

## The Economics of Cognitive Bias: Heuristics and Decision-Making in Entrepreneurial Market Analysis Revised

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## Abstract

Entrepreneurial decision-making is shaped by cognitive processes that influence opportunity recognition and strategy under uncertainty. This study examines how cognitive practices in strategic brand management affect the competitiveness of retail enterprises in selected EU countries and Ukraine, using comparative analysis, Pearson correlation, and multidimensional scaling (MDS).

Findings show that analytically oriented environments are linked to higher brand investment, stronger customer loyalty, and greater competitiveness. MDS identifies three cognitive profiles, analytical, intuitive-adaptive, and transitional, revealing cross-country differences. Institutional quality moderates these effects, with stronger institutions enhancing the link between cognition and performance. The study proposes a framework for assessing managerial cognitive profiles in brand strategy.

The research contributes to behavioural economics and strategic management and offers practical insights for policymakers, educators, and business leaders aiming to strengthen entrepreneurial resilience and competitiveness.

**Keywords:** entrepreneurial cognition; cognitive heuristics; market opportunity recognition; behavioral economics, risk perception.

**JEL Classification:** L26; D91; M13; O52.

## Introduction

In a contemporary economy marked by volatility and information overload, the process of making business decisions is increasingly becoming cognitive in nature. In turbulent markets, entrepreneurs are compelled to combine analytical reasoning with intuitive and heuristic strategies, thereby establishing a balance between rational analysis and swift intuitive responses to environmental changes. This synthesis of thought forms the foundation of cognitive practices, which serve not merely as a data processing mechanism but also as a tool for discerning market opportunities that emerge from the confluence of knowledge, experience, and emotional factors (Vlašić et al., 2024).

The growing significance of cognitive dimensions in entrepreneurship is observed against the backdrop of digital transformation and the use of artificial intelligence in strategic analysis. Such developments necessitate novel approaches to interpreting market signals and making decisions within an uncertain environment, where behavioral biases can both amplify and diminish the business strategies efficacy (Bagorka & Pererva, 2024; Csaszar et al., 2024). This is particularly relevant in countries with transitioning economies, notably Ukraine, where entrepreneurs face substantial risks, restricted access to capital, as well as rapidly evolving demand dynamics. On an international scale, cognitive methodologies are closely linked to the UN Sustainable Development Goals, particularly SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 17 (Partnerships for the Goals), as entrepreneurial initiatives underpin economic growth, innovation, and international collaboration. It is the cognitive flexibility and the capacity to swiftly adapt to global challenges that empower entrepreneurs to identify new opportunities at industries intersection (Ohlert et al., 2025).

At the same time, despite the active advancement of cognitive concepts in management, their practical implications for the companies' competitiveness within transitional economies remain inadequately explored. The scholarly gap resides in the lack of empirical models that integrate cognitive elements of entrepreneurial thought with metrics of brand equity and financial performance. The problem in this research domain is the limited integration of cognitive frameworks into strategic brand management, which reduces the accuracy and

sustainability of business decisions. It is noteworthy that the impetus for this study arises from the necessity to combine cognitive psychology with brand management practices to enhance the resilience of Ukrainian enterprises in the global arena.

Against this background, an empirical investigation is needed to determine whether cognitive decision-making practices translate into measurable improvements in entrepreneurial competitiveness across different institutional contexts.

The purpose of this study is to empirically validate the impact of cognitive practices within strategic brand management on the enhancement of retail enterprises' competitiveness in a globalized economy. The research hypothesis posits that the integration of cognitive practices into the strategic brand management framework enhances the precision of business decision-making and fosters sustainable competitive advantages in both domestic and international markets. To accomplish this aim, the following research tasks were identified:

- To examine current trends in the cognitive approach to strategic brand management and its implications for enterprises' competitiveness across various nations.
- To analyze the interplay between cognitive factors, investments in brand capital, customer loyalty, and enterprises' financial performance, with a focus on case studies from EU countries and Ukraine.
- To develop cognitive profiles of strategic brand management that can serve as frameworks for increasing the competitiveness of retail enterprises.

To strengthen the applied analytical logic of the study, the research framework is further specified through three propositions derived from the literature review and tested through the subsequent comparative, correlational, and multidimensional analyses:

- Proposition 1. Countries characterized by a stronger analytical cognitive profile of entrepreneurial decision-making demonstrate higher levels of brand investment intensity and more stable competitiveness outcomes.
- Proposition 2. Higher levels of brand investment are positively associated with customer loyalty and financial performance, although the strength of these relationships varies depending on the maturity and stability of the national business environment.
- Proposition 3. Transitional economies are more likely to display mixed cognitive profiles, in which digital adaptability coexists with weaker stability of strategic outcomes, reflecting the combined influence of analytical and intuitive decision-making patterns.

These propositions do not replace the main research hypothesis; rather, they operationalize it into analytically observable relationships and provide a clearer bridge between the theoretical discussion on cognitive practices and the empirical evidence presented in the Results section.

