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1. Galatasaray University GSU Managerial and Social Sciences Letters is a peer-reviewed journal published periodically, twice a year, in March and September. The journal includes theoretical, conceptual, and empirical research articles in the fields of economics and administrative sciences, especially in economics, business administration, political sciences, and international relations. Whether or not applications from other disciplines will be evaluated is primarily decided by the editor during the preliminary evaluation. The publication languages of the journal are English and French.

2. The articles sent to the journal are first subjected to a preliminary examination in terms of form and content. The format requirements and the submission process must be fulfilled in accordance with the journal's conditions. Works that do not comply with these are subject to editorial rejection. The articles that are found suitable in terms of form and content are presented to the editorial board for reviewer appointments. It is not guaranteed that every article submitted to the journal will be included in the peer-review process. A period of two weeks is anticipated for the preliminary editorial evaluation of the articles and 10–12 weeks for the peer-review evaluation.

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5. The articles that have been evaluated and accepted for publication are listed in the issue they will be published in according to their discipline in Turkish alphabetical order: Economics (İktisat), Business Administration (İşletme), Political Science (Siyaset Bilimi), and International Relations (Uluslararası İlişkiler). Articles accepted for publication in the relevant discipline are listed alphabetically according to the surname of the responsible author.

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2. Les articles envoyés à la revue sont d'abord soumis à un examen préalable quant à la forme et au fond. Les exigences de format et le processus de soumission doivent être remplis conformément aux conditions de la revue. Les œuvres qui ne respectent pas celles-ci sont sujettes à un rejet éditorial. Les articles jugés appropriés en termes de forme et de contenu sont présentés au comité de rédaction pour nomination de relecteurs. Il n'est pas garanti que chaque article soumis à la revue soit inclus dans le processus d'évaluation par les pairs. Une période de deux semaines est prévue pour l'évaluation éditoriale préliminaire des articles et de 10 à 12 semaines pour l'évaluation par les pairs.

3. Les articles soumis à la revue sont envoyés à au moins deux examinateurs liés au domaine de l'article pour évaluation. Si l'un des rapports des examinateurs est positif et l'autre négatif, la décision de publication est prise par les éditeurs de la revue. Si cela est jugé nécessaire, l'article peut être envoyé à un troisième relecteur pour évaluation.

4. Les articles soumis à la revue ne doivent pas être dans le processus d'évaluation d'une autre revue en même temps et ne doivent pas avoir été acceptés pour publication ou publiés ailleurs auparavant. En téléchargeant l'article dans la revue, l'auteur ou les auteurs sont réputés avoir déclaré et accepté la responsabilité de cette publication.

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Editorial

Dear esteemed readers,

Galatasaray University Managerial and Social Sciences Letters (GSUMASS) is dedicated to fostering interdisciplinary research—particularly in economics, administrative sciences, and social sciences—with the aim of advancing both theory and practice. We also seek to build and share a vibrant research community with you, our esteemed authors and readers, by nurturing a strong research climate within our faculty. To this end, we publish two issues each year, in March and September.

Since our inaugural issue, we have worked with diligence and commitment. Now, we are delighted to present the second issue of the third volume of GSU MASS Letters. This issue features three invaluable articles spanning a broad range of topics. The first management article focuses on online purchasing behavior through the lens of personality traits. Then, the second political science article a critical analysis of the first Pink Tide, focusing on the experiences of Brazil and Venezuela. The third study analyzes project selection within R&D departments in the production of durable consumer goods using multicriteria decision-making.

We extend our sincere gratitude to everyone who contributed to this effort—including our field editors, referees, and authors. We remain committed to approaching future issues with the same dedication and care, confident that our journal will soon take its place among the most prestigious and influential publications in its field.

We hope you enjoy your reading experience.

