, or perceptions of organizational roles (Tazminur et al., 2024).

The literature regularly distinguishes two main categories of diversity for conceptual clarity:

- demographic diversity, associated with variables such as gender, age and ethnicity.
- functional diversity, reflected through educational level, professional experiences and acquired skills.

In human resource management, most research focus on five dimensions considered essential for understanding the effects of diversity on organizational dynamics:

Most research in the field of human resource management focuses on five key dimensions, considered essential for understanding the effects of diversity on organizational dynamics:

1. gender,
2. age,
3. ethnicity and cultural,
4. educational,
5. professional experience.

These dimensions are frequently analysed due to their empirical frequency, as well as their implications for performance, cohesion, and human resource management strategies. According to relevant studies, interactions, communication, trust, and perceptions of fairness among employees are affected by diversity (Chung, 2024).

Therefor, a careful conceptualization is the foundation for an adequate academic analysis of the effect of diversity on organizations.

2.2 Diversity and organizational performance

In the management literature, the relationship between diversity and organizational performance is one of the most debated topics. Empirical results are often different or contradictory. On the one hand, diversity improves performance by diversifying skills, creativity, and decision-making efficiency (Chung, 2024). Diverse teams generate more perspectives, find creative solutions, and adapt more effectively to different markets.

For example, Rafaqat et al. (2022) show that, when properly managed, diversity, particularly regarding gender, age, and ethnicity, reduces role stress, increases commitment, and stimulates innovation. Relevant studies confirm that age and cultural diversity improves social and cognitive capital (Tazminur et al., 2024).

However, the literature also shown negative or unclear effects, especially in cases where inclusive practices do not support diversity. Cultural differences can lead to tensions, misunderstandings and a lack of cooperation in the team, which affects team efficiency and morale (Hossain, 2023). Furthermore, stereotypes, prejudices or exclusionary mechanisms result in an adverse relationship between demographic diversity and performance (Kaur & Singh, 2025)

A recurring conclusion in the specialized literature is that diversity does not always lead to better results; this only happens in organizations that maintain efficient systems for managing differences. Based on this reasoning, it is justified to examine the mediating role of human resource management, which is a component through which diversity can be converted into a sustainable competitive advantage.

2.3 Challenges associated with diversity

Workforce diversity generates a series of problems that can affect harmony, job satisfaction and the efficiency of organizational processes. Among the most frequently mentioned obstacles are:

1. *Intercultural conflicts and communication differences*, studies show that cultural differences can lead to different interpretations, different communication styles and difficulties in organizing activities (Tazminur et al., 2024). Communication becomes even more problematic in teams where

employees have different native languages or have a divergent understanding of hierarchy and authority (Hossain, 2023).

2. *Prejudices, stereotypes and latent discrimination*, diversity makes implicit bias more likely to occur. This type of bias manifests itself through incorrect evaluations, symbolic exclusion or resistance to change (Kaur & Singh, 2025). Studies show that teams with large age gaps or organizations with very homogeneous cultures often have stereotypes.
3. *Difficulties in cohesion and integration*, differences in working styles can have an impact on team harmony and trust between members, especially in the early stages of collaboration (Rafaqat et al., 2022).
4. *Role ambiguity and organizational tensions*, diversity of professional experience can lead to misunderstandings about obligations, procedures or standards (Chugh, 2024).

These challenges justify the importance of a HRM focused on proactive, flexible and inclusive

2.4 HRM practices in managing diversity

In the recent literature, there is increasing attention to the role of HRM in mediating the effect of diversity on an organization. The practices that have been found effective include:

1. *Inclusive recruitment and selection*, by implementing procedures that decrease bias and promoting competency-based selection (Hossain, 2023).
2. *Intercultural training and inclusion skills training*, providing development programs for leaders and employees that help understand and accept cultural differences (Kaur & Singh, 2025).
3. *Fair evaluation and reward*, to prevent stereotypes and discrimination (Chugh, 2024).
4. *Inclusive leadership*, raising leaders who can handle diversity, facilitate communication, and decrease intercultural tensions.
5. *Building an inclusive organizational culture*, diversity can be converted into a strategic resource if it is seen as obstacle.

2.5 Gaps in the literature and the study's positioning

Despite the significant amount of research on diversity, the literature presents two major limitations:

1. *Fragmentation of studies*, many research analyse diversity on a single component (gender, age, ethnicity), ignoring the interdependence between the components. This aspect limits the understanding of the phenomenon as a whole.
2. *Lack of integrated models that include HRM mediation*, most studies examine the direct relationship "diversity → performance", without including human resource management as a strategic mechanism that modifies the effects of diversity.

Therefore, the present study is positions itself a conceptual work with an integrative purpose, providing a theoretical framework in which human resource management is an essential element in transforming diversity into a competitive advantage.

3. RESULTS AND DISCUSSIONS

The integrative literature review highlights that there is a complex and multifaceted relationship between workforce diversity, human resource management practices, and organizational performance. This section critically analyses the results of the literature review, synthesizes the conceptual mechanisms, and explains how human resource management mediates and influences diversity in contemporary organizational contexts.

3.1 The ambivalence of diversity effects: between opportunity and risk

The diversity generates both significant benefits and challenges, as the literature demonstrates. Studies highlight that diverse teams are able to adopt innovative solutions and organizational flexibility (Chugh, 2024) and adopt original solutions and adapt quickly to change (Rafaqat et al., 2022).

In contrast, diversity has the potential risks to increase the discord, communication difficulties and interpersonal tensions, especially when the organization does not have effective mechanisms for inclusion (Hossain, 2023). Studies show that negative effects are more visible in teams where there are strong differences in values, norms or work styles are strong and are not systematically managed (Tazminur et al., 2024).

This ambivalence supports the idea that diversity is a conditional phenomenon, whose outcomes depend on context, organizational culture, and managerial actions.

3.2 HRM as a mediating mechanism of the relationship between diversity and performance

The role of human resource management as a key mediator of diversity effects has been highlighted in the literature.

A key contribution of the literature is the increasing emphasis on the role of HRM as the main mediator of the effects of diversity. According to recent studies the impact of diversity on performance is not direct, but influenced by practices such as:

- inclusive recruitment and selection,
- cross-cultural training,
- diversity-oriented leadership,
- fair evaluation,
- retention policies tailored to diverse groups.

Kaur and Singh (2025) emphasize that creating an human resource management culture that promotes participation, discussion, and equal opportunities leads to better organizational outcomes.

Therefore, human resource management serves as an organizational filter, which decides whether diversity creates insatiably or provides a competitive advantage.

3.3 The strategic mechanism of inclusion

Literature review has shown that "inclusion capability" represents the vital strategic attribute that differentiates high-performing organizations from those that are susceptible to diversity. Organizations that embrace inclusion into:

- human resource management processes,
- organizational culture,
- communication systems,
- decision-making processes,

succeed in both enhancing the benefits and decreased the negative effects of diversity (Chugh, 2024).

Inclusion becomes an organizational competency that can be developed, measured, and optimized, just like other strategic skills.

3.4 Interaction between diversity dimensions

An issue that is frequently overlooked is that diversity dimensions do not operate independently. For example:

- how age and professional experience diversity influence team dynamics.
- cultural diversity is linked to ethnic diversity in perceptions of authority, roles.
- educational diversity may attenuate the effects of gender diversity on cognitive performance.

Most research investigate a single type of diversity in isolation, which means that the current literature does not sufficiently explore this complex relationship (Rafaqat et al., 2022).

3.5 Proposing an integrative conceptual framework

Based on the literature analysed, the paper argues a conceptual framework which includes:

1. *Diversity* → creates tension and resources
2. *HRM* → is a mediating process and has a integrative role
3. *Inclusion* → is the main factor determining how HRM turn diversity intro performance
4. *Organizational performance* → is the result of the process of aligning strategic objectives.

This conceptual model provides a coherent perspective on the phenomenon, responding to the demands of the specialized literature for an integrative theory that clarifies how diversity become a long-term strategic advantage.

3.6 Managerial implications

Starting with a theoretical discussion, organizations should embrace the following strategic directions:

- creating cross-cultural training programs.
- adopting impartial recruitment, evaluation and promotion procedures.
- developing feedback mechanisms and intercultural discussions.
- improving diversity-oriented leadership.

Thus, organization can use diversity as a strategic asset to reduce risks.

4. CONCLUSIONS

Social, demographic and technological transformations of the last decades have generated workforce diversity, a structural phenomenon of modern organizations. Diversity is a dynamic process whose effects are conditioned by how organization manage it. This is underlined through the analysis of the specialized literature. Personal performance, team cohesion and organizational results are influenced by the main diversity components, such as age, ethnicity and culture, educational level and professional experience.

Diversity can boost innovation and adaptability of organizations, generating significant competitive advantages, according to the literature (Chugh, 2024; Rafaqat et al., 2022). However, diversity can cause cultural misunderstandings, poor communications and organizational fragmentations in the absence of inclusion mechanisms and human resource management systems (Hossain, 2023; Tazminur et al., 2024). It is apparent from this duality that diversity cannot be treated superficially or as a one-off initiative, but instead is required a systemic, strategic and continuous approach.

The central conclusion of this research is that diversity management defines the strategic direction, and human resource management is the operational mechanism that implements this vision. Human resource management translates the strategic purpose of diversity into concrete organizational practice through specific policies, processes, and tools, such as equitable assessment, inclusive hiring, diversity-oriented leadership, and cross-cultural development programs. Therefore, a company‘s capacity to transform diversity into a competitive advantage hinge on how mature its human resource management systems are.