## 1. Literature Review

Over the past decade, the cognitive approach to entrepreneurial decision-making has emerged as one of the leading theoretical and practical paradigms in management, economic psychology, and behavioral finance. It elucidates how entrepreneurs discern market opportunities, evaluate risks, formulate strategies, and render decisions amid uncertainty. The research conducted by Camuffo et al. (2024) underscores that scientifically grounded entrepreneurial cognition fosters systematic strategic decisions, albeit excessive formalization may stifle creativity. Gilbert-Saad et al. (2023) proved that the application of cognitive heuristics reduces decision-making processes in volatile environments, while Sasseti et al. (2022) introduced the concept of "decision rhythm", which articulates the cyclical nature of the

processes involved in scanning, searching, and evaluating opportunities. Arshi et al. (2024) reveal that cognitive errors of types I and II lead to premature rejection of promising ideas, consequently resulting in the loss of opportunities.

In the digital era, cognitive practices are being redefined under the influence of artificial intelligence and data analytics. Pereira et al. (2024) emphasize that cognitive technologies are transforming the decision-making experience itself. The exploration of behavioral dimensions and cognitive biases remains a key area of contemporary research. Nobre et al. (2022) categorize typical thinking errors, such as overconfidence and the “status quo” effect, which distort rational decision-making.

From an applied economic perspective, cognitive biases should also be interpreted through the lens of opportunity cost, reflecting the economic value of suboptimal decisions. In entrepreneurial contexts, such biases do not merely distort perception but generate measurable financial consequences, including misallocation of resources, delayed market entry, and inaccurate pricing strategies. For instance, the anchoring bias may lead entrepreneurs to rely excessively on initial reference values (e.g., historical prices, competitors’ benchmarks, or subjective expectations), resulting in systematic mispricing of new ventures. This can manifest either in underpricing, leading to unrealized revenue potential, or overpricing, which reduces market penetration and customer acquisition rates.

Similarly, overconfidence bias may result in excessive investment in brand development without proportional returns, thereby increasing sunk costs and reducing capital efficiency. Thus, cognitive biases represent not only behavioral distortions but also sources of hidden economic losses, which can be conceptualized as opportunity costs within entrepreneurial decision-making frameworks.

In transition economies, subjective risk perception frequently prevails formal analysis, as noted by Melović et al. (2022), while Almeida (2024) correlates cognitive competence with the capacity to create sustainable innovations. Scuotto et al. (2024) emphasize that innovative failures catalyze cognitive learning. Furthermore, Romani-Torres and Norena-Chavez (2023) accentuate the roles of team passion and innovative capacity as mediators between cognitive perception and market opportunities, whereas Zhu et al. (2024) illustrate how emotional-cognitive interactions enhance entrepreneurs’ ability for identifying niches within a dynamic environment. In addition, Ramadhani et al. (2025) illustrate that business analytics and artificial intelligence are progressively becoming entrepreneur’s principal cognitive instruments.

Marchyshyn’s (2025) investigation reveals that the transparency of accounting information shapes managers’ cognitive attitudes, thereby influencing the quality of decision-making. This notion aligns with the frameworks proposed by Lelyk et al. (2022) and Mironova et al. (2022), who developed models for evaluating economic security and selecting innovation strategies predicated on data reliability and its analytical application.

Thus, the transparency of accounting data constitutes a prerequisite for the efficacy of economic security models and innovative development, while the methodological instruments outlined in Sumets et al. (2022) enhance this perspective by facilitating the assessment of enterprise stability and cognitive responses to risk. Raiko and Drepin (2025) complement this argument by positing that the synergy between marketing and the experience economy cultivates a cognitive paradigm of entrepreneurship, wherein analytical data is integrated with emotional factors in managerial decisions.

Noteworthy is the study by Anggadwita and Indarti (2025), which elucidates that the cognitive barriers faced by women entrepreneurs during the internationalization of small and

medium-sized enterprises (SMEs) stem from cultural biases and a lack of informational resources, culminating in an intuitive-empathic thinking style. Gabrielsson et al. (2022) highlight the significance of adaptability in digital internationalization, while Guercini and Milanese (2022) observe that even within the digital landscape, entrepreneurs tend to rely on simplified heuristic approaches.

In general, an examination of contemporary literature reveals three predominant trends. First, cognitive practices are emerging as a central mechanism of strategic entrepreneurship that synthesizes data, experiential knowledge, and intuition. Second, global research underscores the significance of digital technologies in cultivating the cognitive flexibility essential for attaining the UN Sustainable Development Goals: SDG 8, SDG 9, and SDG 17. Third, the impact of collective and cultural factors on the cognitive strategies' efficacy remains insufficiently explored, particularly in transitional economies such as Ukraine. These gaps delineate the future scientific research vector: the development of an integrated model that combines cognitive processes, digital tools, and international market contexts into a cohesive system of entrepreneurial decision-making.

