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The Concept and Manifestation of Behavioral Economics: Domains and Processes

Serhii Petrukha[1,*], Nina Petrukha[2], Ihor Kononenko[3], Maryana Matveyeva[4], Dymytrii Grytsyshen[5]

[1] Department of Transport and Logistics, West Ukrainian National University, Ternopil, Ukraine
[2] Department of Management in Construction, Kyiv National University of Construction and Architecture, Kyiv, Ukraine
[3] Educational and Rehabilitation Institution of Higher Education "Kamianets-Podilskyi State Institute", Kamianets-Podilskyi, Ukraine; Institute of Technology and Business in Prešov, Prešov, Slovakia
[4] Department of Public Administration, Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies, Lviv, Ukraine
[5] Zhytomyr Polytechnic State University, Zhytomyr, Ukraine

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ABSTRACT

Behavioral economics has arisen as an important discipline that bridges the gap between psychology and traditional economic theory, questioning the conventional wisdom that consumers are always rational actors. Furthermore, behavioral economics provides frameworks for understanding the intricacies of consumer behavior, particularly in the digital age, both in microeconomic domain (consumers' behavior) and macro-plane (public policy). Based on integrative review method, the study revealed and summarized existing theories of behavioral economics, their paradigms, implications, and contradictions. In particular, the peculiarities of nudging are analyzed, including the ones in today' digital age. Behavioral economics manifestations both at micro-level and macro-level, as well as micro-macro levels dependencies were analyzed, and implications for public policy were suggested. Potential ramifications of the findings include improved prediction models, promoting wise choices, and upending preexisting economic paradigms. This study adds to the body of knowledge in this developing topic by outlining the importance of researching behavioral economics in order to have a solid grasp of human behavior in social and economic contexts.

1. Introduction

Behavioral Economics is an interdisciplinary science that employs facts, models, and methods from neighboring disciplines such as psychology, sociology, anthropology, and biology to develop descriptively accurate findings about human cognitive ability and social interaction, as well as to investigate the implications of these findings for economic behavior. Cognitive biases, defined as systematic patterns of deviations from norms or rationality in judgment, are frequently found. Consumers' decisions are frequently influenced by emotional, social, and psychological aspects. The behavior of various economic agents is frequently not fully rational due to factors such as a limited capacity to calculate the cost and benefit of a decision, a lack of self-control and a desire for immediate satisfaction, the display of different choices in different emotional states, and the use of simple rules of thumb - Heuristics - as a simple and easy way of making decisions [1].

[*] *Corresponding author.*
E-mail address: psv03051984@ujis.in.ua

Behavioral economics is used at the micro level to investigate how psychological factors influence individual decision-making, and at the macro level to observe how these individual behaviors aggregate and interact to create larger market patterns, such as market anomalies or shifts in macroeconomic outcomes such as consumption habits. While the micro level focuses on individual biases and bounded rationality, the macro level addresses their aggregate impact on economic systems, frequently explaining events that orthodox economic models do not account for. Thus, behavioral economics effects decisions at all levels, from consumers to policymakers. Behavioral economics enhance strategic management practices. Organizations have the possibility to gain sustainable competitive advantages by integrating behavioral insights into their strategy formulation, risk assessment, resource allocation, and stakeholder management processes

When behavioral economics (BE) first gained popularity, it was widely regarded as a microeconomic tool that focused on the peculiarities of individual decision-making. However, as governments, companies, and economists began to employ it more extensively, a new concern arose: whether behavioral economics shapes systemic decision-making rather than individual decisions. In 2020, the OECD Behavioral Insights Unit identified BE as a tool for both micro and macro public policy formulation, highlighting its impact on citizen trust and systemic behavior [2]. Interestingly, the UAE's Behavioral Sciences Lab, founded under the Prime Minister's Office, was created expressly for policy-scale behavioral experiments, such as in education, sustainability, and digital services [3].

One of the most visible signs of behavioral economics' progress across the micro-macro spectrum is its role in digital transformation. Behavioral design is now a critical component in the development of platforms, applications, and customer-facing ecosystems, but it has the potential to impact millions of people and systemic behaviors.

In this vein, the objective of this article is to integrate and summarize various viewpoints and evidence regarding manifestations of behavioral economics within both micro- and macro-perspective.

2. Literature Review

2.1 Theoretical Domain

Because of the paradoxes that rational choice theory has produced, behavioral economics has emerged as a field of study in economics. Furthermore, it is an area of economics that examines how individuals make tangible decisions on a daily basis, challenging the tenets of the traditional economy [4]. According to the literature, behavioral economics is a subfield of economics that is predicated on the theories of human behavior. These theories are supported by findings from other social sciences, biology, and psychology research. Behavioral economics is a branch of economics that has grown out of the paradoxes that rational choice theory has created. Additionally, it is a branch of economics that challenges the principles of the traditional economy by analyzing how people make concrete decisions on a daily basis [4]. Based on theories of human behavior, behavioral economics is a branch of economics, according to the literature. Research in biology, psychology, and other social sciences supports these theories.

Behavioral economics, an interdisciplinary field that blends economics and psychology, is crucial to comprehending how psychological processes influence people's financial decisions. Thaler [5] asserts that the rise of behavioral economics has put traditional economics, which is predicated on the idea of the "rational man", to the test and successfully fixed the flaws and shortcomings in conventional economic theories and models. The field of behavioral economics research has advanced significantly in recent years. By moving from the periphery of economics to the center, behavioral economics theory has made it possible for individuals to examine and comprehend human aspects and how they affect economic activity from a wider range of perspectives.