Best regards,

Volkan DEMİR

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Online Shopping Intentions Through HEXACO Personality Traits: Assessment Within the Framework of TPB, ECM, and TAM*

Research Article / Araştırma Makalesi

Emre Harorlı†

ABSTRACT

The increasing demand of consumers for online platforms has intensified competition, prompting these businesses to enhance their services by analyzing consumer behavior in greater detail. Accordingly, businesses are seeking different methods to develop strategies to understand factors influencing consumers' online shopping behavior, to create personalized shopping experiences and increase customer satisfaction. This research combines common frameworks such as Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Expectation-Confirmation Model (ECM) to evaluate factors affecting purchases through websites and mobile applications. In addition, the research model incorporates the exogenous variable "HEXACO Personality Inventory Personality Traits" to understand consumers' personality traits, determine whether factors affecting purchasing behavior differ across personality types and examine the effect of personality traits on online purchasing behavior. The study analyzes the responses of 400 out of 423 participants using Structural Equation Modeling with SPSS AMOS. It was determined that intention, perceived ease of use, perceived behavioral control, subjective norm, and expectation had statistically significant effects on the attitude towards behavior and perceived usefulness. Furthermore, it was shown that the variables in the research model had distinct effects on each other for participants with different personality traits according to HEXACO personality inventory.

Keywords : *HEXACO, Theory of Planned Behavior, Technology Acceptance Model, Expectation-Confirmation Model, Online Shopping, Consumer Behavior.*

1. INTRODUCTION

The rapid advances in information and communication technologies have also changed consumer expectations and behavior, leading to the rise of online shopping as a convenient and popular means of purchasing goods and services. As of October 2024, the number of internet users worldwide reached 5.52 billion, representing 67.5% of the global population. In the same period, social media users were recorded at 5.22 billion, representing 63.8% of the global population (Petrosyan, 2024). The widespread use of internet and mobile devices has made easier for consumers to access online retail platforms. The wide range of online products and services has further accelerated the shift toward e-commerce. COVID-19 pandemic further accelerated this trend, as many consumers turned to online platforms for their purchases due to curfews and restrictions on in-person shopping. The global e-commerce market is expected to reach USD 4,117 billion by 2024. Market revenue is projected to grow at an annual rate of 9.49% and reach USD 6,478 billion by 2029 (Statista, 2024). Businesses seeking to capitalize on this growth in online shopping volume have begun to focus on digitalization initiatives and investments to remain competitive (Harorlı, 2021).

Adopting a customer-centric management style has become an essential aspect of a company's survival strategy in today's business environment (Sheth et al., 2011), including concentrating the e-commerce efforts on meeting requirements and preferences of its clients. As a result, knowing the factors influencing online purchasing behavior is critical for researchers and practitioners since this can help in the design and

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marketing of online retail platforms and improve online shopping experience. Understanding customer behavior, on the other hand, is challenging; researchers have identified various aspects that can influence online purchasing behavior, such as cognitive, attitudinal, and psychological factors, as well as expectation-approval processes. Consumers' overall satisfaction or dissatisfaction is believed to affect their post-purchase intentions, whether they complain, re-purchase, do not purchase, or combine these two. As a result, accurately analyzing satisfaction is critical since it allows businesses to forecast consumer behavior and adopt suitable marketing strategies based on consumer's satisfaction (Hossain and Quaddus, 2012).

In contrast to traditional retail, e-commerce has distinct advantages such as round-the-clock accessibility, quick and cost-effective access to product information, price comparison facilitation, and convenient product comparison. Despite these compelling advantages, a sizable minority of consumers remain hesitant to use this channel. This shows that there are significant challenges to e-commerce adoption (Rudolph et al., 2004). E-commerce, which presents many opportunities and advantages for both businesses and consumers, can be further optimized by addressing these barriers that impede its widespread adoption. However, a comprehensive examination of these obstacles is required to devise effective strategies for overcoming them.

This study seeks to address a gap in the literature by offering a more comprehensive understanding of the factors influencing consumers' online shopping intentions through the integrated consideration of cognitive models. Cognitive factors of online shopping behavior refer to the mental processes and thoughts that influence a consumer's decision-making and behavior related to online shopping. These factors include consumers' perception of online shopping experience, their attitudes toward online shopping, their beliefs about the benefits and drawbacks of online shopping, and their level of trust in online shopping environment (Mothersbaugh et al., 2019). Some examples of cognitive factors that have been studied in the literature include perceived usefulness, perceived ease of use, perceived risk, trust, and perceived enjoyment (Cheung et al., 2008; Gefen et al., 2003; Ha et al., 2019; Qin, 2007).