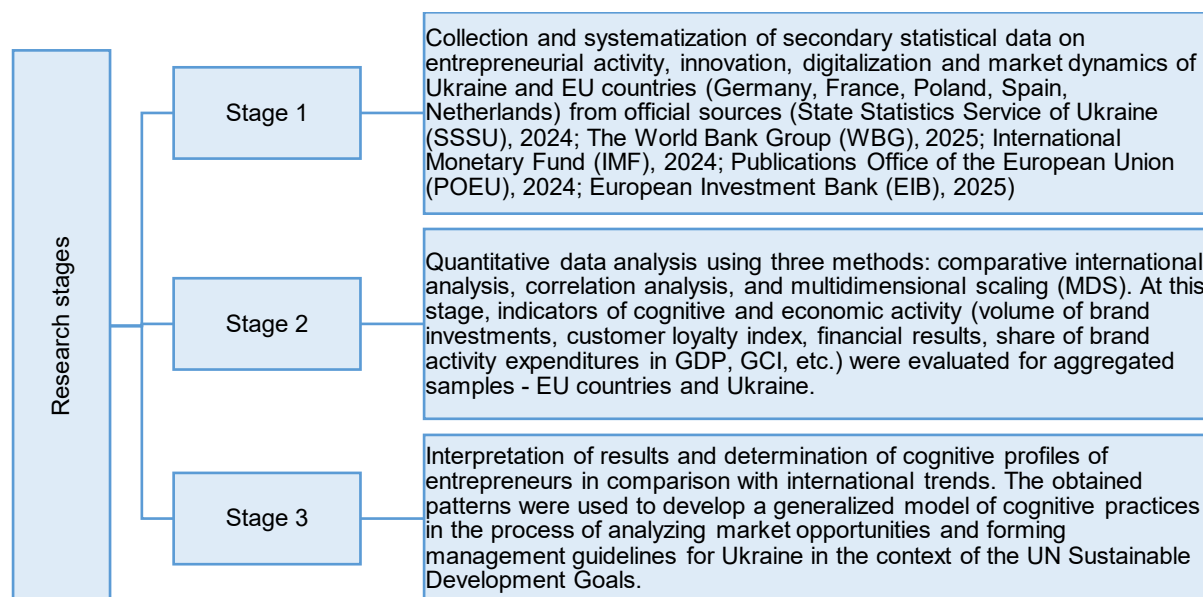
An additional dimension that requires further consideration is the role of institutional environments in shaping and constraining cognitive biases. Strong institutional frameworks, characterized by transparent regulations, reliable financial systems, access to high-quality data, and well-developed market infrastructure, can act as external stabilizers of decision-making processes. In such environments, entrepreneurs are more likely to rely on structured information and analytical tools, which reduces the influence of cognitive distortions such as anchoring, overconfidence, and heuristic-based judgments. In contrast, in emerging institutional contexts, where regulatory uncertainty, limited access to verified information, and market volatility prevail, cognitive biases tend to exert a stronger influence on entrepreneurial decisions. Under such conditions, intuitive and heuristic-based reasoning often substitutes for formal analysis, increasing the probability of suboptimal strategic choices. Therefore, institutional quality can be considered a moderating factor that either mitigates or amplifies the economic effects of cognitive biases.

## 2. Research Methodology

The empirical study sought to validate the hypothesis regarding the influence of cognitive practices on the efficacy of entrepreneurial decision-making in the context of analyzing market opportunities across diverse countries. This study was conducted utilizing open statistical data spanning the period from 2019 to 2024 and was executed in three successive stages, as illustrated in Figure 1.

In methodological terms, the study also tested three analytical propositions concerning: (1) the relationship between analytical cognitive profiles and brand investment intensity; (2) the relationship between brand investment, customer loyalty, and financial performance; and (3) the specific mixed character of cognitive decision-making in transitional economies. These propositions were examined through a combination of comparative international analysis, Pearson correlation analysis, and multidimensional scaling (MDS), which together enabled the identification of regularities between cognitive profiles and market-related performance indicators.

Figure 1: Research Stages



Source: Authors' own development.

The general population of the study comprised 120 observations, derived from open statistical data spanning the period 2019–2024 across six nations: Ukraine, Germany, France, Poland, Spain, and the Netherlands. This dataset encompassed 20 key indicators (e.g., innovation index, entrepreneurial confidence level, business activity indicators, digital readiness index, etc.) for each country, encapsulating the cognitive, analytical, and behavioral dimensions of entrepreneurial activity. Among the variables examined, the proportion of GDP allocated to brand-related expenditures (advertising) and the overarching competitiveness level of the business environment were also evaluated in accordance with the Global Competitiveness Index (GCI) devised by the World Economic Forum (WEF).

The sample size facilitated an exploration of the fundamental aspects of entrepreneurial decision-making, ranging from market structures to innovation and investment behavior metrics. The research period encompassed pre-crisis, crisis, and post-crisis stages of the global economy development (including the COVID-19 pandemic, military conflicts in Ukraine, and the EU's energy transformation), thereby enabling a dynamics analysis of the entrepreneurs' cognitive practices and business systems' adaptability under varying conditions. Ukraine is exemplified as a nation where the confluence of intuitive reasoning and digital analytics can serve as a catalyst for sustainable development. The selection of the other five European nations is substantiated by their representativeness of diverse market behavior models. Germany exemplifies rational, technologically-driven entrepreneurship. France serves as a case study of state-sponsored innovation and the advancement of cognitive approaches to business education. Poland illustrates entrepreneurs' adaptability within a transitional economy. Spain integrates traditional business practices with "green" innovations. The Netherlands represents an open model of knowledge dissemination and digital innovation.

To enhance reliability, the data was scrutinized against criteria for the completeness of time series, the legitimacy of sources, the absence of omissions exceeding 10%, and adherence to international standards (ISIC, Eurostat). Following a process of cleaning, deduplication, and normalization on a 0–1 scale, a final sample of 60 aggregated observations (10 per country) was established, ensuring an error margin of no more than 5% and satisfying

international representativeness criteria (EIB, 2025; WBG, 2025). The sample encompasses both quantitative metrics of economic development and cognitive attributes of entrepreneurship, such as flexibility, analytical skills, and the capacity to make effective decisions amid uncertain conditions. The study calculated metrics that elucidate the interrelationship between cognitive factors and the efficacy of brand management: the volume of brand investments, the customer loyalty index, the aggregated financial efficiency indicator, the share of brand activity expenditures in GDP, as well as general competitiveness index of the business environment (GCI). Indicators were delineated separately for EU nations and Ukraine, facilitating a comparative analysis of the cognitive and economic profiles within both systems. All computations and visualizations were performed in Microsoft Excel 2021, and the findings provided the foundation for a multi-layered empirical analysis of the entrepreneurs' cognitive behavior within an international context.