This paper provides an integrative conceptual framework through which inclusion is the main factor via which human resource management convert diversity intro performance. This framework provides a nuanced understanding of the phenomenon and helps to develop interdisciplinary discussions within the field of human resource management, organizational psychology, and sociology of work.

4.1 Contributions and implications

- Consolidate the conceptual basis for the future analyses by clarifying the five main factors of diversity.
- Proposes a holistic perspective on the role of human resource management as a tool for achieving diversity management objectives.
- Argues that evolving organizational capacity for inclusion is a necessary strategic resource.

- Provides well-defined managerial guidelines for implementing effective diversity and inclusion policies.

4.2 Limitations and directions for future research

The analysis does not contain any empirical contribution of its own, as it is a theoretical and exploratory research. The interaction between the components of diversity, the effectiveness of human resource management, or comparative evaluation of human resource management in organization form different sectors

Ultimately, the success of organizations in a diverse environment depends on their ability to integrate personal distinctions into a common vision, by implementing contemporary human resource management that focuses on inclusion, continuous learning, and equity.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 215 of 237
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0010

THE CURRENT LANDSCAPE OF DIGITAL TRANSFORMATION IN ADMINISTRATIVE PROCESSES OF HIGHER EDUCATION: A SYSTEMATIC LITERATURE REVIEW

LARISA-ELENA STÂNGACIU[i]

Abstract: *The digital transformation of Higher Education Institutions (HEIs) is frequently equated with the adoption of educational technology for teaching and learning. This narrow focus has resulted in a significant research lacuna regarding the administrative and operational ecosystems that sustain university functions. This systematic review aims to rectify this imbalance by analysing the technological landscape, strategic governance, and efficiency impacts of digitizing administrative workflows.*

Adhering to PRISMA guidelines, a systematic review was conducted on 60 peer-reviewed studies published between 2019 and 2025, sourced from Scopus, Web of Science, IEEE Xplore, and Springer. The study utilized a mixed-methods design: a descriptive bibliometric analysis was performed to ensure metadata compatibility, while a qualitative thematic synthesis was applied to map the trajectory of administrative modernization.

Bibliometric data confirms a structural disparity, where research on virtual teaching vastly overshadows inquiries into administrative processes. Thematic analysis reveals that administrative efficiency is currently being reshaped by Robotic Process Automation (RPA) and Artificial Intelligence (AI). However, the success of these interventions depends less on hardware than on organizational culture and strategic governance.

Keywords: *higher education institutions; digitalization; digital transformation; administrative processes*

JEL Classification: *I23, O33, O32, L86, M15*

1. INTRODUCTION

Higher education institutions (HEIs) worldwide are undergoing digital transformation in response to rapid technological advances and changing stakeholder

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expectations. This transformation extends beyond teaching and learning to encompass the administrative processes that underpin university operations. Digital adoption in administrative processes refers to the integration and effective use of digital technologies to carry out universities' management and organizational tasks. In the wake of the Fourth Industrial Revolution and the COVID-19 pandemic, HEIs faced intense pressure to modernize bureaucratic workflows and move towards fully digital, paperless administrative systems (Kayanja et al., 2025). However, current academic discourse frequently conflates the digitalization of the institution with the digitalization of the classroom.

Recent bibliometric analyses confirm this systemic imbalance. Research by Hariyanti et al. (2025) reveals that the field is dominated by instructional leadership and professional development, often sidelining managerial efficiency. Similarly, Vargas-Hernández et al. (2024) demonstrate that scientific production is heavily skewed toward virtual teaching and online learning methodologies, leaving the administrative structures that support these activities underexamined. Even studies that address organizational challenges, such as Singun (2025) often bundle administrative barriers, like leadership and culture, within broader pedagogical concerns, failing to isolate the specific operational bottlenecks of the university.

This pedagogical bias has created a blind spot regarding administrative workflows. As noted by Tsupari et al. (2024), when universities implement digital tools at the task level (e.g., individual teaching apps) without addressing the process level (e.g., integrated management systems), it often leads to sub-optimization, fragmented data, and increased administrative burdens for staff.

To address this, recent scholarships have begun to redefine academic management through the lens of business process efficiency and resilience. Ülker & Otrar (2025) found that university staff prioritize knowledge management and continuous improvement systems over mere digitalization, suggesting that the cultural and administrative capacity to manage data is a prerequisite for successful transformation.

Furthermore, the scope of administrative transformation is expanding to include infrastructure resilience and financial control. Tarasenko et al. (2025) highlight the emergence of the cloud university where administrative operations are virtualized via digital twins to ensure institutional continuity during crises. This aligns with broader public sector trends identified by Laamanen et al. (2024), who note that while the digitization of public financial management has enhanced transparency and fiscal control, its specific application within the complex governance of HEIs requires further exploration.

Therefore, this review moves beyond the classroom to examine the digital transformation of HEI administration. It aims to identify how universities are leveraging technologies like Robotic Process Automation (RPA), Cloud Computing, and Artificial Intelligence (AI) to enhance operational resilience and efficiency.

To address these gaps and provide a comprehensive overview of the state of the art, this review is guided by the following research questions:

RQ1: What characterizes the current landscape of digital transformation of HEI administrative processes?

RQ2: Which factors influence the successful digital transformation within university administration?

RQ3: How does the digital transformation of administrative workflows impact institutional efficiency and resilience, and what are the implications for staff and student satisfaction?

2. REVIEW METHODOLOGY

A systematic literature review was conducted to examine pertinent research, strictly following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The search targeted articles published between 2019 and 2025, a timeframe selected to capture the most current and relevant research.

The selection process yielded a total of 60 pertinent studies which were included in the qualitative thematic synthesis and bibliometric analysis.

2.1 Search Strategy

The literature search was conducted across four databases: Scopus, Web of Science, Springer and IEEE Xplore. These platforms were selected for their extensive and dependable collections of articles. The search methodology utilized string construction and Boolean operators to combine variables, focusing on accessible, peer-reviewed articles (Table 1).

Table 1. *Search strings*

Database	Search string	Results
Scopus	TITLE-ABS-KEY (“higher education" OR "higher education institutions" OR universit* OR HEI) AND TITLE-ABS-KEY ("digital transformation" OR digitalization OR digitalisation OR "digital strategy" OR "digital maturity") AND TITLE-ABS-KEY (	186

Database	Search string	Results
	"administrative processes" OR "administrative services" OR "management processes" OR "organizational processes" OR "university management" OR "institutional processes")	
Web of Science	TS=("higher education" OR "higher education institutions" OR universit* OR HEI) AND TS=("digital transformation" OR digitalization OR digitalisation OR "digital strategy" OR "digital maturity") AND TS=("administrative processes" OR "administrative services" OR "management processes" OR "organizational processes" OR "university management" OR "institutional processes")	75
IEEE Xplore	("All Metadata":"higher education" OR "All Metadata":"higher education institutions" OR "All Metadata":universit* OR "All Metadata":HEI) AND ("All Metadata":"digital transformation" OR "All Metadata":digitalization OR "All Metadata":digitalisation OR "All Metadata":"digital strategy" OR "All Metadata":"digital maturity") AND ("All Metadata":"administrative processes" OR "All Metadata":"administrative services" OR "All Metadata":"management processes" OR "All Metadata":"organizational processes" OR "All Metadata":"university management" OR "All Metadata":"institutional processes")	150
Springer Nature Link	("higher education" OR "higher education institutions" OR universit* OR HEI) AND ("digital transformation" OR digitalization OR digitalisation OR "digital strategy" OR "digital maturity") AND ("administrative processes" OR "administrative services" OR "management processes" OR "organizational processes" OR "university management" OR "institutional processes")	526

Source: Own elaboration based on database search results

2.2 Search Results

The screening process was managed using Rayyan (Rayyan: AI-Powered Systematic Review Management Platform, 2025), a web-based systematic review tool, to organize references and record decisions. (Figure 1) illustrates the selection process.

In total, 937 records were identified through the database searches. We first removed 511 records as irrelevant based on title/abstract or failing criteria (many of these were on unrelated topics or non-scholarly sources). We imported the remaining 426 records into Rayyan for detailed screening. After removing 35 duplicate entries, 391 unique records proceeded to screening titles and abstracts.

Each record was evaluated independently against the inclusion criteria (Table 2); this stage led to 283 records being excluded.

Table 2. *Inclusion, exclusion and quality criteria*

Inclusion criteria	Exclusion Criteria	Quality Criteria
Published between 2019-2025	Wrong context	Is the article's objective, method, and conclusion consistent and clearly presented?
Primary focus on HEI administration	Lack of focus on HEI administration	Is the research methodology (e.g., qualitative, quantitative) clearly stated?
Full-text available	Articles that are only available as abstracts or presentations.	Does the article fully meet all inclusion criteria?
Journal articles, conference papers	Non-peer-reviewed sources	

Source: Own elaboration

We obtained the full texts of the 108 most relevant and promising articles for in-depth review. Unfortunately, we could not access full text for 17 of these (despite library and online searches), so those had to be omitted. This left 91 sources which were read fully. From these, a further 20 sources were excluded upon full-text reading: common reasons included discovering that the study did not actually address university administrative processes in any depth, or it lacked substantive results (e.g., a proposal without evaluation), and 11 of them did not meet the required structure for the bibliometric analysis. Finally, 60 publications met all criteria and were included in the systematic review.

The articles identified after the screening process were systematically organized using Zotero (Zotero, 2025), a free reference management tool. This software facilitated citation management and organizing the studies.