Technology acceptance is a multi-stage process encompassing users' initial perceptions and intentions and ongoing evaluations and behaviors affected by these perceptions (Bhattacherjee, 2001). This process necessitates the examination of users' initial acceptance decisions and long-term loyalty, particularly in technology-based consumer behaviors like online shopping. Consequently, it is of significant theoretical and practical significance to investigate the behavioral evolution of users in online shopping research using a comprehensive approach. *The Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Expectation-Confirmation Model (ECM) are the most frequently employed theoretical frameworks in the study of users' online shopping intentions* (Ashraf et al., 2014; Gefen et al., 2003; Ha et al., 2021; Ha and Stoel, 2009; Hozhabri et al., 2014; Lee et al., 2024; Ruangkanjanases et al., 2024; Tong, 2010). However, the literature fails to provide a comprehensive theoretical framework that encompasses the entire process of users' online shopping because these models are typically employed individually or in conjunction with one another. *In this context, the objective of this study was to enhance theoretical explanations by incorporating three models that address various aspects of user behavior. There are three main reasons why the research will be more comprehensive when these three models are combined.*

TAM explains individual technology acceptance through cognitive factors such as perceived usefulness and ease of use (Luo et al., 2017) and provides a theoretical framework to predict online shopping intention and behavior (Gefen et al., 2003). However, this model does not consider the social context of user behavior and assumes that usage will automatically continue after the initial acceptance of the technology (Lee, 2010; Samaradiwakara and Gunawardena, 2014). At this stage, models that examine social pressures and behavioral control are needed to overcome limitations.

The Theory of Planned Behavior (TPB) posits that individuals' motivation to engage in a behavior is shaped by their Attitudes, Subjective Norms, and Perceived

Behavioral Control and argues that behavior is more likely to be executed if it is perceived positively (Attitude), if it aligns with the beliefs and values of the significant others in the individual's social network (Subjective Norms), and if the individual feels a sense of control over the behavior (Perceived Behavioral Control) (Ajzen, 2011). TPB and TAM are used to identify the cognitive drivers of attitude toward technology, provide content within the framework of TPB, and determine why users form positive or negative attitudes toward new technology (Lee, 2010). However, TPB does not explicitly address the effect of technology-specific beliefs or satisfaction on long-term behaviors. To overcome this weakness, the analysis has incorporated ECM, which evaluates post-purchase satisfaction and reuse intention, into the model.

ECM is built on the premise that consumers generate expectations about items or services before purchasing them and then evaluate their performance afterward, depending on whether those expectations were met or surpassed. It anticipates that consumers' confirmation or denial of their expectations would influence their post-purchase attitudes and actions, such as satisfaction, loyalty, and re-purchase intentions (Hossain and Quaddus, 2012; Oliver, 1980; Qin, 2007). At this point, ECM, which focuses on users' continued intention and satisfaction after their first experience, offers a framework that complements the shortcomings of TAM and TPB (Huda, 2023). ECM emphasizes how the fit between user expectations and actual performance shapes satisfaction and reuse intention (Hozhabri et al., 2014). ECM and TPB, which have been most frequently employed in previous research either separately or in combination and are robust enough to be integrated with TAM to detect behavioral intentions and continuance (Mustafa and Garcia, 2021), are of particular importance in the context of this research. Bringing the three models together will create a dynamic structure that explains both the initial acceptance decision, the continuance intention shaped by social factors, and post-purchase satisfaction. Thus, the behavioral evolution of users in their online shopping processes can be tracked in detail from the beginning to long-term loyalty.

Individual differences reflected in personality traits have increasingly been investigated as determinants of online shopping behavior. Prior studies indicate that personality traits significantly shape individuals' attitudes toward technology and purchase intentions (Tsao and Chang, 2010; Uşaklı, 2020; Wu and Ke, 2015). Building on this evidence, the proposed integrated model incorporates personality traits as external variables alongside cognitive and social dimensions to explain variations in user behavior. *HEXACO personality inventory, which assesses six core dimensions—Honesty–Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience (Ashton and Lee, 2009)—was employed to capture these individual differences*. This approach enhances the theoretical understanding of how personality influences technology acceptance while offering practical insights for developing personalized marketing strategies.

The article is structured as follows: first, theoretical background and conceptual framework are provided. Next, the methodology is presented. Finally, research results are discussed.

2. THEORETICAL BACKGROUND/ CONCEPTUAL FRAMEWORK

The analysis of online shopping behavior is an essential aspect of e-commerce research (Moshrefjavadi et al., 2012). A multitude of theories and models have been proposed to explain e-commerce behavior.