The study was conducted employing a comprehensive array of methodologies designed to ensure the validity of cross-country comparisons regarding cognitive practices in entrepreneurial decision-making.

Comparative international analysis method was utilized to identify differences in cognitive decision-making models across nations with varying levels of entrepreneurial development. All statistical variables were meticulously standardized through min–max normalization, which facilitates the reduction of indicators from disparate scales to a singular dimensionless scale. The calculation was executed using the formula:

$$N_{ij} = \frac{x_{ij} - x_{min}}{x_{max} - x_{min}},$$

where  $x_{ij}$  – the actual value of indicator  $j$  in country  $i$ ,  $x_{min}$  and  $x_{max}$  – the minimum and maximum value of the indicator in the dataset.

This approach ensured the comparability of indicators irrespective of their measurement units and enabled the juxtaposition of cognitive and economic characteristics of various countries on a unified scale. Following the indicators normalization, comparative profiles of cognitive characteristics pertaining to entrepreneurship were constructed, encompassing levels of innovativeness, entrepreneurial confidence, analytical thinking, and adaptability.

Correlation analysis method, the Pearson linear correlation coefficient ( $r$ ) was used to quantitatively evaluate the relationships between cognitive characteristics of entrepreneurial behavior and macroeconomic indicators. The analysis encompassed the following variables: innovation index, GDP per capita, share of start-ups, investment in R&D, employment rate, as well as entrepreneurial confidence. The calculations were tested at a significance level of  $\alpha = 0.05$ , adhering to international reliability standards. Correlation analysis made it possible to determine the extent to which cognitive factors (analytical skills, flexibility, innovation) are consistent with the economic results of countries and to identify patterns between the level of cognitive activity and entrepreneurial productivity. The obtained coefficients became the basis for further spatial relationships interpretation within the framework of multivariate analysis.

Multidimensional scaling (MDS) method was employed to identify cognitive similarities and differences among nations. Its application enabled visualizing the positioning of states within a common cognitive space of entrepreneurial decisions and the identification of clusters exhibiting similar cognitive models. France, Germany, and the Netherlands are characterized by an analytical mode of thinking, while Spain and Poland exhibit an intuitive-adaptive approach, with Ukraine occupying an intermediary position that underscores its cognitive

flexibility. MDS facilitated the transition from individual indicators to a systemic perspective of cognitive structures, thereby revealing the factors that exert the most significant influence on entrepreneurial decisions.

### 3. Research Results

As part of examining trends in strategic brand management and the competitive landscape of retail enterprises, an international comparative analysis of brand management indicators across selected nations was undertaken. Table 1 shows that in the developed EU nations (Germany, France, the Netherlands), the proportion of brand investments from 2019 to 2024 has escalated ( $\approx 0.6\text{--}0.7\%$  of GDP), coinciding with elevated competitiveness indicators (78–82 points). In contrast, Poland and Spain exhibited lower expenditures ( $\approx 0.5\%$  of GDP), aligning with the average competitiveness level (70–75 points). Ukraine reveals volatile dynamics, maintaining a range of  $0.8\text{--}1.0\%$  of GDP until 2022, followed by a decline to  $0.5\%$  due to the ramifications of military conflicts, and a partial resurgence to  $0.7\%$  in 2024. Concurrently, the competitiveness index remains the lowest (57–60 points), underscoring the correlation between the efficacy of brand investments and the stability of the market environment. Collectively, the international disparities affirm that nations with higher brand investment are characterized by heightened competitiveness among trading enterprises, which aligns with the objectives of sustainable economic growth (SDG 8) and innovative development (SDG 9).

Table 1: Brand Investment Intensity and Competitiveness in the EU and Ukraine (2019–2024)

Country	Advertising expenditures, % of GDP (2019)	Advertising expenditures, % of GDP (2024)	Change points	Competitiveness Index (2019)	Competitiveness Index (2024)	$\Delta$ Index points
Germany	0.67%	0.70%	0.03	81.80	83.50 (estimated)	1.70
France	0.57%	0.60%	0.03	78.80	79.50 (estimated)	0.70
Netherlands	0.51%	0.55%	0.04	82.00	84.00 (estimated)	2.00
Spain	0.49%	0.52%	0.03	75.30	76.00 (estimated)	0.70
Poland	0.45%	0.50%	0.05	68.90	70.00 (estimated)	1.10
Ukraine	0.80%	0.70%	-0.10	57.00	59.00 (estimated)	2.00

Note: Competitiveness indices for 2024 are estimated based on recent trends, as official data are unavailable. Ukraine's 2022 advertising market share ( $0.5\%$  of GDP) was included in the average calculations.

Source: Calculated by the authors based on data from SSSU (2024), WBG (2025), IMF (2024), POEU (2024), EIB (2025).