By focusing disproportionately on salient payoffs - those that stand out in a particular choice context - instead of giving equal weight to all outcomes, Bordalo *et al.* [6] adopt salience theory to analyze how people make decisions under risk. Systematic behavioral biases like overreaction to extreme outcomes or underweighting of less important information are captured by this divergence from neoclassical expected utility theory. The authors contend that these distortions are predicted even when these salience-driven decisions depart from individual rationality. Although the article itself does not directly assess whether aggregate market results remain rational, this predictability does pave the way for possible rectification by institutional design or market processes. However, the model further bridges the gap between behavioral insights and conventional economic modeling by demonstrating how systematic cognitive biases may be defined and integrated into microeconomic theory.

Salience theory is applied to consumer choice by Bordalo *et al.* [7], who demonstrate how people consistently give more weight to features of products that stand out in a particular situation (like very cheap pricing) and less weight to less noticeable but no less significant features. Predictable infractions of the neoclassical paradigm of utility maximization result from this, such as contradictory decisions made across frames that appear to be similar. However, based on the relative importance of product features, these distortions follow recognizable patterns and are not random. The systematic nature of these biases suggests that markets could, in certain circumstances, predict or even counteract them through price tactics, product placement, or competition, even though the research primarily focuses on individual-level departures from rationality. Even while the overall impacts of behavioral anomalies rely on the institutional context and market dynamics, the work supports the more general idea that these anomalies can be accurately represented within microeconomic frameworks.

2.2 Consumer' Decision-Making: The Role of Biases, Emotions, and Nudges

According to Shah's [8] narrative review, cultural values, social factors, and cognitive biases all have a significant impact on people's decisions. Recent behavioral economics research has shown that consumers, particularly those making health-related decisions, can be influenced by biases such as loss aversion, anchoring, and present bias. Furthermore, it investigates how religious and cultural variables influence how people in different societies behave as customers. The analysis also underlines the relevance of nudging and other culturally relevant interventions in helping people make better health and financial decisions. Furthermore, the importance of cultural, social, and personal elements in determining how nudges function for different people and groups is emphasized. For example, nudges that work in a Western metropolis may not function as effectively in the country or in cultures with distinct health beliefs and behaviors.

The idea of nudging, created by Richard H. Thaler and Cass R. Sunstein, is fundamental to behavioral economics and involves using little changes to influence human behavior. By taking advantage of cognitive biases, nudges are intended to influence decisions in predictable ways without limiting options or altering incentives [9]. In fact, nudging employs choice architecture principles to impact judgments gradually, encouraging positive behaviors while keeping autonomy.

The potential of nudge theory to promote the adoption of sustainable products is examined by Gupta et al. [10]. According to the study's findings, nudges can improve consumer behavior in a variety of cultural situations and raise knowledge of sustainability. Consumer choices are immediately impacted by nudges, but the data also suggests that further research is necessary.

Hasan et al. [11] combine decades of research in their integrative review, concentrating on four main themes: the influence of framing and choice architecture, emotional drivers of behavior, social influences on consumption, and cognitive shortcuts and biases. Remarkable research shows

systematic departures from rational choice through patterns including anchoring, loss aversion, and the endowment effect. Consumer choices are further influenced by emotions like regret and anticipation, and peer pressure and societal norms quietly impact what people buy. Furthermore, without changing financial incentives, the way choices are structured through nudges or defaults has a significant impact on consumer behavior. This review offers a sophisticated framework for comprehending decision-making in the real world by fusing ideas from marketing, psychology, and economics. In addition to advocating for the moral use of behavioral interventions to protect consumer autonomy, it makes the case that incorporating behavioral insights results in more successful marketing campaigns, laws, and corporate operations.

2.3 Psychological Underpinning of Market Processes

According to Abhyankar [12], while many psychological elements are important even for markets, market exchange renders them irrelevant. Research in behavioral economics has shown that people's judgments and decisions are frequently subject to systematic biases and heuristics, and that they are heavily influenced by the context of the decision. This is in contrast to the traditional neoclassical economics assumption that people are rational homooeconomicus who always seek to maximize their utility and follow their "true" preferences.

Studies in behavioral economics show that cognitive heuristics - elements that could be regarded as predictive of choice behavior - affect decision making. Cognitive outline, alternative anchoring, the degree of prototypicality of alternatives, their memory availability, and the retro-assessment of alternatives are the most researched of these.

Heuristics (mental shortcuts), framing effects (the way decisions are presented), loss aversion (the greater impact of future losses), and bounded rationality (limited cognitive capacities) are some of the key ideas of behavioral economics (BE) that are discussed in the literature. By "nudging" people toward better decisions, an understanding of these factors aids firms and policymakers in creating more successful strategies, ranging from financial planning to marketing [13]. Table 1 provides a concise overview of the principles, rules, and uses of behavioral economics.

Table 1.
Behavioral economics' paradigm elements

How Decisions Are Explained by Behavioral Economics	Important Behavioral Economics Concepts	Key Ideas in Behavioral Economics
Challenges of Conventional Rationality: Behavioral economics acknowledges that people are emotional, predictable, and capable of making "unwise" decisions, in contrast to traditional economics, which holds that people always make decisions to maximize their utility rationally.	Prospect theory describes how people view and respond asymmetrically to possible benefits and losses, placing greater emphasis on the suffering of losses than on the joy of comparable gains.	Marketing and Product Design: Businesses create goods and marketing efforts that appeal to consumer psychology by using behavioral insights.
Aspects of psychology: It recognizes that the following factors affect decision-making: Cognitive biases include confirmation bias and overconfidence, which are systematic patterns of judgmental divergence from the norm or from reason.	The concept of bounded rationality holds that people's ability to make decisions is constrained by their time, information, and cognitive limitations.	Finance: Behavioral economics aids in the explanation of irrational investor behavior and the effects of variables such as loss aversion in financial markets.
	Choice Overload: People may become overwhelmed and find it difficult to make wise selections when there are too many options accessible.	Public Policy: To develop interventions that support desired behaviors, including advancing environmental sustainability or

Heuristics are mental shortcuts that facilitate speedy decision-making but may result in mistakes. Emotions: The part emotions play in forming decisions, such as projection bias or loss aversion, which is the dread of losing something. Social Influences: The ways in which other people's actions and decisions, including herd mentality, affect personal choices.	Nudges and choice architecture are strategies for influencing decisions without limiting options. Among the examples are: - Defaults: Making a chosen choice the standard setting, like enrolling individuals in retirement savings plans automatically. - Framing is the presentation of options in a way that highlights particular features, which might influence how people view them.	health, policymakers employ behavioral concepts.