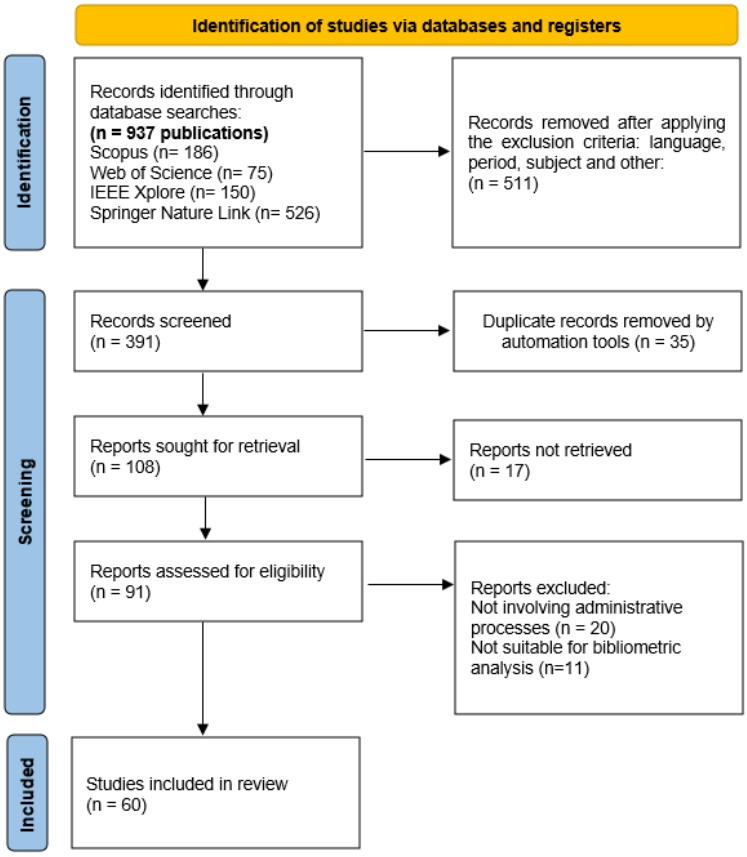


Figure 1. *PRISMA 2020 flow diagram*

2.3 Synthesis method

The analysis involved a multi-stage process. First, articles were read and managed in Zotero. Then, for each of the 60 included studies, we extracted a standard set of data to facilitate analysis. A spreadsheet was used to tabulate bibliographic details (title, authors, year, publication venue) and key information (findings, conclusions, limitations, research gaps). We also recorded key findings relevant to our research questions, for example, any reported outcomes of digital adoption (efficiency gains, user feedback, etc.), any challenges or barriers noted, and any frameworks or models referenced. We noted recurring keywords such as "digitalization", "automation", "smart university", "digital maturity", "efficiency", "stakeholders", "strategy", "barriers", and "staff skills". These keywords guided a thematic coding process.

To conduct further quantitative and visual analysis the "Chronotome" bibliometric script from a Kaggle notebook was adapted (Popescu-Apreutesei & Iosupescu, 2025). This script was used to process the extracted data and generate visualizations such as word cloud unigrams, bigrams, trigrams and annual scientific production.

Using thematic analysis, the studies were grouped into thematic categories based on their primary focus and findings. Finally, we found about nine major themes that kept appearing (Table 3).

3. RESULTS

3.1 Descriptive analysis

To understand the broader landscape of research on the digitalization of administrative processes in higher education institutions (HEIs), we conducted a comprehensive bibliometric analysis. This analytical approach allowed us to systematically map the intellectual structure of the field and identify key research themes.

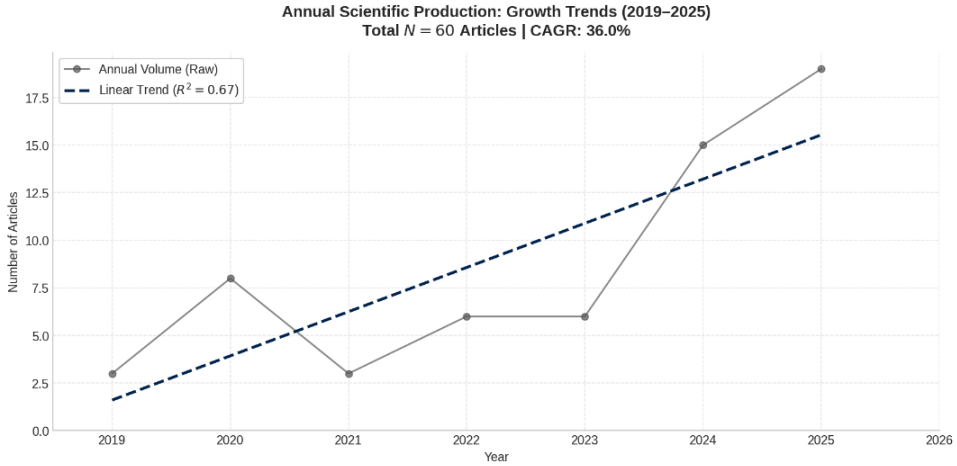


Figure 2. *Annual Scientific Production*

As shown in (Figure 2), a noticeable shift occurred in 2019 and 2020, where production of articles rose considerably. This spike likely correlates with the onset of the global COVID-19 pandemic, which acted as a catalyst, forcing institutions to rapidly adapt to digital solutions.

Although there was a brief dip in 2021, the trend has followed a sharp upward trajectory since 2022, reaching its peak in 2025 with nearly 20 articles. This exponential growth in the last three years suggests that the topic has moved beyond the emergency

remote teaching and has become a sustained, relevant priority for Higher Education Institutions globally. The continued rise indicates that digital transformation is no longer a temporary measure but a central strategic focus for the future of education.

We identified the core terminology and the emerging concepts involving this research field by analyzing the frequency of author keywords unigram, bigram, and trigram analysis.

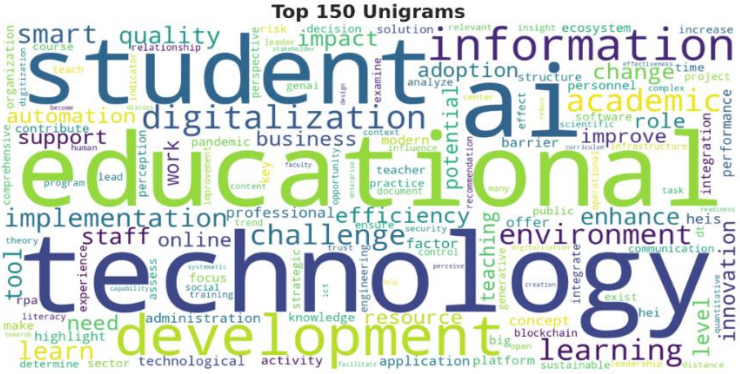


Figure 3. *Top 150 Unigrams*

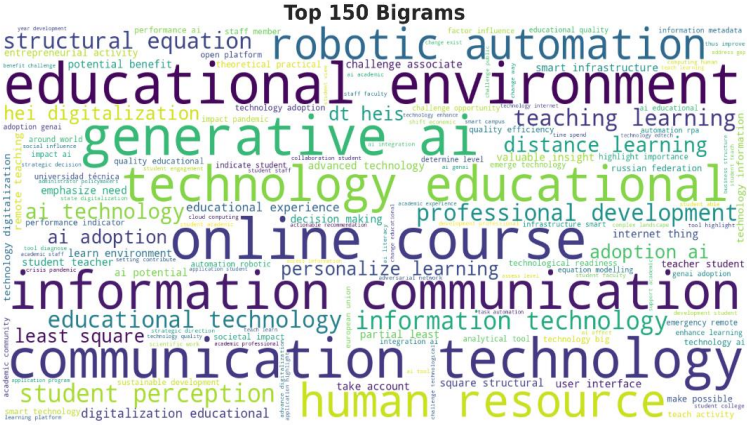


Figure 4. *Top 150 Bigrams*

The unigram word cloud (Figure 3) highlights that the field is still predominantly student centric. While words like “student”, “educational” and “technology” are ubiquitous, specific keywords related to institutional operations like “staff”, “efficiency”, “integration” appear far less frequently or are notably smaller in the visual hierarchy. It suggests that the discourse is still fixated on the tools for education instead of the processes of the institution.

The bigram analysis (Figure 4) offers a slightly more nuanced view but still confirms the lack of administrative dominance. We observe the emergence of specific operational terms such as “robotic automation” and “human resource”, however they are visually dwarfed by the overwhelming prevalence of teaching-focused bigrams, such as “online course”, “educational environment” and “generative ai”.

3.2 Thematic synthesis

This section presents a qualitative thematic analysis. Through a detailed synthesis of the included studies, we identified nine core themes that categorize, among others, the primary barriers, innovations and organizational challenges that shape the digital transformation in HEIs. As shown in Table 3, the key dimensions identified from the collection of articles include digitalization, staff and student management and change, AI adoption, automation and smart technologies.