The following important trend in strategic brand management is the digitalization of brand communications. In all examined countries, there is a pronounced increase in the proportion of online advertising within the framework of marketing expenditures, reflecting the transition of enterprises towards digital channels for customer engagement (Table 1). The average share of digital advertising in the EU increased from  $\approx 50\%$  in 2019 to over  $67\%$  in 2024. As illustrated in Table 2, in the Netherlands and Germany, the share of digital advertising reached  $\approx 70\%$  and  $65\%$ , respectively (compared to  $\approx 45\%$  and  $40\%$  in 2019), while France exhibited a figure of about  $60\%$  (up from  $35\%$  in 2019). Spain and Poland also experienced a remarkable doubling of this metric (from  $\approx 30\%$  to around  $60\%$ ). Notably, Ukraine has the most digitally-

oriented brand management framework: online advertising constituted  $\approx 50\%$  of the market in 2019, and by 2024, its share increased to a record 78%. This trend signifies a swift adoption of digital tools by Ukrainian entrepreneurs, even amid crises, aligning with the global trend towards innovation (SDG 9). The substantial proportion of online communications has enabled numerous trading firms to sustain engagement with customers during the COVID-19 pandemic and martial law, thereby ensuring a degree of business resilience.

Table 2: Share of digital advertising in total advertising expenditure, % (comparison 2019 and 2024)

Country	Digital, % of total spending (2019)	Digital, % of total spending (2024)	Change, points (2019→2024)
Germany	40%	65%	25
France	35%	58%	23
Netherlands	45%	70%	25
Spain	30%	55%	25
Poland	30%	65%	35
Ukraine	50%	78%	28

Source: calculated by the authors based on data from SSSU (2024), WBG (2025), IMF (2024), POEU (2024), EIB (2025)

To evaluate the relationship between investments in brand equity, customer loyalty, and financial performance, the Pearson linear correlation coefficient was employed, utilizing data from 2019 to 2024, analyzed separately for EU countries and Ukraine (Table 3).

Table 3. Correlations Between Brand Investment, Customer Loyalty, and Financial Performance

Indicators (pair correlation)	$r$ (selection of EU countries)	$r$ (Ukraine)
Investing in brand equity - Customer loyalty	0.76	0.65
Brand equity investment - Financial results	0.58	0.50
Customer loyalty - Financial results	0.82	0.73

Note: Correlation is significant at  $\alpha = 0.01$ . EU estimates are based on aggregated data from Germany, France, the Netherlands, Spain, and Poland ( $n = 100$ ); Ukraine estimates are based on a separate sample ( $n = 20$ ). Owing to the limited Ukrainian sample, p-values are not reported; however, all coefficients exceed  $r = 0.45$ , indicating moderately strong relationships.

Source: calculated by the authors based on data from SSSU (2024), WBG (2025), IMF (2024), POEU (2024), EIB (2025)

The calculations were conducted independently for Ukraine and an aggregated sample of EU countries, which differ in economic structure, market maturity levels, and institutional stability. This division enables a more nuanced understanding of disparities in cognitive practices and facilitates assessing the effects of analytical versus intuitive approaches on the efficacy of strategic decision-making. The analysis encompassed the following indicators: the volume of brand investments, the customer loyalty index, and the aggregate financial index.

All correlations were found to be positive and statistically significant ( $p < 0.01$ ), thereby confirming the connection between brand investment and enhanced customer loyalty as well as improved financial outcomes for enterprises. In EU countries, stronger correlations were observed:  $r = 0.76$  between brand equity investments and customer loyalty,  $r = 0.58$  between brand investments and financial performance, and  $r = 0.82$  between customer loyalty and

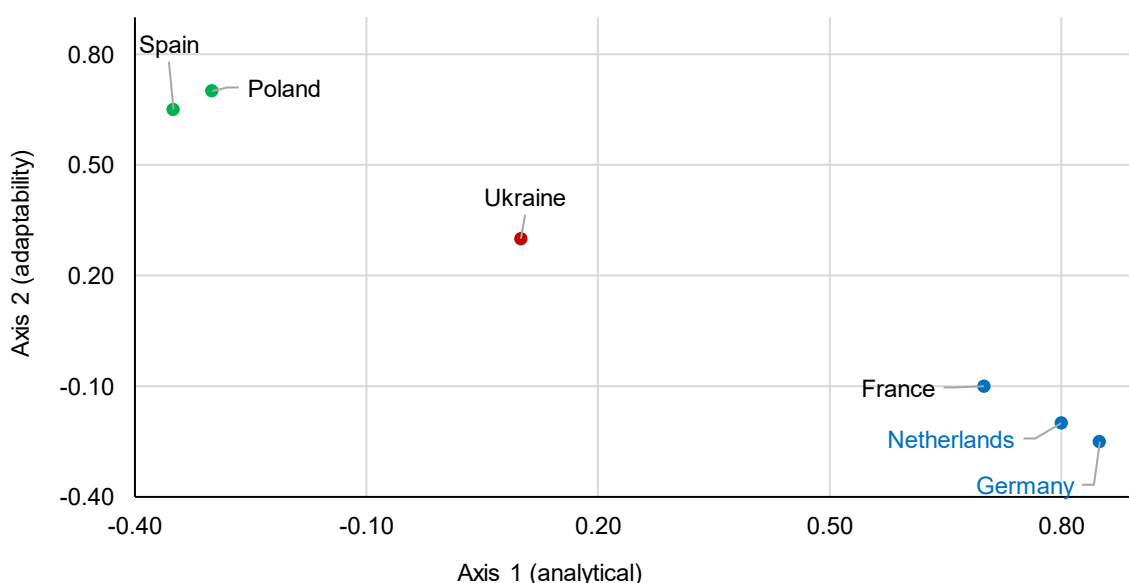
financial performance. For Ukraine, the correlation strengths were somewhat diminished ( $r = 0.50-0.73$ ), reflecting the increased volatility and delayed impact of brand investments within the transition economy. Nonetheless, the significant correlation between customer loyalty and financial performance ( $r = 0.73$ ) underscores the pivotal role of customer retention in fostering business stability.