Source: Cartwright [14]

2.4 Macroeconomic plane

Driscoll and Holden [15] revealed that behavioral economic insights have contributed to development in macroeconomics, emphasizing the need of using behavioral aspects in the design of savings plans and pension systems. Furthermore, the authors argue that behavioral aspects can aid in the resolution of difficulties in the New Keynesian model, such as the counterfactual absence of inertia in the classic New Keynesian model of economic fluctuations. At the same time, the authors emphasize that more study is needed to distinguish between behavioral and conventional causes.

At the same time, the relationships between BE at the micro and macro levels are complex and not always obvious. The author presents a paradigm for evaluating a self-organizing-optimizing system of autonomous interacting agents, with nonlinear dynamics at the macro level and stochastic individual behavior at the micro level. Judge [16] discussed how to empirically depict and analyze the nonequilibrium nature of macroeconomic behavior systems and illustrated how to assess and comprehend the hidden parts of stochastic dynamics that drive them using entropy-divergence methodologies and micro income data. The study presents empirical applications of the information theoretic family of power divergence measures-entropic functions, interpreted in a probabilistic setting with Markov dynamics.

Meanwhile, despite the availability of valuable scholarly publications in the field of micro- and macro-manifestations of BE, this domain remains interesting and perspective for research, in particular with regard to peculiarities of digital economics and VUCA/BANI environment.

3. Methodology

Due to the nature of the topic being studied, this study's research approach was deductive and grounded in theoretical research reflections from the reference field. Induction, recovery statements, and theories from the literature on economic practice were used to support the deduction.

The research is of qualitative nature. The research tool of choice was the integrative review. While a systematic review usually focuses on a single topic in a specific context and uses a preset process to synthesize data from related studies, a narrative review may include a broad range of studies and provide an overall overview, along with interpretation and critique. Topics that need a meaningful synthesis of research evidence - which may be wide or complex - and that call for in-depth, nuanced description and interpretation are frequently well-suited for narrative reviews. The selection of the narrative review method as a research tool for the current study was based on these characteristics.

For generating the sample of items for study, the Consensus platform, which searches numerous databases simultaneously through a single interface, was used. The following databases were chosen

based on the research topics and the library's general suggestions, as well as education and psychology-related resources: MDPI, Springer, ScienceDirect, ResearchGate, and JSTOR. The extra limitation "English language" was also selected in this interface. 267 resources were found as a result of this search. After removing duplicate items from both within and between databases, combining all of these resources produced 164 unique resources. The publication's scope, volume (a minimum of three pages was required for inclusion), scientific quality, and relevance to the subject were all evaluated during the screening process. The selection procedure is shown in a schematic in Figure 1.