Table 3. *Studies and their topics*

Topic Number	Theme	Primary Keyword Focus	Studies
1	Smart Learning Ecosystems	smart, technology, educational, ecosystem, development, distance, digitalization, business, learning, big, information, organization, activity, learn, iot	ElRashidy & ElSabry (2024); Heidari et al. (2024); Marchant-Pérez & Ferreira (2024); Pham et al. (2020); Rozhkova et al. (2020); Shindina et al. (2022); Stoykov et al. (2024)
2	Digital Administration Practice	educational, information, practice, administration, technology, digitalization, document, community, academic, development, knowledge, improvement, student, towards	Alexander & Manolchev (2020); Coronel & Salazar (2024); Laufer et al. (2025); Reis et al. (2022); Safiullin & Akhmetshin (2019)
3	Staff and Student Change	student, educational, challenge, ai, pandemic, change, professional, staff, impact, relationship, public, solution, technology, development, digitalization	Bazyl et al. (2025); Brink et al. (2020); Feuerlicht et al. (2021); Geryk (2023); Irjala (2024); Marcinkevage & Kumar (2025); Sanchez (2020); Stefanova (2022); Wang et al. (2025); Yang (2024)

Topic Number	Theme	Primary Keyword Focus	Studies
4	Strategic Governance of Digital Learning Systems	technology, educational, digitalization, information, ai, environment, learn, development, learning, online, innovation, implementation, course, concept, hei	George & Wooden (2023); Kucina Softic et al. (2022); Langseth et al. (2023); Laufer, Deacon, et al. (2025); Mora & Morales (2024); Moroz et al. (2025); Palamarchuk et al. (2022); Rasa (2025); Sebihi et al. (2025); Setyadi et al. (2025); Stoyanova & Anguelov (2024); Teslia et al. (2020)
5	AI and Digital Performance	ai, technology, information, software, performance, sustainable, communication, product, capability, automation, quantitative, level, professional, work, improve	Kelder et al. (2025); Martyakova et al. (2019); Ronaghi & Ronaghi (2025)
6	Resource Digitization	heis, document, area, digitization, resource, longitudinal, perspective, enable, offer, engineering, relevant, contribute, social, campus, environmental	Chernogorova & Dimova (2019); Cruz-Cárdenas et al. (2022); Hogea et al. (2021); Spörk et al. (2024)
7	Operational Automation	technology, rpa, automation, academic, efficiency, digitalization, blockchain, personnel, operational, quality, integration, enterprise, center, robotic, potential	Beloev et al. (2023); Gunawan & Wijaya (2023); Kozak & Klement (2025); Lukita et al. (2023); Maitreyawira et al. (2024); Petrova & Lashmanova (2020); Smagul & Daineko (2024)
8	GenAI Adoption Governance	challenge, adoption, ai, generative, genai, platform, level, academic, impact, decision, governance, dt, tool, language, open	Bravo-Jaico et al. (2025); Hughes et al. (2025); Xu (2025)
9	User Adoption Challenges	ai, student, barrier, educational, technology, tool, perception, heis, development, academic, need, professional, dt, stream, ict	N. Alexander et al. (2021); Brink et al. (2024); González-Pérez et al. (2025); Grosseck et al. (2020); Mat Yusoff et al. (2025); Murdan et al. (2024); Santos-Jaén et al. (2025); Singun (2025); Stana et al. (2024)

3.2.1 Smart Learning Ecosystems

Studies from this theme feature a shift where HEIs are no longer viewed as static providers of content, but as dynamic, interconnected environments driven by data and

intelligent technologies. The backbone of these ecosystems relies on advanced infrastructure. Pham et al. (2020) propose a systematic "Smart university" model rooted in five domains, including IoT ecosystems and smart infrastructure, to function as living laboratories for digital transformation. This structure is supported by ElRashidy & ElSabry (2024), who emphasize the importance of data intelligence in decision-making, advocating for the use of technologies, like cloud computing, for improving educational outcomes.

Moving beyond technological architecture, studies highlight a transition in innovation ecosystems from triple- to quadruple-helix models, arguing that collaboration is now as critical as competition for social impact (Marchant-Pérez & Ferreira, 2024). Findings also indicate that actor engagement and effective communication across different levels of the ecosystem are critical determinants of well-being, supporting the idea that collaboration is essential for improving IT service outcomes (Heidari et al., 2024).

Other studies identified the need for digital maturity profiles. A model for digital maturity is proposed and findings emphasize the importance of digitalization in various aspects of university operations, including teaching methods, student experience, and administrative functions (Shindina et al., 2022). However, the transition is not without hurdles; Rozhkova et al. (2020) note that digitalization levels vary significantly due to a lack of unified standards and qualified personnel, while Stoykov et al. (2024) suggest that focusing on Artificial Intelligence to automate administrative functions could be an important step towards transforming academic roles and improving access to academic resources.

3.2.2 Digital Administration Practice

A significant body of literature addresses the critical modernization of university administration. This theme emphasizes the shift from legacy systems to agile, data-driven management frameworks. Safiullin & Akhmetshin (2019) argue that developing a tailored digitalization strategy is essential for competitiveness, noting a decisive shift from traditional paper materials to online resources that optimize specialist training and knowledge assimilation.

Effective administration requires more than just new tools, some studies indicate. Coronel & Trigos Salazar (2024) propose a digital framework to bridge the gap between theory and practice, advocating for a robust educational data model to overcome the limitations of current accreditation and management methods. Another study points out that the human element is imperative in digital transformation. "Communities of practice" facilitate the dialogue necessary for process improvement, leading to higher

satisfaction with institutional information and better decision-making (Reis et al., 2022, p. 4). Similarly, Laufer et al. (2025a) identify organizational practices: accumulating, engaging and reassembling as essential for navigating crises, emphasizing that staff play a pivotal role in reimagining work processes despite potential emotional resistance. Finally, Alexander & Manolchev (2020) suggest that future universities may evolve into knowledge spaces, where entrepreneurial academics drive innovation to address external commercial pressures and precarious employment models.

3.2.3 Staff and Student Change

Digital transformation is reshaping the roles and experiences of the university's core stakeholders: staff and students. Stefanova (2022) notes that the COVID-19 pandemic acted as a catalyst, forcing rapid adaptations such as 24-hour support systems and digital signatures, tough another study warns that without appointed digital leaders, these transformations often fail to integrate into organizational strategy (Sanchez, 2020).

For staff, the landscape is evolving toward higher complexity. Irjala (2024) identifies the emergence of highly skilled professionals in Finnish universities, a new category of staff with specialized knowledge and managerial titles, while Wang et al. (2025) point out the urgent need to improve digital literacy among administrators to effectively leverage big data.

The impact on students is equally profound. Studies report that students' satisfaction can be improved. Yang (2024) affirmed that digital management models can increase student satisfaction by 25% and reduce administrative time by 30%, while Bazyl et al. (2025) found that AI integration improves administrative efficiency by 40% and can reduce student expulsion by 15% through proactive monitoring. Marcinkevage & Kumar (2025) propose that mastering Generative AI for a CRM offers a new frontier for engagement.

In contrast, a study highlights that while students associate digitalization with modernity, they remain insecure about data transparency and the lack of a clear digital vision (Brink et al., 2020). Another study (Feuerlicht et al., 2021) argues that the long-term success of these changes depend on management entrepreneurship, suggesting that agile, smaller universities may adapt faster than larger, inertial institutions.

3.2.4 Strategic Governance of Digital Learning Systems

The implementation of online learning systems moves beyond simple adoption to rigorous strategic planning. Palamarchuk et al. (2022) argue for the mathematical justification of IT strategy scenarios, using expert evaluations to ensure alignment with

expected results. To operationalize this, Teslia et al. (2020) advocate for a systems engineering approach, proposing the creation of a digital transformation office to manage the unified digital space and electronic document flows. Artificial Intelligence plays a central role in this strategic transformation, George & Wooden (2023) suggest AI can revolutionize administrative functions and personalize learning trajectories, a potential echoed by Sebihi et al. (2025) though they caution against risks like algorithmic bias.

Practical examples of implementation success include Mora & Morales (2024), whose system centralized data management and automated routine marketing processes. Nevertheless, again, successful implementation is fundamentally human-centric. Laufer et al. (2025b) emphasize that organizational trust and shared decision-making are prerequisites for innovation, while Langseth et al. (2023) highlight the role of institutional entrepreneurs in support units who build capacity from the bottom up. This requires managing complexity, Rasa (2025, p. 387) notes the challenge of "post digital dissensus", where diverse technology stances must be navigated, and Setyadi et al. (2025) find that effective risk management strengthens the relationship between digital literacy and innovation performance.

Ultimately, quality assurance is vital, Moroz et al. (2025) report high satisfaction with IT provision using ACSI methodology, while Stoyanova & Anguelov (2024) argue that students must be the primary evaluators of digitalization effectiveness, and Kucina Softic et al. (2022) stress that post-pandemic strategies must shift focus from mere technology use to pedagogical application.

3.2.5 AI and Digital Performance

Findings emphasize the necessity of adopting advanced software products to automate traditional functions, specifically highlighting subsystems like Student Management and Student Performance as vital for aligning management practices with the digital economy (Martyakova et al., 2019). Moving towards specific technologies, Ronaghi & Ronaghi (2025) found that the adoption of Artificial Intelligence significantly improves the sustainable performance of universities, particularly in the environmental domain, where the advantages of AI tools were found to outweigh the disadvantages. Kelder et al. (2025, pp. 17755-17756) demonstrated that "authentic leader behaviors" provide a stronger pathway to enhancing digital productivity and capability than other factors. Leadership development is necessary for motivating academics to engage with digital technologies.

3.2.6 Resource Digitization

Operational efficiency provided the need for digitization of institutional resources. Cruz-Cárdenas et al. (2022) identify a significant surge in research on this topic driven by the COVID-19 pandemic, noting a thematic shift from economic concerns to enabling technologies, though they warn that established organizational cultures often slow the pace of transformation. Practical applications of this digitization focus heavily on eliminating bureaucratic friction, as Hogea et al. (2021) demonstrate by finding that digital alternatives reduced the time to obtain orders to just 2-4 hours and eliminated the need for 10-13 physical signatures per document. Similarly, a study advocate for repurposing existing platforms like Moodle to handle administrative e-services (Chernogorova & Dimova, 2019). However, Spörk et al. (2024) frame the pandemic as a repeated disaster, revealing that while initial digital responses were coherent, the lasting effects of short-term solutions have led to fragmented perspectives among stakeholders.