For Ukraine, a positive correlation was observed between the examined indicators; however, the strength of this correlation is somewhat diminished ( $r = 0.50-0.73$ ). The relationship between brand expenditure and financial performance is characterized by  $r = 0.50$ , which is notably lower than the EU average (0.58). This disparity may suggest a heightened volatility and delayed effects of brand investments within a transition economy. Concurrently, the correlation between customer loyalty and financial performance remains significant ( $r = 0.73$ ), underscoring the crucial role of customer retention in ensuring business stability.

In EU nations, correlations exhibit a greater balanced, reflecting sophisticated brand management practices: under stable conditions, investments in brand equity yield predictable advancements in loyalty and profitability. This difference can also be interpreted through the institutional lens: stronger institutional environments in EU countries enhance the consistency between cognitive decision-making and economic outcomes, whereas weaker institutional structures in transitional economies reduce the predictability of this relationship by allowing cognitive biases to play a more dominant role. In contrast, the outcomes of brand initiatives in Ukraine are inconsistent due to external shocks and divergent cognitive approaches to opportunity management. The identified correlations corroborate the hypothesis regarding the influence of cognitively driven brand strategies on enterprise competitiveness, aligning with SDG 8 (sustainable economic growth through enhanced labor productivity).

Figure 2 shows the configuration of the sample across two dimensions, which elucidate the majority of data variance (Stress criterion = 0.07, a statistical indicator of the multivariate scaling model's quality), signifying the model's good fit. Within the constructed MDS model, the first axis reflects the transition from intuitive to analytical cognition, while the second axis delineates the adaptability of brand management systems to external fluctuations.

Figure 2. MDS Map of Countries by Brand Management Practices (2019–2024)



Source: Authors' own development

As a result of MDS mapping, two primary clusters of nations, alongside the distinct positioning of Ukraine, are clearly visible. The first cluster (located in the lower right quadrant of Figure 2) encompasses Germany, the Netherlands, and France, which exhibit closely aligned coordinates and gravitate towards an analytical type of thinking. These countries are distinguished by high metrics in brand management and outcomes stability, indicating a systematic application of analytics and data in their business decision-making processes.

The second cluster (positioned in the upper section of the map in Figure 2) comprises Spain and Poland, which are situated next to each other and tend towards an intuitive-adaptive approach. They are characterized by moderate levels of brand investment and performance, with strategic decisions that are more flexible and situational, depending upon local conditions. Ukraine occupies an intermediate position on the MDS map, situated at a certain distance from both clusters. This positioning underscores the transitional nature of the cognitive framework among Ukrainian entrepreneurs, reflecting a synthesis of analytical and adaptive thinking styles. On the one hand, contemporary digital practices are being integrated in Ukraine, akin to those in the group of developed nations. On the other hand, there persists a significant variability in decision-making and dependence on external factors, aligning it closer to intuitively oriented markets. This position is consistent with previously established moderate correlations and reflects the ongoing process of developing sustainable brand management strategies.

For a more nuanced understanding of the identified clusters, Table 4 summarizes the salient characteristics of the cognitive profiles associated with brand management strategies. Typical values for indicators are presented, which may serve as a foundation for practical recommendations.

Table 4. Cognitive Profiles of Strategic Brand Management

Profile	Countries	Brand investment (online advertising, % of GDP)	Customer loyalty (index, 0–100)	Financial performance (index, 0–100)	Decision-making style
Analytical	France, Germany, Netherlands	High ( $\approx 0.6$ – $0.7$ )	High ( $\approx 85$ – $90$ )	High ( $\approx 80$ – $85$ )	Oriented, predicted
Intuitive-adaptive	Spain, Poland	Medium ( $\approx 0.5$ )	Medium ( $\approx 75$ – $80$ )	Medium ( $\approx 70$ – $75$ )	Flexible, reactive to context
Transitional	Ukraine	Relatively high ( $\approx 0.7$ – $0.8$ )	Moderate ( $\approx 70$ )	Low ( $\approx 60$ )	Mixed, unstable

*Note:* Correlation is significant at  $\alpha = 0.01$ . EU ( $n = 100$ ) and Ukraine ( $n = 20$ ) were analysed separately. *Source:* calculated by the authors based on data from SSSU (2024), WBG (2025), IMF (2024), POEU (2024), EIB (2025)

The analytical profile (Germany, Netherlands) is marked by the highest investments in brand capital ( $\approx 0.65\%$  of GDP), elevated consumer loyalty ( $\approx 88$  out of 100), and stable financial outcomes. In contrast, the intuitive-adaptive profile (Spain, Poland) reflects average metric values ( $\approx 0.5\%$  of GDP; loyalty  $\approx 77$ ). The transitional profile (Ukraine) combines relatively high brand investments (approximately  $0.7\%$  of GDP) with a lower effectiveness of their application (loyalty index  $\approx 70$ , with the financial index being the lowest). This indicates that Ukrainian enterprises invest in their brands at levels comparable to their EU counterparts but achieve lesser outcomes due to constrained analytical decision-making and an unstable

environment. In nations characterized by an analytical approach, decision-making tends to be more predictable, whereas an intuitive approach results in greater variability. To enhance the competitiveness of Ukrainian enterprises, it is advisable to strengthen the analytical component while preserving flexibility: this rationale elucidates Ukraine's intermediate position on the cognitive map (Figure 2). The discerned gap between clusters also points to the potential for international collaboration (SDG 17). The exchange of EU analytical practices and the adaptive experiences of developing nations could significantly augment the efficacy of global brand management strategies.