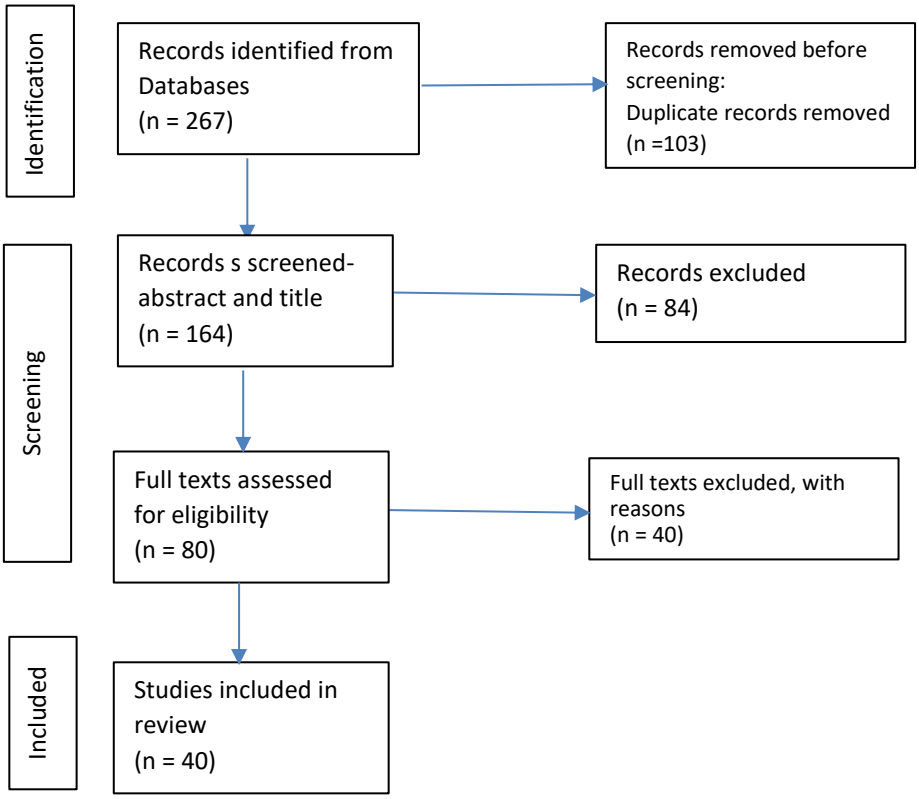

Fig. 1. Diagram of the selection process
Source: developed by the authors

4. Results and Discussion

4.1 Perceived Risk and Emotions. Consumption and Happiness Tie

In consumer research and policy, behavioral economics' ideas are now widely accepted. Today, the empirical and theoretical insights of BE have become a cornerstone of understanding consumer behavior, helping to inform policymakers on how to encourage people to make better, smarter, healthier, and more sustainable choices in a variety of fields, including health behavior, pension saving, investment decisions, food choices, sustainable consumption, and warning sign design [17]. BE addresses the issue of how individuals truly act when making decisions and how to make better decisions to increase the welfare of consumers. Using the right tactics to increase sales every quarter is always important for the market. The findings of BE science provide businesses with strategic guidance to advance innovation, enhance adaptive strategic management decision-making, and promote sustainable practices within dynamic ecosystems shaped by the growing influence of behavioral economics on managerial frameworks, which capitalize on a deeper understanding of human behavior.

People respond to risky situations on two levels: cognitively and emotionally. As a result, making decisions in uncertain and risky scenarios goes beyond simple cognitive processes. Emotions have an impact on how risk is perceived and approached. Amos Tversky's empirical research challenged the

notion that investors are logical. Tversky established in 1995 that investors are more likely to make risk-averse choices in profits and risk-seeking ones in losses. Investors appear to be risk-averse for minor losses yet unconcerned about a tiny likelihood of a major loss (quoted in Rizzo and Whitman [18]). This undermines the widely held notion of economic rationality.

Daniel Kahneman and Amos Tversky demonstrated that most people exhibit risk-averse behavior when their potential earnings are disclosed, and they turn into risk-seekers when they are confronted with possible losses. This behavior is similar to that of a gambler who raises the stakes in an attempt to eliminate losses. The results of the traditional theory of expected utility, which was created by mathematician Daniel Bernoulli, were rejected as a result of this finding, which has been empirically proven via multiple research.

With a focus on the idea of emotional intelligence and the potential for purchasing behavior through emotions or affective states that frequently lie at the cognitive dissonance, the role of emotions and attitudes that define the decision-making process is starting to be taken into account more in the context of BE. Behavioral economics improves on classical explanations of consumer utility by incorporating psychological aspects of the consumer's decision, analyzing decision-making utility, anticipatory utility, experimental utility, residual utility, diagnostic utility, and closely related concepts of behavioral economics tools such as employment effects, ownership effects, loss aversion, and status quo. Consumer decisions should result in a particular level of contentment, or better still, happiness.

According to behavioral economists, the continual negative link between consumption and happiness may be due to people's lack of awareness of what causes them to be happy or unhappy. Every time a person makes a decision and does not get the expected consequences or discovers an option that might have yielded a better result, they are a potential for regret. Can be taken into account both regret post-choice, which appears after the individual has experienced the outcome of the decision, and regret in advance, which manifests itself before it is made. Thus, aversion to regret can have the effect of consumer inertia. For this reason, behavioral economists believe that consumer decisions must be considered in terms of opportunity costs and the remorse that comes with them [19].

4.2 Critique of Rationality

A rising understanding that customers' and enterprises' own heuristics and biases may lead their conduct to stray from the economic model of rationality has resulted from the integration of behavioral sciences into microeconomics, which focuses on the decisions and actions of individual actors. Most major institutions now include behavioral economics in their courses, and behavioral techniques are included (even briefly) in most mainstream textbooks. Furthermore, behavioral economics has boosted alternative viewpoints like Nathan Nunn's research on cultural economics, Robert Shiller's Narrative Economics, and Ernst Fehr's work on "strong reciprocity" by highlighting the shortcomings in the dominant rational-actor approach [20].

However, the behavioral revolution's influence outside of microeconomics is still quite small. Since economics frequently takes its cues from the natural sciences, especially physics, many academics remain dubious about applying psychological insights to the area. The well reported crisis of replication in psychology has added to this pessimism.

The behavioral tendency has been mostly disregarded by macroeconomists, who examine how economies work overall and the effects of variables like output, inflation, currency rates, and monetary and fiscal policy. Their apathy appears to be a reflection of their conviction that personal peculiarities must balance one another out and that the odd deviations from reason noted by behavioral economists must be counterbalanced. This method directly implies that there is no need

to enhance quantitative assessments based on value-maximizing behavior, such as the dynamic stochastic general equilibrium models that are the mainstay of policymaking.

But it's still unclear if these presumptions are accurate. The responses of economic actors, especially financial institutions and investors, seem to be motivated by herd mentality and what John Maynard Keynes called "animal spirits" during banking crises like the Great Recession of 2008 or the current crisis brought on by the recent failure of Silicon Valley Bank (quoted in Chaudhuri [21]).

As Keynes points out in The General Theory of Employment, Interest, and Money, "anticipating what average opinion expects the average opinion to be" is rife with uncertainty and inaccuracy even in the absence of a financial crisis. But even with George Akerlof's steadfast support for a behavioral macroeconomics that takes into account "cognitive bias, reciprocity, fairness, herding, and social status", macroeconomic theory's practical underpinnings are still weak, and there has been little progress in systemizing knowledge of contagion-type phenomena using techniques like network analysis (cited in Sunstein [22]).

The opposition of economics to behavioral sciences has longstanding roots [23]. Elinor Ostrom's answers to the tragedy of the commons and the work of Akerlof, Michael Spence, and Joseph E. Stiglitz (all four received Nobel Prizes) on asymmetric information are examples of exceptions to the dominant neoclassical paradigm that have been recognized by the discipline in recent decades. However, economists have resisted updating the fundamental presumptions of the field.