3.2.7 Operational Automation

Robotic process automation is emerging as a powerful tool to dismantle the bureaucratic inefficiencies plaguing higher education. Kozak & Klement (2025) reveal that 84,9% of Czech academics report increasing administrative demands that detract from teaching and research. Gunawan & Wijaya (2023) found that implementing RPA for attendance reporting reduced task time by 99,9% and costs by 43% over five years. Similarly, Smagul & Daineko (2024) demonstrated that applying RPA in a university medical center reduced task completion time by 66,67% and cut costs by 60%. Another study highlights the role of Chatbots in operational efficiency, noting that perceived usefulness is one of the key drivers for adoption among students.

At the systemic level, Petrova & Lashmanova (2020) argue that the digital maturity of personnel subsystems is critical, suggesting that automated data collection enhances recruitment quality and strategic integration. More advanced integrations include Lukita et al. (2023), who propose using Blockchain to create decentralized, immutable academic repositories that resist tampering and single points of failure. Finally, Beloev et al. (2023) emphasize that realizing this potential requires standardized digital literacy frameworks and collaboration between academia, industry, and government to ensure effective technology integration.

3.2.8 GenAI Adoption Governance

Effective digital governance must now address both competitive market pressures and specific technological risks. Xu (2025, pp. 9-10) argues that open data

platforms have transformed universities into "calculable entities", shifting governance toward self-surveillance and market-driven discipline. However, the rise of Generative AI complicates this landscape; literature highlights that GenAI disrupts existing policies, introducing unstable and interconnected risks regarding academic integrity, data security, and the spread of false information (Hughes et al., 2025). To manage these challenges, Bravo-Jaico et al. (2025, p. 2) advocate for a structured "digital maturity" model to bridge current gaps in automation and staff competency, emphasizing that institutions must move from partial digitization to a strategic, fully integrated governance framework.

3.2.9 User Adoption Challenges

The final theme addresses the human dimension of digital transformation, specifically focusing on student perceptions and the systemic barriers to Artificial Intelligence (AI) adoption. N. Alexander et al. (2021) frame the university as a complex system where people and user interfaces are as critical as data and processes, emphasizing that strategic management must be grounded in Big Data to navigate this transition. However, successful integration relies on valid assessment; González-Pérez et al. (2025, pp. 27-28) validated the "DT-Smarty" model to measure digital readiness, identifying "Continuity and security plans" as a critical dimension often overlooked in educational innovation.

From the student perspective, Santos-Jaén et al. (2025) reveal a psychological barrier: while prior knowledge of AI increases confidence, excessive fear of perceived risks can lead to mental blocks that reduce participation in educational programs. Mat Yusoff et al. (2025) found that student satisfaction and perceived utility have a stronger impact on AI adoption than content quality or credibility, suggesting students prioritize user-friendly functionality over theoretical rigor. Despite these opportunities, structural barriers remain. Murdan et al. (2024) identify the digital divide, privacy concerns, and the urgent need to upskill educators as primary obstacles to AI excellence. Similarly, Stana et al. (2024) highlight that institutions often fail to leverage ICT tools effectively, creating gaps in teaching and administration. Brink et al. (2024) critique the broader research landscape, noting that while many studies identify these barriers, there is a lack of systematic approaches to actually overcome them, necessitating a shift toward solution-oriented research.

4. DISCUSSIONS

The findings reveal a landscape that is rapidly evolving from basic digitization to complex, intelligent ecosystems. While prior bibliometric analyses (Hariyanti et al., 2025; Vargas-Hernández et al., 2024) identified virtual teaching as the dominant theme, our results demonstrate that administrative transformation is driven by a distinct set of technologies, primarily RPA, AI, and Cloud Computing.

The emergence of RPA as a key theme (Theme 7) is particularly significant. Studies by Gunawan & Wijaya (2023) and Smagul & Daineko (2024) provide concrete evidence that automating routine tasks, such as attendance reporting and medical record management, can yield efficiency gains of up to 99.9%. This directly challenges the task-level digitization criticized by Tsupari et al. (2024), showing that when universities automate end-to-end workflows rather than isolated tasks, the administrative burden on staff is measurably reduced. Furthermore, the shift toward Smart Learning Ecosystems (Theme 1) and Resource Digitization (Theme 6) indicates that leading institutions are moving beyond the paperless office to create Digital Twins of their operations, as advocated by Tarasenko et al. (2025). This transition from static management to dynamic, data-driven governance represents a fundamental maturation of the administrative function.

Consistent with Ülker & Otrar (2025), who found that staff prioritize knowledge management over mere digitalization, our thematic synthesis confirms that successful transformation is less about technology than about Strategic Governance (Theme 4) and GenAI Adoption Governance (Theme 8). The review identifies a clear tension between the technological imperative to adopt new tools and the cultural readiness required to use them effectively.

The findings highlight that Digital Administration Practice (Theme 2) requires a shift in organizational culture, moving from hierarchical bureaucracies to agile communities of practice (Reis et al., 2022). However, our review also uncovers significant friction. The theme of User Adoption Challenges (Theme 9) reveals that while students and staff acknowledge the utility of digital tools, they are hindered by a lack of digital literacy and clear governance frameworks (Brink et al., 2024; Wang et al., 2025). This validates Singun's (2025) observation of cultural barriers but refines it by pinpointing specific administrative bottlenecks, such as data transparency and algorithmic bias, that require targeted policy interventions rather than generic change management.

The review provides robust evidence that administrative digital transformation significantly enhances institutional resilience and stakeholder satisfaction. In contrast to the pedagogical literature which often focuses on learning outcomes, the

administrative literature quantifies success through operational metrics. Yang (2024) and Bazyl et al. (2025) report that AI-driven management systems can increase student satisfaction by 25% and reduce administrative time by 30%. This suggests that the invisible work of administration, when optimized, has a direct and positive impact on the student experience.

Moreover, the theme of AI and Digital Performance (Theme 5) demonstrates that digital maturity is a predictor of sustainable performance (Ronaghi & Ronaghi, 2025). By leveraging cloud infrastructure and AI, universities are not only becoming more efficient but also more resilient to crises. The concept of the "cloud university" (Tarasenko et al., 2025, p. 2) represents the pinnacle of this resilience, where administrative continuity is guaranteed through virtualization. This finding is relevant for policymakers, as it reframes digital investment not as a cost, but as a strategic asset for institutional survival in an increasingly volatile global context.

Ultimately, this review bridges the gap identified by Tsupari et al. (2024) by demonstrating that the blind spot of administrative processes is being filled by a growing body of research focused on Operational Automation and Strategic Governance. While the volume of this research still pales in comparison to pedagogical studies (as shown in our bibliometric results), the impact of these administrative innovations is profound. By shifting the focus from the classroom to the back-end operations, this review highlights that the true digital university is one where administrative excellence enables academic success, rather than competing with it for resources.

5. CONCLUSIONS

This systematic literature review has addressed the imbalance in the academic discourse surrounding the digital transformation of higher education. While prevailing research has extensively documented the digitization of teaching and learning, the transformation of administrative processes has remained a significant structural lacuna. By synthesizing evidence from 61 studies published between 2019 and 2025, this review demonstrates that the digital university is not merely an aggregation of virtual classrooms, but a complex, data-driven ecosystem where administrative excellence is a prerequisite for academic success.

The findings confirm that the landscape of administrative transformation is rapidly evolving from static digitization to dynamic automation. Technologies such as Robotic Process Automation (RPA) and Artificial Intelligence (AI) are no longer theoretical possibilities but practical necessities, capable of delivering considerable efficiency gains. This shift from task-level tools to process-level integration challenges

the traditional view of administration as a support function, repositioning it as a strategic asset for institutional resilience.

However, the review also highlights that technology alone is insufficient. The successful adoption of digital administrative systems is contingent upon strategic governance and cultural readiness. University staff prioritize knowledge management and robust quality assurance systems over mere technological novelty, signaling that the human element, digital literacy, leadership, and trust remain the primary determinant of success. Furthermore, the emergence of the cloud university model underscores the necessity of resilient infrastructure to ensure continuity in an increasingly volatile global environment.

Future scholarship should move beyond the barriers to adoption narrative to explore the long-term impacts of administrative automation on university governance models. Specifically, further research is needed to quantify the return on investment of RPA and AI in non-academic departments and to develop ethical frameworks for the use of generative AI in university administration. By closing the gap between pedagogical innovation and operational efficiency, the higher education sector can build institutions that are not only digital by design but resilient by nature.

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REBS Review of Economic & Business Studies

Volume 18, Issue 2/Dec. 2025, pp. 239 of 255
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0011

IT'S ALL ABOUT MANAGEMENT MANAGING INTERNAL COMMUNICATION PROCESSES

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Abstract: *Internal communication has become a growing discipline in modern organizations due to its significant impact on employees' performance. Today, internal communication integrates various processes, such as corporate communication, communication led by line managers, digital channels, and interpersonal communication. However, this diversity can lead to information overload and a loss of focus, as well as a challenge in internal communication management. This article presents the findings of a qualitative study that constitutes the first stage of a PhD-level research entitled: "The Relationship between Internal Communication Led by Line Managers and the Strength of Employees' Engagement in Companies". This study examines the internal communication processes based on data collected through interviews with 7 managers and 7 employees. The study has identified three core themes within internal communication processes:* ***managerial communication skills, managing corporate communication,*** *and* ***managing types of channels and methods****. Each theme illustrates a combination of key categories, i.e., sharing, listening, and the use of digital channels. Among these, managerial communication skills have emerged as the most critical process for internal communication delivery. This article not only reinforces existing literature but also highlights the pivotal role of line managers' managerial communication skills in the delivery of internal communication. Notably, this is evident even among employees whose line managers do not actively engage in communication with them.*

Keywords*: internal communication; internal communication management, communication led by managers, corporate communication, communication channels, managerial communication skills.*

JEL Classification: M

1. INTRODUCTION

Internal communication is considered one of the growing fields related to the transmission of messages within organizations (Tkalac Verčič et al., 2012). In recent decades, newly-founded global research organizations dealt with the issue, among them International Association for Public Relations (IPRA), founded in

2000 in the United Kingdom; and The Global Communication Research Network (GCRN), founded in 2015.