Thus, multivariate analysis enabled us to discern the variances among clusters in entrepreneurs' cognitive methodologies for evaluating market opportunities and brand management. Each cluster necessitates tailored brand development strategies: for analytical markets, an emphasis on innovation, Big Data analytics, and the enhancement of predictive accuracy; for intuitive markets, the adoption of structured approaches without losing flexibility; for transitional markets, comprehensive brand equity building initiatives aimed at bolstering consumer trust and leveraging international expertise.

#### 4. Discussion

The findings confirm that entrepreneurs' cognitive practices constitute a system-forming factor in the analysis of market opportunities and the quality of strategic decision-making. More specifically, the empirical results support the three propositions formulated in the Introduction by demonstrating that analytically oriented country profiles are associated with stronger brand management outcomes, that brand investment is positively related to customer loyalty and financial performance, and that Ukraine exhibits a mixed transitional cognitive profile rather than a fully analytical one.

An important contribution of this study is the economic interpretation of cognitive biases through the concept of opportunity cost. The results suggest that differences in cognitive profiles across countries are reflected not only in decision-making styles but also in the efficiency of resource allocation. In analytically oriented economies, structured decision-making reduces the likelihood of systematic cognitive biases, such as anchoring and overconfidence, thereby minimizing economic losses associated with suboptimal pricing and investment decisions. In contrast, transitional economies such as Ukraine, where intuitive and analytical approaches coexist, are more susceptible to cognitive distortions that may result in inefficient brand investment, delayed strategic adaptation, and mispricing of products. These effects can be interpreted as opportunity costs, representing the gap between realized and potential economic performance.

The positive relationships identified between brand investment, customer loyalty, and financial performance are consistent with the findings of Gilbert-Saad et al. (2023), who demonstrated that cognitive heuristics accelerate strategic decision-making without compromising effectiveness. Similarly, the stronger relationships observed in Germany, France, and the Netherlands support the arguments of Vlašić et al. (2024), emphasizing the value of integrating analytical and exploratory thinking in entrepreneurial decision-making.

At the same time, in countries with transitional economies, particularly Ukraine, the correlations are notably weaker, partially confirming the conclusions of Melović et al. (2022) regarding the predominance of intuitive risk-taking behavior over rational decision-making in volatile conditions. This phenomenon is attributed to differences in institutional quality between EU countries and Ukraine, which directly influence the extent to which cognitive biases affect

entrepreneurial decision-making. In the EU, stronger institutional frameworks, including regulatory transparency, developed financial markets, standardized reporting systems, and access to reliable analytical data, act as mechanisms that partially mitigate cognitive biases by constraining subjective judgments and encouraging evidence-based decision-making. In contrast, in Ukraine's emerging institutional environment, characterized by higher uncertainty, weaker regulatory enforcement, and limited access to structured market information, entrepreneurs are more likely to rely on heuristic and intuitive reasoning. This increases the susceptibility to cognitive biases such as overconfidence, and availability bias, amplifying their negative economic effects, including mispricing, inefficient investment allocation, and delayed strategic adaptation. Similar discrepancies are also evidenced by the research conducted by Anggadwita & Indarti (2025), who identified that cultural and gender barriers influence the preference for an empathic-intuitive thinking style in business internationalization.

The resultant two-cluster model (analytical – intuitive-adaptive) aligns with the cognitive flexibility concept substantiated by Feng et al. (2022). According to the above concept, the efficacy of strategic decisions depends on entrepreneurs' capacity to swiftly alter cognitive frameworks in response to external challenges. Ukraine's intermediate position on the multidimensional scaling (MDS) map reflects the transition from intuitive to analytical thinking. Such dynamics substantiate the hypothesis posited by Camuffo et al. (2024) that scientifically grounded approaches to cognition foster predictable business outcomes, whereas the absence of structured cognitive models undermines the forecasting precision.

The findings are also congruent with the research conducted by Csaszar et al. (2024), which established that the interplay between artificial intelligence and human judgment does not replace the cognitive process; rather, it augments it by providing novel sources of information. Entrepreneurs from nations with elevated levels of digital intensity, particularly the Netherlands and Ukraine, exhibited more flexible and prompt responses to market signals. This observation aligns with the hypothesis put forth by Pereira et al. (2024) regarding the influence of cognitive technologies on the level of managerial decisions within the retail sector. The positive correlation between the degree of digitalization in brand communications and financial performance substantiates the connection between SDG 8 and SDG 9: digital analytics fosters sustainable growth through a more efficient use of resources.