- **Technology Acceptance Model** (TAM) is extensively used in studies analyzing customer online purchase behavior in e-commerce research (Fayad and Paper, 2015). Davis (1989) proposed TAM as a theoretical framework for understanding the cognitive and affective processes that underpin consumers' perceptions and evaluations of new technologies and how such perceptions and evaluations shape their adoption and usage decisions. TAM comprises three essential components: perceived usefulness, perceived ease of use, and online shopping intention (Yılmaz, 2018). TAM offers a roadmap for making informed judgments on initiatives that can increase

organizational acceptability and effectiveness of information technologies (Venkatesh and Bala, 2008).

- However, depending solely on the TAM to comprehend and assess the factors that drive customer behavior in online buying is insufficient since consumers go through a complex process that includes planning, recognizing needs, exploring solutions to meet those needs, analyzing information received via research, and finally, making purchasing decisions (Panitapu, 2013). Furthermore, consumer expectations are important in the purchasing process. Consumers have specific expectations regarding a product or service before making a purchase. They rate their contentment or dissatisfaction based on how well their expectations are met and the perceived benefits they obtain. The extent to which expectations are met determines the consumer's level of satisfaction or discontent (Bhattacherjee, 2001).
- TAM also permits the incorporation of additional variables, allowing for a more comprehensive examination of the research problem. Accordingly, **Theory of Planned Behavior (TPB) and Expectation-Confirmation Model (ECM)—both widely used in marketing research and sharing several constructs with TAM—were integrated into the research model**. This integration is intended to enhance the model's explanatory power and enable a more nuanced analysis of the variables under investigation.
- Ajzen's pioneering article "The Theory of Planned Behavior", addresses the elements determining the desire to engage in a given behavior and how such intentions translate into actual behavior (Ajzen, 1991). Oliver developed Expectation Confirmation Theory (ECT) in his article "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions", to explain the cognitive processes by which consumers compare their pre-purchase expectations with their post-purchase perceptions and how this comparison determines satisfaction or dissatisfaction (Oliver, 1980). Most marketing research studies have used ECT, which is also applied by Information Systems researchers with a few modifications and has been referred to as the Expectation Confirmation Model (ECM) (Hossain and Quaddus, 2012).
- As we have mentioned in the introduction, analyzing customer personality traits as a variable might provide a fresh perspective. Various personality trait models have been employed in studies on online shopping behavior, with Big Five Personality Traits and **HEXACO Personality Inventory** being the most widely used. Both provide robust frameworks for examining individual differences; however, HEXACO model continues to offer considerable potential for generating novel insights and improving predictive accuracy (Anglim and O'Connor, 2019). HEXACO **incorporates a sixth dimension, Honesty–Humility which measures traits such as honesty, fairness, modesty, and the tendency to avoid manipulative behaviors for the purpose of gaining material benefit** (Ashton and Lee, 2007). The absence of this dimension in Big Five may result in the neglect of critical moral and ethical traits. Consequently, employing HEXACO framework, with its inclusion of Honesty–Humility, can provide a more comprehensive and nuanced perspective for this research. With the incorporation of HEXACO, more significant factors affecting online purchase behavior can be analyzed by personality traits.

In this study, the HEXACO-60, a 60-item personality inventory developed to assess individual personality traits with greater validity and reliability, was employed. The primary aim of developing HEXACO-60 was to retain the psychometric properties of the original HEXACO-100 while allowing for faster administration. This shorter format facilitates more efficient data collection and helps maintain participants' attention and motivation. HEXACO-60 has been translated into multiple languages and applied across diverse cultural contexts, demonstrating its international validity and reliability (Lee and Ashton, 2009). Its brevity and proven effectiveness have made HEXACO-60 a widely preferred tool in scientific research.

Table 1 presents studies examining online shopping intentions between 2003 and 2024, focusing on TAM, TPB, ECM, and HEXACO independently or together. Previous studies have examined a range of factors influencing the intention to engage in online shopping, including compatibility, perceived usefulness, ease of use, security, normative beliefs, and self-efficacy. Core constructs such as attitude, subjective norms, and perceived behavioral control have been identified as critical determinants of users'

intentions to adopt and use various information technologies. Satisfaction with prior online shopping experiences has been shown to strongly predict continuance intention, while trust and shopping enjoyment also serve as important motivators of continued use. Conversely, perceived risk negatively affects consumer satisfaction. In the context of internet banking, security/privacy and financial risks negatively influence usage intentions, whereas perceived benefit, positive attitudes, and perceived usefulness have a positive impact. Additionally, attitudes, subjective norms, self-image, and self-efficacy have been found to significantly shape online purchase intentions.