4.3 Behavioral Economics in Digital Age: New Grounds and Manifestations of Consumer' Behavior

Recently, the study of consumer behavior patterns in the digital economy has been introduced to the BE research area. Applying psychological principles, behavioral economics explains how consumers make decisions in the digital economy, impacting everything from app engagement to online purchases. Digital platforms use concepts like social proof, scarcity cues, and personalized suggestions to influence user behavior. This might result in more conversions and loyalty, but it can also raise ethical questions regarding data protection and manipulation. This confluence generates both opportunities for digital nudging, which helps users make better decisions, and risks of exploitation due to algorithmic designs that take advantage of cognitive weaknesses [24]. As demonstrated by both Tamilarasi [25] and Bergram *et al*. [26], the integration of digital technologies and behavioral economic theory has ushered in a new era of persuasive design that is defined by the concept of nudging.

In the digital era, algorithms, social proof, targeted ads, and real-time data feedback all influence decisions in addition to individual preferences and needs. Cognitive biases including anchoring, loss aversion, and the availability heuristic have been exacerbated by these digital tools. For example, price anchoring is a common strategy used by internet businesses to make discounts seem more alluring and influence customers to make particular purchases [27]. Digital platforms are made to draw and hold users' attention, frequently taking advantage of behavioral patterns to make money. Compulsive behavior may result from the infinite scroll, playback capabilities, and customized alerts, which play on users' cognitive shortcuts. These methods serve as examples of "nudging", which is the idea that little adjustments to the decision architecture can affect behavior without limiting possibilities. Nudges are frequently imperceptible but incredibly powerful in the digital marketplace, influencing customer journeys in ways that they might not be entirely aware of.

Convenience is becoming a major factor in customer decision-making thanks to the growth of e-commerce and mobile applications. However, there is a cost to this convenience: less consideration and a greater propensity for impulsive purchases. Behavioral economists investigate how self-control is impacted by digital interfaces, demonstrating that convenience and smooth transactions might take precedence over long-term objectives or financial concerns. One-click ordering, in-app

purchases, and temporary promotions take advantage of the urge and scarcity effects to promote hasty, frequently illogical decisions.

Furthermore, how customers look for and assess information has changed in the digital age. People are prone to information overload because there are so many reviews, comparison tools, and user-generated content available. This frequently results in decision fatigue, which makes people rely more on default options or heuristics. According to behavioral economics, consumers may put convenience ahead of accuracy or satisfaction, which can result in less-than-ideal decisions [28].

Digital platforms' growing reliance on data analytics and behavioral tracking has given marketers the ability to comprehend and forecast customer preferences with previously unheard-of accuracy. The relationship between digital interfaces and behavioral patterns is heightened by this degree of customization. Customers are consequently responding to algorithms that are intended to mold their tastes in addition to making choices based on their own preferences. Concerns about autonomy, privacy, and manipulation have arisen as a result of this interaction, leading to a more thorough investigation of the moral implications of behavioral economics in online trade.

Overall, the decision-making process of consumers has changed significantly in the digital world due to the quick growth of digital technology. In addition to having a significant impact on consumer decisions, digital technologies like information overload, personalized suggestions, social media group effects, and digital payments also make behavioral economic phenomena like mental accounting and bounded rationality more apparent. Using behavioral economics principles like reference dependency and loss aversion, Chen [29] shows how customers use digital platforms to make "good enough" judgments instead of the best ones. He specifically points out that consumers are getting completely new purchasing experiences thanks to technology like virtual reality (VR) and augmented reality (AR). By enabling customers to experience goods or services in virtual worlds, these technologies produce immersive retail environments that influence consumers' emotional choices and buying patterns. Customers can simulate usage situations to see the real consequences of products in virtual stores in addition to viewing things from a 3D perspective to comprehend their appearance and characteristics. By increasing customers' attention and emotional connection with things, this immersive experience transcends the constraints of traditional shopping and influences their decisions to buy. Additionally, virtual reality produces completely immersive virtual shopping environments that let customers experience what it would be like to walk into a store, browse merchandise, try it on, or communicate with virtual salespeople or other customers. By improving interaction and entertainment, this kind of shopping not only raises customer satisfaction and engagement but also improves the urge to buy. Customers can have more tailored and interesting shopping experiences thanks to these immersive technologies, which influences their purchasing decisions.

Furthermore, taking deep learning and reinforcement learning into consideration, the exponential expansion in data availability allowed for the quick advancement of machine learning capabilities. This made it possible to create AI systems for big data pattern selection and a variety of other applications, including computer vision/image recognition, speech/natural language processing, recommender systems (like those found in social networks and search engines), and predictive analytics [30]. This laid the groundwork for the first AI-enabled products that the general public used: virtual personal assistants like Alexa, Siri, or Cortana.

4.4 AI Revolution and Social Influence Via Digital Platforms: New Options of Nudging

With AI and machine learning algorithms customizing recommendations, products, and information, personalization has emerged as a key component of digital customer engagement. Although customization improves the user experience, it also reduces options and strengthens

confirmation bias. In order to discreetly guide behavior in predefined directions, behavioral economists study how these feedback loops can restrict exploration and reinforce preexisting preferences. This brings up significant ethical issues around manipulation and autonomy in digital settings.

Another important consideration for consumers in the digital age while making decisions is social influence. Herd behavior, in which people imitate the behavior of others rather than using their own judgment, is influenced by social media trends, influencer endorsements, and online evaluations. Consumers frequently follow perceived standards, even at the expense of their own preferences or common sense, which behavioral economics explains [31]. This phenomenon is especially apparent in viral marketing and networked consumption patterns. Rich insights into how and why people make the decisions they do online are provided by the incorporation of behavioral economics into the study of digital consumer behavior [32]. Businesses, legislators, and consumers all need to grasp these behavioral tendencies as technology develops further. Stakeholders may create more effective systems that encourage openness, equity, and better informed decisions in the digital marketplace by acknowledging the psychological foundations of digital decision-making.