A comparative analysis with the studies conducted by Dubard and Smith (2024) as well as Zhu et al. (2024) reveals that the emotional-cognitive interaction and moral-value orientations significantly influence the opportunities in volatile markets. This phenomenon is particularly pronounced among Ukrainian entrepreneurs, for whom value-driven motivation compensates for the absence of institutional predictability. In this context, the findings of Marchyshyn (2025) regarding the influence of accounting information transparency on managerial decision-making psychology assume greater significance. In light of the above, enhanced information transparency facilitates a transition from reactive to rational decision-making.

Thus, empirical evidence corroborates international findings that cognitive practices are not only reflections of individual cognitive styles; they represent a systemic resource for bolstering the enterprises' competitiveness (Grimaldi et al., 2025; Ohlert et al., 2025). For Ukraine, this underscores the imperative for institutional support aimed at fostering cognitive education among entrepreneurs, the integration of artificial intelligence into business analytics, as well as the development of collaborative knowledge platforms in alignment with SDG 17.

## Conclusions

The study elucidated that cognitive decision-making practices constitute a pivotal element in enhancing the efficacy of entrepreneurial activity amid global uncertainty. In the contemporary business environment, characterized by an exponential increase in information flows, the entrepreneurs' capacity to combine analytical, intuitive, and adaptive thinking has become critically essential for enterprises' sustainable evolution. The trends delineated across six nations revealed that a culture of analytical thinking enhances the precision of strategic decisions, while cognitive flexibility bolsters resilience against shocks and crises.

Cross-national disparities in cognitive frameworks governing entrepreneurial decisions were examined. These disparities are also shaped by differences in institutional environments, which determine the extent to which cognitive biases are mitigated or amplified in the decision-making process. In European Union countries, particularly Germany, France, and the Netherlands, an analytical type of thinking predominates, fostering a stable correlation between investments in brand capital, customer loyalty, and financial performance. Conversely, Poland and Spain exhibit an intuitive and adaptive orientation, emphasizing rapid responsiveness to market fluctuations. Ukraine occupies an intermediate position between these clusters: Ukrainian entrepreneurs adeptly integrate rational methodologies with pronounced emotional and intuitive sensitivity regarding the market. This suggests the emergence of a new type of entrepreneurial cognition (hybrid in nature), merging analytical systematicity with behavioral plasticity.

The relationship between the digitalization of brand management and cognitive approaches to decision-making is scrutinized. The substantial proportion of digital communications within the marketing expenses framework, particularly in Ukraine, underscores the significance of digital analytics as a cognitive support mechanism for entrepreneurs. These findings align with global sustainable development goals, chiefly SDG 8, SDG 9, and SDG 17. In this context, the implications of the results bear considerable practical significance for designing educational programs centered on entrepreneurial cognition, enhancing SME support policies, as well as establishing institutional frameworks for knowledge exchange among nations.

The established cognitive profiles of strategic brand management possess substantial potential for practical application within governmental entities, consulting firms, and business associations. These profiles can be utilized to formulate cognitive maps of business strategies, diagnose decision-making paradigms, and evaluate organizational readiness for digital innovation. For enterprises, these findings provide a foundational framework for constructing systems that monitor cognitive factors influencing management efficacy, integrating artificial intelligence tools into strategic planning, and devising adaptive business models.

The scientific novelty resides in the synthesis of cognitive analysis with empirical macroeconomic indicators, culminating in the development of a two-cluster model that describes international patterns of entrepreneurial thinking. In addition, the study extends the interpretation of cognitive decision-making by introducing the concept of opportunity cost associated with cognitive biases, highlighting their direct impact on pricing accuracy, investment efficiency, and overall business performance. The practical significance of this study is reflected in creating an analytical foundation for the formulation of cognitively-oriented brand management strategies designed to enhance the enterprises resilience in the face of external disruptions.

The limitations of this study stem from the reliance on aggregated macro data, which fail to account for entrepreneurs' nuanced micro-behavioral characteristics. Future research should focus on micro-level analyses of cognitive patterns, the experimental evaluation of interventions in decision-making processes, as well as the comparative assessment of AI influence of artificial intelligence across various stages of the entrepreneurial cycle. In summary, the findings confirm that the integration of cognitive analysis with digital tools enhances the entrepreneurial decisions' efficacy, while international knowledge exchange fosters the establishment of a sustainable ecosystem for entrepreneurial development within the framework of SDG.

#### Credit Authorship Contribution Statement

Conceptualization was carried out by Bulavina, O., Kremena, R., Zhylin M., Shevchuk, O., and Ulinici, A.; methodology was developed by Bulavina, O., Kremena, R., and Ulinici, A; formal analysis and investigation was performed by Bulavina, O., Kremena, R., Zhylin M., Shevchuk, O., and Ulinici, A; data curation was undertaken by Bulavina, O., Kremena, R., and Ulinici, A.; the original draft was prepared by Bulavina, O.

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#### Conflict of Interest Statement

The authors declare no conflicts of interest.

#### Data Availability Statement

The data supporting the findings of this study are derived exclusively from publicly available secondary sources, including the State Statistics Service of Ukraine (SSSU), the World Bank Group (WBG), the International Monetary Fund (IMF), the European Investment Bank (EIB), and the Publications Office of the European Union (POEU). The processed datasets and analytical calculations are available from the corresponding author upon reasonable request.

#### Ethical Approval Statement

This study is based exclusively on secondary data obtained from publicly accessible institutional databases and published statistical sources. It does not involve human participants, animals, clinical data, surveys, interviews, or experiments. Consequently, ethical approval and informed consent were not required in accordance with applicable institutional and international research ethics guidelines.

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