Another example of the increasing scope of internal communication is reflected in the volume of articles about this field. A review conducted in 2020 (Lee & Yue, 2020), examined 223 articles on the topic. These articles were published in nine journals dealing with the field of communication between the years 1970-2019. The findings indicated that more than half of the studies in this field were conducted after 2011, highlighting an increasing interest in and focus on internal communication over the past decade.

The literature emphasizes the growing importance of internal communication management and the multitude of processes involved. This article presents the first part of a qualitative research, which constitutes the first stage of the methodology applied in a study on a PhD level, entitled: "The Relationship between Internal Communication Led by Line Managers and the Strength of Employees Engagement in Organization". The study aimed to examine the processes involved in managing internal communication, in order to understand which processes should be managed. Moreover, for the benefit of further research, it is necessary to understand the role of line managers in managing communication, as well as the managerial communication skills required for the initiation of effective communication processes.

2. LITERATURE REVIEW

2.1 Definition of Internal Communication

Among the accepted definitions, internal communication refers to the formal and informal messages and information transmitted within the organization (Kalla, 2005). Furthermore, there are definitions according to which internal communication also deals with the transmission of messages between stakeholders in the organization, including employees and employers (Tkalac Verčič & Špoljarić, 2020). The concern with stakeholders was also expressed in the definition of Welch and Jackson (2007), according to which internal communication is based on several stakeholder interfaces within the organization. These interfaces include corporate communication that is delivered through the organization communication unit, led by line managers, and communication between coworkers (Welch & Jackson, 2007).

2.2 Managing Internal Communication Dimensions and the Impact Thereof

Managing internal communications also implies managing a variety of communication dimensions (Men & Bowen, 2017). Communication dimensions refer to communication in the managerial-leadership top-down flow and bottom-up dialog; corporate communication that is transmitted by the professional communications unit of the organization; and communication between coworkers across the organization, i.e., transmitted by employees and opinion leaders (Men & Bowen, 2017).

The empirical literature asserts that managing internal communication has an impact on organizational indicators and processes, among them improving employee-organization relationships (Kim & Rhee, 2011); promoting a sense of trust among employees (Men et al., 2020); increasing employees' engagement (Mishra et al., 2014), and satisfaction (Coric et al., 2020). When internal communication is examined from a business perspective, the literature also highlights the ability of internal communication to connect employees' personal goals and objectives with organizational goals and their performance (Mayfield & Mayfield, 2018).

2.3 Communication Led by Managers

Managers are one of the factors that generate communication in an organization. Communication led by managers plays an important role in motivating employees (Timm & Peterson, 2000). Motivation connects employees to goals, driving them to perform and accomplish organizational goals (Timm & Peterson, 2000). Managers who connect employees to the organization's vision also create inspiration that motivates employees (Mishra et al., 2014). Part of the communication led by managers relates to the communication of feedback and encouragement as affecting employees' effectiveness (Ryan & Deci, 2000). Moreover, dealing with managers as communication leaders requires managerial skills, such as communication style, ability to listen, and the use of various communication channels (Men et al., 2020). Furthermore, line managers play an important role of driving communication in units, as noted by Erikson (cited in Forssberg & Malm, 2001). According to Erikson, managers are 'communication generators' and have an essential role in sharing organizational knowledge, as well as conveying instructions and direction for execution. The literature stipulates an evolution in managers' function, as well as their role in leading communication that creates an engine for employees' involvement (Pugh & Dietz, 2008).

2.4 Corporate Communication

One of the roles of corporate communications is sharing organizational information. (Berger, 2008). In fact, it is a traditional role of communication, namely, engaging in and exchanging information associated with the organization's activities, organizational focus, employees' role, and the market in which they operate (Berger, 2008; Men & Bowen, 2017). Moreover, corporate communication promotes employees' alignment with the organization's goals and strategic focuses (Hume & Leonard, 2014).

The promotion of listening constitutes one of the focuses of corporate communication. Active listening to employees enhances a dialogue that promotes listening to the voice of employees, mutual understanding, as well as being a motivating factor in accepting ideas raised by the employees (Park et al., 2014).

2.5 Managing Internal Communication Channels and Methods

Since McLuhan (1964) has minted the familiar expression: "The medium is the message", internal communication has developed so that each channel and each media tool encompass benefits and effects adapted to different audiences. Today, the variety of internal communication channels is wide and renewed in accordance with the dynamic media outside the organization, and its development has been intensified in the 21st century (Crescenzo, 2011). The diverse mix of communication channels includes face-to-face communication (Mishra et al., 2014); personal conversations; phone conversations; and, of course, web tools including intranet, blog, employees' applications, digital screens (Crescenzo, 2011); and communication via corporate social media channels (e.g., corporate application) (Ewing et al., 2019). All these channels and methods have been highly effective in employees' engagement and positive employees' feelings.

Despite the significance that the literature attributes to internal communication, there is less information regarding the role of line managers in leading internal communication among other communication processes that are managed. Hence, the significance of this study.

3. QUALITATIVE RESEARCH METHODOLOGY

This article is the first part of a research on a doctoral level that aims to explore the connection between internal communication and employees' engagement. A

qualitative study was conducted among line managers and employees in order to investigate the processes involved in internal communication.

3.1 Aspects of Qualitative Research

As qualitative research methods examine the insights and meanings derived from empirical data, it seems appropriate to accomplish the aims of this study. Moreover, qualitative research facilitates the investigation of the sources and causes of a phenomenon or behavior through a methodical and in-depth analysis of the obtained qualitative information (DiCicco-Bloom & Crabtree, 2006). One of the tools of qualitative research is conducting interviews through face-to-face conversations, through a web interface, or through small focus groups (Creswell, 2009). The researcher of this study conducted semi-structured interviews. The`interviews consisted of open questions that encouraged the participants to answer them, in order to find out their opinions about the processes involved in internal communication (Creswell, 2009).

3.2 The Research Population

The interviewees were 7 line-managers in organizations with over 150 employees and 7 employees who did not manage people. The organizations were from diverse fields, namely, high-tech, finance, industry, infrastructure, and healthcare. The employees were both male and female (3 male employees and managers and 3 female employees and managers). Their ages ranged between 27 and 60, and they fulfilled varied roles. The decision to include line managers was based on studies that found they were a driving force in leading employees in companies (Welch, 2011).

3.3 Sampling Method for Conducting In-Depth Interviews

The researcher of this study applied a convenience sample when choosing the research population for the interviews. In this sample, the participants are chosen from the population available to the researcher for the purpose of conducting the study (Creswell, 2009). Considering the diversified sample, namely employees and managers, the data presented varied opinions that would be examined quantitatively in the quantitative research phase. The interview guide was designed according to the guidelines recommended by Brinkmann and Kvale (2015), and it is presented in Appendix 1.

Table 1: *The research design of the qualitative interviews presented in this article*

Qualitative Research aim	Research Design	Research population	Analysis method
To explore the processes that are involved in internal **communication** in companies.	Semi-structured interviews	7 Line Managers 7 Employees	Content analysis

3.4 Hypotheses

In light of the literature review, i.e., according to Men & Bowen (2017), communication dimensions refer to communication in the managerial-leadership top-down flow and bottom-up dialog; corporate communication that is transmitted by the professional communications unit of the organization; and communication between coworkers across the organization. And according to Erikson (cited in Forssberg & Malm, 2001), line managers play an important role of driving communication in units. Hence, the following two hypotheses were tested in this study:

1. In internal communication management, several processes are involved simultaneously.
2. Processes related to communication led by managers will receive a high weight among all the processes involved.

3.5 Building the Interview Guide - The questions

The interview guide should comprise targeted questions based on the theoretical background and an evolving dimension in light of the dialogue with the interviewees (Brinkmann & Kvale, 2015). In this research, the guide consisted of questions based on theoretical background, concepts in the field, taxonomy and theories, facilitating an open dialogue (see Appendix 1).

3.6 Content Analysis Method

In this study, content analysis was performed based on collected information that was arranged in a way that allowed for interpretation of the information, for example, using questions such as "What was said?" (Shkedi, 2003). The performed analysis was a thematic analysis (Shkedi, 2003). In this framework, the information collected in the form of words and phrases was mapped into topics with shared meaning and

interpretation and from them, three themes of processes involved in internal communication were obtained.

3.7 Validity and Reliability

Creswell (2009) presents eight ways for attaining validity and reliability in qualitative research. One of them is External Audits, namely, inviting professionals to review the process and findings to ensure that the research was conducted properly. Thus, this research was validated by a qualitative analysis expert. The interview guide was validated by conducting a pilot of two interviews. Following the validation process, the interview guide was revised and adjusted, while the number of questions was adjusted, repeated questions were removed, and the questions suitability to their purpose was checked. Moreover, the completed questionnaire was backhand translated to ensure that the translation represents the questions asked in the original language.

3.8 Ethical Aspects

The research aim was explained to all the interviewees, and all seven managers and seven employees gave their informed consent to provide data. They were assured anonymity in publishing the information while protecting the information they provided. All interviewees agreed to be recorded or to be filmed during the ZOOM session.

4. FINDINGS

4.1 Content Analysis of the Interviews

The data obtained from the interviews (7 managers and 7 employees) was content analyzed. The words, concepts, phrases, and sentences were grouped into three central themes that presented processes involved in internal communication in companies:

- Managerial communication skills
- Managing corporate communication
- Managing types of channels and methods of communication

Each theme comprised several categories that reflected it, based on the spirit of the interviews and comprehension of the topic. Table 2 depicts the themes and categories that emerged from the content analysis.