Cascio developed the BANI idea in 2020 as an extension and modernization of the VUCA concept, which has been used since the Cold War, to characterize the modern world [33]. Both models highlight how complicated things are right now and how unpredictable and varied the business environment is. Businesses must adopt a new management style based on adaptability, empathy, and the capacity to function in unpredictable environments. In order to deal with the most recent, complex reality, owners and managers need reconsider their methods and tactics and create new ones. In particular, BE tools can act as a “lifebuoy” to help them stay afloat in this tumultuous environment.

The advent of behavioral nudging on online platforms is another significant feature of the digital age. Digital nudges are used by governments, health organizations, and corporations to promote positive habits like saving more money, eating better, or practicing sustainable consumerism. Although the goal of these nudges is to increase welfare, they also pose concerns around transparency and consent. Behavioral strategy deals with strategic management from a psychologically informed perspective, integrating emotional aspects in strategic management. Behavioral economics is essential to policy formulation and digital governance because it offers a framework for assessing the morality and efficacy of these interventions. Therefore, in the contemporary digital era, there is a sort of convergence between macroeconomic and microeconomic levels in BE. Furthermore, behavioral insights can be used by governments and consumer protection organizations to create efficient actions that protect consumers against deceptive advertising and predatory behavior. Setting default options or streamlining online disclosures, for instance, can significantly enhance user outcomes. These observations aid in bridging the gap between the ability of the typical customer to make wise selections and intricate digital systems.

4.5 Changes in Macroeconomic Domain of BE: Theory and Practice

Researchers have been adding increasingly more behavioral economics findings to macroeconomic models over the last three decades. This modification has two primary causes. First, macroeconomists have realized that models that rely on the premise of optimal behavior frequently struggle to account for important real-world data. In order to improve the fit of their model predictions to the data, researchers have employed behavioral economics assumptions. Earlier attempts to accomplish this were deemed ad hoc. The second justification for integrating behavioral economics findings into macroeconomics has lessened the severity of this criticism: experimental

economists and cognitive psychologists have shown several consistent differences between human and "economic man" decisions.

Insights from behavioral economics have contributed significantly to our knowledge of macroeconomic phenomena by helping to explain more aspects of real-world behavior than the more restrictive theoretical framework that most economists have previously used. Some behavioral assumptions that have already been integrated in macroeconomic models, such as fairness considerations, appear particularly promising. In other circumstances, one can guess that behavioral assumptions are required to explain macroeconomic mysteries such as the economy's inertial reaction to shocks, but it is unclear which assumptions are the optimal ones. Other cognitive psychology findings have still to be investigated in terms of macroeconomic ramifications.

However, there are issues with adding behavioral assumptions to macroeconomic models. It is frequently challenging to determine which behavioral characteristics are most pertinent for macroeconomic models, even when there is strong microeconomic evidence for those aspects from experimental economics or cognitive psychology. For instance, whereas inertia in macroeconomic consumption behavior is well supported by research, it is unclear if this inertia results from habit formation, rule-of-thumb consumption, or other factors [34]. The question of whether behavioral characteristics or other departures from the conventional economic model, such as agency issues, financial frictions, or incomplete information, should be included in macroeconomic models is also up for debate. Therefore, additional study is required to inform the model specification selection.

Behavioral economics adds bounded rationality to microeconomics while maintaining important structural tenets, rather than replacing it. Say's law, the macro-level idea that output creates revenue and, consequently, the capacity for demand, is essential to this integration. Because of this relationship, microeconomic limitations mirror more fundamental macroeconomic ideas. According to Da Silva [35], as long as adjustments are made over an extended period of time, the basic truth that supply creates the revenue required for demand is unaffected even when market behavior is warped by correlated cognitive biases and the positive feedback dynamics that go along with them, such as herding or bubbles. The author also explores how behavioral aberrations affect collective results. The author also demonstrates how institutions serve as circuit breakers. Institutions (central banks, bankruptcy courts, and regulatory agencies) take action to break feedback loops and reroute behavior toward sustainable patterns even in the face of behavioral distortions. Notably, these organizations arise in response to the necessity of preserving the supply-demand relationship rather than being outside of Say's rule. They restore long-term consistency by filtering out excessive behavior. Bank recapitalizations and post-crisis stimulus, for instance, help to keep demand from collapsing and separating from productive capacity.

Under the proper institutional settings, it is possible to redirect the same psychological factors - cognitive bias, behavioral noise, overconfidence, herding, etc. - that skew individual judgment. The secret is to design surroundings that transform human flaws into signals rather than distortions, not to eliminate them. Similar techniques, such as competitive markets, price feedback, or institutional reforms, can reorient misaligned expectations toward coherent outcomes, much like aggregation and calibration strategies reduce behavioral noise in forecasting.

An adaptive learning assumption is included into a typical New Keynesian Macroeconomic model setting by De Grauwe [36]. Equations (1), (2), and (3), respectively, represent the aggregate demand and supply equations along with the Taylor rule.

$$y_t = a_1 \widetilde{E_t} y_{t+1} + (1 - a_1) y_{t-1} + a_2 \left(r_t - \tilde{E}_{\pi_{t+1}}\right) + \epsilon_t \quad (1)$$

$$\eta_t = b_1 \widetilde{E_t} \pi_{t+1} + (1 - b_1) \pi_{t-1} + b_2 y_t + \eta_t \quad (2)$$

$$r_t = c_1 (\pi_t - \pi^*) + c_2 y_t + c_3 r_{t-1} + u_t \quad (3)$$

where y_t is the output gap in period t, r_t is the nominal interest rate, π_t is the rate of inflation. π*is the inflation target. y_{t-1}, r_{t-1} and π_{t-1} are lagged variables of output gap, interest rate and inflation. Additionally, this model includes two components that look ahead to the output gap and inflation, that is $\widetilde{E_t} y_{t+1}$ and $\widetilde{E_t} \pi_{t+1}$.

The conventional DSGE model makes the assumption that agents have reasonable expectations. The tilde above E in the model above alludes to the fact that expectations are not logically formed. It is believed that agents have cognitive limits that keep them from having reasonable expectations. These agents employ basic forecasting principles and assess the rules' forecasting abilities after the fact. They decide to use the rules that forecast output and inflation rate the best as a result of this review. It is assumed that agents estimate future inflation and the output gap using basic principles, or heuristics. Optimism and pessimism are endogenous waves of animal spirits that drive the business cycle in a self-fulfilling manner due to this adaptive learning assumption. This also results in a two-way causal relationship, whereby optimism or pessimism causes output to rise or fall, and output growth or fall in turn exacerbates optimism or pessimism.

In the meanwhile, Roos [37] contends that due to basic issues with the DSGE methodology, incorporating behavioral characteristics into New Keynesian DSGE models is not persuasive. He argues that complexity economics and agent-based modeling are better ways to apply behavioral economics research to more realistic macroeconomic models. Since both behavioral economics and complexity economics stress the direct interaction of diverse agents that are boundedly rational, they are naturally related. A promising new method that could restore the relevance and realism of conventional macroeconomics is behavioral and complexity macroeconomics.

However, new counterfactuals to evaluate the consequences of policies like income taxation and new instruments to modify habits like savings rates are provided by behavioral models. Additionally, behavioral models offer fresh recommendations for the best course of action that can be described in a non-paternalistic way by techniques similar to those found in neoclassical models. Model uncertainty can offer a fresh justification for the use of behavioral nudges, but it does not support the use of the neoclassical model. Rather than considering behavioral economics as a distinct subfield that questions the presumptions of neoclassical models, it could be more fruitful to incorporate behavioral aspects to the extent that they aid in answering fundamental economic concerns.

4.6 Implications for Policy-Making

Prior to implementing behavioral approaches, policymakers should determine the answers to several important issues about:

– The issue they must address;

– Identification of target groups that the policy will address, as well as distinctions between them in terms of attitudes and motivations, should assist design a detailed plan of action;

– Acknowledgment of the structural and practical obstacles people encounter, which are imposed on them by the environment in which they behave;

– Availability of good options for various societal groups;

– The potential for present policies to be improved;

– Potential unforeseen and intended effects of the new protocols;

– Strategies for involving society in the problem-solving process, promoting public discussion, winning support, obtaining legitimacy when needed, and determining the best format for discussion.

A variety of solutions based on behavioral economics insights may be used after the answers to the aforementioned questions have been determined. These consist of:

– A suitable framing of the context of the choice, where the default or most prominent possibilities are the proposed alternatives;

– Supplying clear information and giving people more time to consider the matter before making a decision,

– Implementing commitment tools, such as cooling-off periods or financial goods, to stop money withdrawals before deadlines or when a negative habit takes over;

– Making an effort to alter societal standards by appealing to people's perceptions of themselves as "good citizens";

– Priming is the process of introducing people to particular images, words, or experiences in order to make them aware of the issue that has to be resolved.

Table 2 provides a more thorough description of potential reactions to behavioral tendencies.

Table 2.
Policy implications based on a behavioral approach

Approach of neoclassical economic school	Behavioral economics approach	Policymaking implications
Preferences are exogenous; institutions and the development of economic systems are neglected, as is the impact of other individuals on forming preferences.	People like members of their own group and are receptive to influence from those they like. They learn by watching others, particularly in unclear circumstances, during emergencies, and when others are experts.	Alter social norms to extend the impact of policies; exert influence over those in positions of authority within the community.
Decisions made out of habit are not covered by the theory; decision makers maximize their utility; only the effects of decisions are examined.	Current actions are influenced by the frequency of past behaviors; habits are hard to break the more often they are repeated, the more strongly they are linked to rewards, and the sooner the rewards arrive; When a decision is difficult, its implications are significant, and there is sufficient time and knowledge to think them through, conscious thought before making a decision occurs more frequently.	Think about the part habits play and how to "unfreeze" them; locate rewards for their behavior modification and prompt feedback to strengthen the new habit.
People are motivated to alter their behavior by financial incentives; analysis does not include altruistic motivations.	People care about the justice of their activities, and financial incentives have the potential to demotivate and displace intrinsic motivation.	Fines may be ineffective if the behavior that needs to be changed is deemed disgraceful, and prizes for good deeds may also be ineffective. Therefore, the regulation and the organization that enforces it must be seen as equitable.
Self-expectations on one's own conduct, attitudes, and beliefs are disregarded, and promises and commitments are not kept unless supported by consequences.	People want to lessen cognitive dissonance, which is the discrepancy between attitudes or values and behaviors; the possibility of feeling ashamed influences conduct.	Use voluntary pledges, particularly those that are written, public, made by organizations, and communicated through current channels of communication; Realistic promises should be made, ranging from the simplest to the most difficult; People need to take an active role.
People are indifferent to benefits and losses; readiness to pay is equivalent to willingness to accept.	People are loss-averse; they work harder to avoid losing money than to make it; they prioritize losses over gains; and they compare gains and losses to the status quo.	When someone has a legitimate claim to something that could be taken away from them, leverage your readiness to accept; use their willingness to pay when an upgrade is suggested and they are entitled to