Table 2: *Themes and related categories*

Themes	**Category**	**Evidence**
Managerial Communication Skills	Interpersonal communication	*"Walk around among the people. Talk to them"* *"I feel that I lack personal communication with my manager"*
	Sharing	*"Involves me in tasks, goals, processes"*
	Listening	*"Be attentive to what is said and to feelings"*
	Encouragement and performance	*"Clarifies the tasks for them"*
Managing Corporate Communication	To update cross-cutting issues	*"Shares topics related to the organization as well as general topics"*
	Waterfall (top-down) and Listening (bottom up)	*"I'm passing this on to my employees".*
Managing Types of Channels and Methods of Communication	Valuable to employees	*"Employees want to participate and to know"*
	Customized communication for individuals and groups	*"We have a weekly one-on-one meeting and we also have company meetings"*
	Combination of personal & digital communication	*"We meet both one-on-one and in TEAMS".*
	Mix of communication channels	*"Messages also go through the organizational portal, video news, email, and personal meetings".*
	Managing communication routine	"*We have regular routines in our calendar as: a weekly personal meeting"*

The content analysis yielded the categories obtained from the interviewees' statements that reinforced the theme and were part of the processes that took place in managing internal communication:

Theme 1: Managerial communication skills

1. Category: **interpersonal communication** – this is part of the theme since communication occurs also through a manager-employee dialogue. This was attested by the words of a manager: *"Walk around among the people. Talk to them"*.
2. Category: **Sharing** – this is part of the theme since managers share information. Evidence of this emerged, also, in the words of an employee*: "Involves me in tasks, goals, processes"*.
3. Category**: Listening** – this is part of the theme since communication also involves a dialogue. Evidence of this emerged, also, in the words of an employee: "*Be attentive to what is said and to feelings".*
4. Category: **Encouragement and performance** - this is part of the theme since the findings show that managers motivate performance. This was attested by the words of a manager: "*Clarifies the tasks for them*".

Theme 2: Managing corporate communication –

The content analysis gave rise to the categories that emerged from the interviewees' statements. These statements reinforced the theme and were part of the processes that took place in internal communication management:

1. Category: **Update of cross-cutting issues** – this is part of the theme, since in the management of internal communication, organizational content that is relevant to all employees is also discussed. This was evidenced in the words of a manager: *"Shares topics related to the organization as well as general topics"*
2. Category: **Waterfall (top-down) and Listening (bottom up**) – This is another part of the theme that combines information transfer and listening. Evidence of this was expressed also in the words of a manager: *"I'm passing this on to my employees".*

Theme 3: Managing types of channels and methods of communication

The content analysis yielded the categories that emerged from the interviewees' statements, reinforcing the theme and being part of the processes that took place in managing internal communication:

1. Category: **Valuable to employees** – This is part of the theme since communication channels allow employees, among other things, to conduct a dialogue and be partners. Evidence of this was also manifested by the words of a manager: *"Employees want to participate and to know"*
2. Category: **Customized communication for individuals and groups -** This is part of the theme, since in the management of communication channels there is an adaptation of the channel according to the topics and the target audiences (whether it is an individual or a group). Evidence of this also emerged in the words of an employee: *"We have a weekly one-on-one meeting and we also have company meetings"*
3. Category: **Combination of personal & digital communication -** This is part of the theme since the communication channels include face-to-face communication, communication that goes through channels like SLACK, screens in the organization, and more. Evidence of this also emerged in the words of an employee: *"We meet both one-on-one and in TEAMS".*
4. Category: **Mix of communication channels -** This is part of the theme, since the management of communication channel types is based on a diversity of channels that emerged in the interviews and helped in the sharing and conducting of a dialogue. Evidence of this was also found in the words of an employee*: "Messages also go through the organizational portal, video news, email, and personal meetings".*
5. Category: **Managing communication routine -** This is part of the theme since the routine is expressed in methodological and repeated processes of communication at a defined frequency and through a defined channel. Evidence of this was also expressed in the words of a manager*: "We have regular routines in our calendar as: a weekly personal meeting"*

Furthermore, the findings highlighted line managers as a leading factor in the transmission of communication in the organization. During the interview, the interviewees were asked in what way they received communication and information in the organization. The answers showed that words related to line manager as a source of communication delivery (i.e.: line manager, line managers, my manager, my team leader) came up more than any other factor, as shown in Table 3.

Table 3: Frequency of occurrences of the ways in which interviewees receive information and internal communication

Ways by which interviewees receive internal communication	% and No of comments
Words that represent line manager	13 (%56.5)
Digital Channels	6 (%26)
Friends	1 (%4)
Union	1 (%4)
Meetings	2 (%8.6)

Table 3 illustrates that line managers are perceived as the leading source of communication to employees.

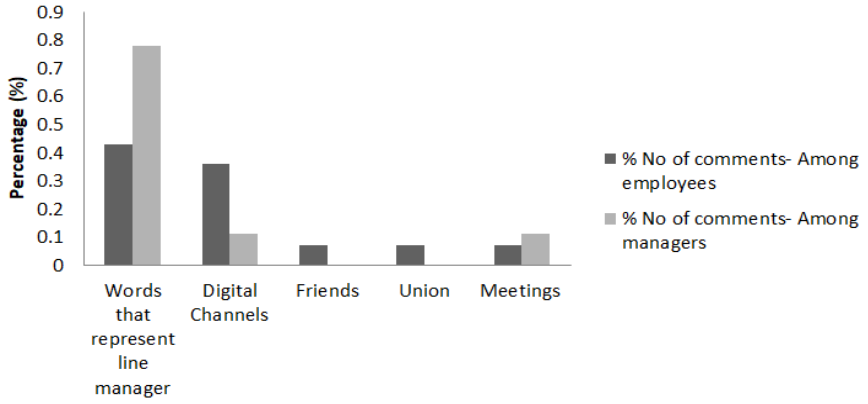


Figure 1: *Frequency of occurrences of the ways in which interviewees receive information and internal communication - Comparing employees and managers*

Figure 1 illustrates that the frequency of managers indicated as a source of message delivery in the organization is identical among line managers and employees**.**

5. DISCUSSION

The findings of this study indicated that both hypotheses were confirmed.

1. In internal communication management, several processes were involved simultaneously, as all the interviewees, both employees and managers, mentioned several processes, e.g., a manager who referred to managerial communication skills: "I clarify the tasks for them" and to managing corporate communication: "I share topics related to the organization."
2. Processes related to communication led by managers were attributed significant weight among all the processes involved, as the content analysis demonstrated that 56.5% of the interviewees used words that represented a line manager when describing the way they received internal communication.

The findings showed that in the interviews both managers and employees referred to the same themes that represented the processes involved in managing internal communication. Likewise, both managers and employees made the greatest number of references to the theme representing line managers' managerial communication skills in the delivery of internal communication.

The findings illustrated a distinction between managers and employees regarding the way they viewed digital channels as a source of internal communication: Employees attributed greater importance to digital channels as a way of receiving communication, with 35.8% of comments, compared to only 11% of managers' comments.

Furthermore, the findings of this study were in line with the current empirical literature, supporting the view that communication management involved managing several dimensions (Men & Bowen, 2017). These dimensions corresponded to the three themes that emerged in this study as reflecting processes in internal communication, namely managerial communication skills, corporate communication management, and the management of various communication channels and methods. Moreover, both the empirical literature and this study indicated that communication led by line managers was one of the processes involved in internal communication (Timm & Peterson, 2000).

Another aspect concerns the role of corporate communication as part of the communication processes within the organization (Hume & Leonard, 2014). Accordingly, this study also shows that processes of corporate communication are involved in internal communication, as well as in promoting two-way communication for message transmission and employee engagement through listening.

An additional aspect that emerged in this study, in line with information from the literature, refers to the fact that the management of internal communication also includes the management of a diverse mix of communication channels, such as face-to-face communication (Mishra et al., 2014).

Both the empirical literature and the findings of this study indicate that line managers require managerial communication skills to effectively deliver

communication. Moreover, these skills emerged as a strong need even among employees whose units lacked communication led by managers.

6. CONCLUSIONS

This qualitative study, which was based on interviews with 7 managers and 7 employees, shows that internal communication management involves the management of several processes simultaneously and can be divided into 3 themes: managerial communication skills, managing corporate communication, and managing types of channels and methods. These processes include managing multiple categories in order to maintain an orderly communication based on dialogue, message transmission, and listening. One of the processes that came up as a central process in delivering communication is communication led by line managers. This is based on managerial communication skills, which include the managers' ability to manage interpersonal communication, share, listen, encourage, and motivate employees to act.

This modest study that is based on semi-structured interviews, offers an opportunity for further research that examines managerial communication skills in depth. This may help in the guidance of managers, training them to manage communication effectively.

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APPENDIX 1 - The Interview guide

The interview guide for employees

Stage 1:

The processes that are involved in internal communication led by line managers, in companies.

Demographic information:

1. Can you please tell me a little about yourself?
1.1. Gender
1.2. What is your age - in decades?
1.3. Role
1.4. Personnel manager / non-employee manager
1.5. Education
1.6. What type of organization do you work for? (Finance, high-tech, industry..)
1.7. Your seniority in the organization
1.8. How many employees are there in the organization where you work?
1.9. How many employees are there in your unit?
1.10. Is your manager experienced or new in the job?
1.11. What is your manager's gender?
2. Can you describe how communication / organizational information, is carried out in your organization (i.e., through the portal, screens, organization mail, Slack, from your CEO's letters, from your line manager, through the employees' union)?
3. How do you mainly get the organizational information?