		the status quo; Compared to incentives of comparable size, penalties are more potent disincentives; Compared to actively paid taxes, taxes collected at the source are simpler to implement.
People are logical and reasonable; they can evaluate options and choose the best one; they solve intertemporal choice problems via exponential discounting.	When making complicated decisions, people employ heuristics, or rules of thumb; they overestimate the likelihood of important and low-probability events and underestimate the likelihood of frequent ones; they employ hyperbolic discounting, are prone to framing effects and defaults; they exhibit overconfidence; and they undervalue free goods.	Rewards for conformance and penalties for noncompliance should be clearly explained; Short-term losses are more motivating than long-term gains; Using commitment technology can help avoid temptation and procrastination.
Increasing the quantity of information or options available does not necessarily make a person worse off; in fact, they may be disregarded or utilized to their advantage.	Giving individuals instructions is demotivating; having more options and information is overwhelming and hinders decision-making effectiveness.	To prevent information overload, decision options should be grouped together; People should be encouraged to participate in the creation of policies; pictorial information should be used to improve understanding; Governments ought to expand on already-existing organizations and projects.

Source: authors' development

The effectiveness of policy implementation in areas like under-saving, contract design, vulnerability measurement, and political support for redistributive policies, both in the Global North and Global South, could be significantly impacted by policy design principles based on insights from psychology and economics. Developing more successful policies can be facilitated by considering behavioral policy design concepts. The first step is to accurately identify the main policy bottlenecks using behavioral models. Scalable solutions that try to get around these constraints should then be carefully planned and evaluated. Lastly, it is important to expand effective interventions (see Fig. 2).

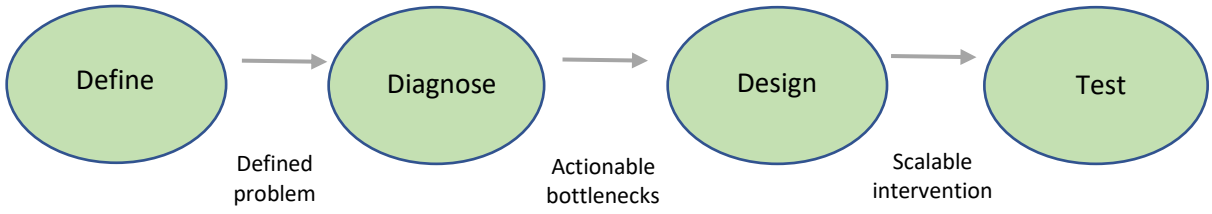

Fig. 2. The stages of behavioral design process
Source: Datta & Mullainathan [38]

The forecasting literature in behavioral economics and psychology, on the other hand, offers a striking example of how individual-level biases and random errors can be balanced with consistent results at the aggregate level [39–41]. Behaviorally noisy or biased assessments are frequently converted into more accurate collective projections by mechanisms including aggregation, averaging, and institutional filtering. The ramifications of these discoveries for economic cooperation are

significant. Under the proper institutional settings, it is possible to redirect the same psychological factors - cognitive bias, behavioral noise, overconfidence, herding, etc. - that skew individual judgment. The secret is to design surroundings that transform human flaws into signals rather than distortions, not to eliminate them. Similar techniques, such as competitive markets, price feedback, or institutional reforms, can reorient misaligned expectations toward coherent outcomes, much like aggregation and calibration strategies reduce behavioral noise in forecasting.

5. Conclusions

Economics has evolved into behavioral ideas and research. Over the past three decades, behavioral economics has transformed orthodox neo-classical economics. Furthermore, the way consumers engage with markets has been completely transformed by the digital era. Digital technologies have changed how people make decisions, from social media and e-commerce platforms to mobile apps and AI-driven customization. Digital marketplaces, as opposed to physical ones, provide fast access to information, a wide range of options, and customized marketing tactics that can either take advantage of or combat behavioral patterns.

Social media, e-commerce, and data analytics have all changed how consumers interact in the digital age. These platforms frequently result in impulsive purchases, subscription traps, and decision fatigue since they are built to take advantage of cognitive biases. Theoretically and practically, behavioral economics offers the means to critically analyze these occurrences. It allows researchers and companies to analyze the non-rational ways in which design elements, targeted ads, and peer pressure impact user behavior. Comprehending these trends is essential to creating digital spaces that are more moral and user-friendly.

In the meanwhile, neoclassical foundations are not doomed by the behavioral revolution in economics. It confirms their applicability under more practical presumptions. We obtain a version of microeconomics that is more empirically supported, psychologically informed, and institutionally conscious by loosening the ideal of perfect rationality while maintaining the architecture of constraints and equilibrium.

Economics must actively engage with human psychology if it is to reflect, let alone affect, human behavior. The neoclassical framework's power has been derived from its alluring parsimony, but as the number of recognized exceptions to it increases, each new discovery poses a potentially existential threat to the field's long-standing paradigm.

With so many academics pursuing new fields of inquiry, the future of behavioral economics and revealed preference research is bright. There are now more opportunities for research in the subject thanks to the incorporation of new technologies including machine learning algorithms, big data analytics, field experiments, and neuroeconomics. It is anticipated that these developments will offer a more thorough comprehension of how people behave while making judgments.

Author Contributions

Conceptualization, S.P. and N.P.; methodology, S.P.; software, I.K.; validation, N.P., I.K. and M.M.; formal analysis, N.P.; investigation, M.M.; resources, D.G.; data curation, M.M.; writing—original draft preparation, S.P.; writing—review and editing, I.K.; visualization, D.G.; supervision, S.P.; project administration, N.P.; funding acquisition, D.G. All authors have read and agreed to the published version of the manuscript.

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The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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