4. Do you feel that you need more organizational information, in order to know what is going on in the organization and to feel part of? Can you give me an example of topics.
5. What topics of communication do you get from your line manager? (missions, feedback, organizational things like: cross projects, employees' events, others)
6. Can you give me an example of topics that your line manager shares with you when he/she refers to the organization (i.e., vision, strategy, new products)
7. What communication channels does your manager use to communicate information to you personally? (personal conversations, mail, messages)
8. What communication channels does your manager use to communicate information to the entire unit? (Team meetings, WhatsApp, Slack, emails, telephone, in the cafeteria)
9. What routines does your line manager have in order to shares information about the organization? The division? The unit?
10. Can you give me an example for good communication with your line manager that makes you understand organizational subjects, and feel connect?

The interview guide for line managers in organizations

Stage 1:

The processes that are involved in internal communication led by line managers, in companies.

Demographic information:

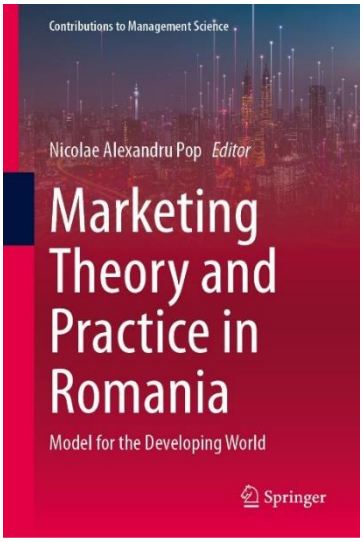
1. Can you please tell me a little about yourself?
1.1. Gender
1.2. What is your age - in decades?
1.3. Role
1.4. Personnel manager / non-employee manager
1.5. Education: high school / bachelor's degree / master's degree / other
1.6. What type of organization do you work for? (Finance, high-tech, industry..)
1.7. Your seniority in the organization
1.8. How many employees are there in the organization where you work?
1.9. How many employees are there in your unit?
1.10. Are you an experienced manager or a new one?
2. Can you describe how communication / organizational information, is carried out in your organization (i.e.,: through the portal, screens, organization mail, Slack, from your CEO's letters, from your line manager, through the employees' union)?
3. How do you mainly get the organizational information?
4. Do you feel that you need more organizational information, in order to know what is going on in the organization and to feel part of? Give me an example please.
5. What topics of communication do you, as a line manager, share with your subordinate? (missions, feedback, organizational things like

6. What communication channels do you use, as a line manager, to communicate personally to each of your subordinate? (personal conversations, mail, messages).
7. What communication channels do you use, as a line manager, to communicate information to the entire unit? (Team meetings, WhatsApp, Slack, emails, in the cafeteria).
8. Can you describe your routines in order to share information about the organization?
9. Can you give a tip for new line manager – what steps and routines a manager should take in order to create on going internal communication with his subordinates?

BOOK REVIEW

REBS Review of Economic & Business Studies
Volume 18, Issue 2/Dec. 2025, pp. 259 of 262
ISSN-1843-763X
DOI: 10.47743/rebs-2025-2-0012

NICOLAE ALEXANDRU POP (ED.) (2025). *MARKETING THEORY AND PRACTICE IN ROMANIA: MODEL FOR THE DEVELOPING WORLD*. CONTRIBUTIONS TO MANAGEMENT SCIENCE. SPRINGER, CHAM. 334 PP.



In *Marketing Theory and Practice in Romania: Model for the Developing World*, edited by Nicolae Alexandru Pop, a distinguished scholar from the Bucharest University of Economic Studies, a comprehensive and richly contextualized examination of Romanian marketing's evolution is presented with both theoretical depth and empirical substance. Positioned within Springer's *Contributions to Management Science* series, the volume seeks not only to document the transformative arc of marketing practice in Romania but also to extract insights with applicability to other developing nations.

The book's central proposition is that Romania's marketing discipline – shaped through three decades of dramatic socio-economic transformation – provides a model for the developing world. The editors and contributors argue that the institutional, cultural, and technological challenges faced by Romanian marketers resonate in many emerging economies across Asia, Africa, and Latin America, where similar legacies of planned economies, nascent market institutions, and uneven digitalization persist.

THEORETICAL SCOPE AND STRUCTURE

The volume comprises twenty-four analytically structured chapters authored by respected academic specialists from Romania's leading universities. Each chapter adheres to a clear scholarly architecture: beginning with conceptual frameworks,

proceeding through methodical analysis, and concluding with illustrative case studies. This approach ensures both academic rigour and practical relevance, making the text suitable for researchers, doctoral students, and advanced practitioners alike.

Topics covered in the book reveal its breadth and ambition:

- Historical and interdisciplinary foundations of marketing in the new economy
- Evolution from Marketing 1.0 to Marketing 6.0
- Relationship marketing and customer relationship management
- International marketing and competitive dynamics in Romanian enterprises
- Neuromarketing and consumer behaviour in the era of artificial intelligence
- Event, political, family business, insurance, retail, and sports marketing
- Marketing in tourism, higher education, and nonprofit organizations

This expansive content demonstrates the editors' intent to treat marketing not merely as a business function but as a multidimensional social phenomena that intersects with economics, politics, culture, and technology.

CONTEXTUAL CHALLENGES AND DEVELOPMENT INSIGHTS

One of the book's most compelling contributions is its articulation of the key structural and systemic challenges that have shaped Romanian marketing:

1) *Transition of Mentality*: Overcoming non-market mentalities rooted in state-controlled economic structures proved fundamental, necessitating a cognitive shift among economic agents and the broader public.
2) *Property Transformation*: The evolution from state and cooperative ownership to private ownership required marketers to reframe competitive logic and consumer orientation.
3) *Civil Society and Nonprofit Dynamics*: The emergence of nonprofit sectors expanded the domain of marketing beyond commercial exchange, fostering social mobilization across demographic boundaries.
4) *Political Interventions*: Romanian marketing needed to navigate recurrent political influences that threatened economic stability and democratic market development.
5) *Digitalization Challenges*: Uneven understanding and implementation of digital technologies resulted in strategic misalignments, especially evident in early digital marketing practices.

These insights reveal that the Romanian marketing experience has not merely mirrored Western trajectories but has confronted unique, transition-specific obstacles, offering valuable lessons for other transitional or emerging economies.

APPLICABILITY TO DEVELOPING NATIONS

A distinctive strength of the book lies in its comparative framing. Rather than offering a parochial historical narrative, the editors explicitly situate Romania's marketing transition within a global dialogue. By probatively engaging topics such as international marketing, AI adoption, neuromarketing, sustainable tourism marketing, and relationship marketing, the text provides conceptual and empirical tools that may be adapted to environments where institutional infrastructures are still forming.

The book's applicability is enhanced by its diversity of case studies, which span sectors and market contexts. Marketing challenges encountered in retail, insurance, sports, family business, and nonprofit organizations are explored alongside broader systemic phenomena. This integration of macro- and micro-level perspectives strengthens the book's relevance for scholars and practitioners in both transitional and emerging economies.

STYLE, METHODOLOGY, AND ACCESSIBILITY

Despite its scholarly density, the book maintains a clear, well-argued, and accessible style. Contributors avoid unnecessary jargon while engaging deeply with theoretical constructs and empirical evidence. Each chapter's structure – beginning with definitional clarity, followed by analytical rigour, and supported by case studies – ensures that the work is not only informative but also pedagogically effective.

From a methodological standpoint, the text balances literature review, qualitative studies, and analytical exposition, making it suitable for academic citation and classroom use. Its cross-disciplinary orientation situates marketing within broader economic, social, and technological processes – a valuable contribution to both marketing theory and development studies.

CRITICAL APPRAISAL AND FUTURE DIRECTIONS

While *Marketing Theory and Practice in Romania* offers rich and contextually grounded insights, further comparative analysis with other transitional economies could deepen its contributions to global marketing theory. Explicit engagement with marketing evolution in contexts such as Eastern Europe, Southeast Asia, or sub-Saharan Africa might illuminate common structural patterns and divergences more fully.

Nevertheless, this volume lays a strong foundation for such comparative work and stands as a significant contribution to scholarship on emerging market marketing strategy.

CONCLUSION

Marketing Theory and Practice in Romania: Model for the Developing World is a substantial scholarly achievement that integrates historical transition analysis, innovative marketing theory, and empirical case studies. Edited by Nicolae Alexandru Pop, the book succeeds in articulating a distinctive model of marketing transformation that resonates far beyond the Romanian context.

For academics and practitioners engaged with international marketing strategy, developmental marketing, and market transformation in emerging economies, this volume offers both theoretical richness and practical insight. It is poised to become a key reference in the field and a valuable resource for understanding how marketing evolves amid systemic economic change.

BIBLIOGRAPHIC INFORMATION

Book Title Marketing Theory and Practice in Romania

Book Subtitle Model for the Developing World

Editors Nicolae Alexandru Pop

Series Title Contributions to Management Science

DOI https://doi.org/10.1007/978-3-031-93875-7

Publisher Springer Cham

eBook Packages Business and Management, Business and Management (R0)

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Hardcover ISBN 978-3-031-93874-0Published: 24 July 2025

Softcover ISBN 978-3-031-93877-1Due: 07 August 2026

eBook ISBN 978-3-031-93875-7Published: 23 July 2025

Series ISSN1431-1941

Series E-ISSN 2197-716X

Edition Number 1

Number of Pages XIII, 334

Number of Illustrations 12 b/w illustrations, 41 illustrations in colour

Topics Marketing, Emerging Markets/Globalization, Development Studies