Table 1: TAM, TPB, ECM, and HEXACO Related Research

Reference	Aim of the Study	Research Model	Research Model Constructs	Brief Finding
Gefen et al. (2003)	Investigate how perceptions of IT's usefulness, ease of use, and trust in e-vendors affect online purchase intentions.	TAM	Perceived Ease of Use, Perceived Usefulness, Trust, Intention	Consumer trust is just as crucial to online commerce as commonly established TAM use-antecedents, perceived usefulness, and perceived ease of use.
Vijasarathy (2004)	Try to explain customer's intention to use online shopping.	TAM	Perceived Ease of Use, Perceived Usefulness, Compatibility, Privacy, Security, Normative beliefs, Self-efficacy	Compatibility, usefulness, ease of use, and security were found to be important predictors of online shopping attitudes, but privacy was not. Normative beliefs, and self-efficacy were found to have considerable influence on the intention.
Hsu et al. (2006)	Incorporate ECM to TPB and examine the antecedents of users' intention to continue online shopping.	TAM & ECM	Attitude, Subjective Norm, Perceived Behavioral Control, Disconfirmation, Satisfaction, Intention	TPB suggests that attitude, subjective norms, and perceived behavioral control influence intention. Similar to ECM's claim, satisfaction with online shopping significantly predicts users' continuance intention.
Qin (2007)	Predict online customer behavior using an extended ECM, integrating factors like perceived risk, trust, and shopping enjoyment from survey data.	ECM	Perceived of Usefulness, Perceived Risks, Trust, Shopping Enjoyment, Disconfirmation, Satisfaction, Intention	Trust and shopping enjoyment are key motivators for online shopping, but their effect is less potent than trust and satisfaction. Perceived risk directly affects consumer satisfaction, with a stronger impact than that of perceived usefulness.
Cheung et al. (2008)	Give an in-depth analysis of previous theoretical literature and provide an integrative model of online consumer behavior.	TPB & ECM	Consumer Characteristics, Environmental Influences, Product Characteristics, Medium Characteristics, Merchant and Intermediary Characteristics, Intention, Adoption, Re-purchase	Most studies concentrated on factors influencing intention for and adoption of online shopping while ignoring those leading to re-purchasing. The literature review emphasizes the need for a unified framework to guide research on this issue.
Lee (2009)	Investigate and incorporate the numerous benefits of online banking to generate a positive element known as a perceived benefit.	TAM & TPB	Perceived Benefit, Performance Risk, Financial Risk, Time Risk, Social Risk, Security Risk, Perceived Ease of Use, Perceived Usefulness, Attitude, Subjective Norm, Perceived Behavioral Control, Intention to Use	The intention to use internet banking is influenced negatively by security/privacy risk as well as financial risk, and positively by perceived benefit, attitude, and perceived usefulness.
Roufbah et al. (2009)	Look at factors influencing users' intentions to use internet banking.	TAM & TPB	Perceived Ease of Use, Perceived Usefulness, Attitude, Subjective Norm, Perceived Behavioral Control, Intention to Use	Factors such as attitude, subjective norm, perceived behavioral control, perceived usefulness, and perceived ease of use significantly affect the intention to use online banking.
Singh (2015)	Explain online consumer behavior by using TPB, TAM, and self-image.	TAM & TPB	Attitude, Subjective Norm, Self-Image, Self-Efficacy, Perceived Ease of Use, Perceived Usefulness, Intention	The study puts various components of the integrated model to the test and discovers that attitudes, subjective norms, self-image, and self-efficacy all have a substantial impact on online purchase intentions.

Reference	Aim of the Study	Research Model	Research Model Constructs	Brief Finding
MacCann et al. (2015)	Investigate the impact of HEXACO personality domains on the prediction of TPB variables and its impact on the intention-behavior gap.	TPB & HEXACO	Attitude, Subjective Norm, Perceived Behavioral Control, Intention, HEXACO	TPB explains 45% of exercise intention and 39% of behavior variance. Emotionality and honesty-humility predict these outcomes, though personality's overall contribution was minor, with honesty-humility showing HEXACO model's utility for understanding exercise.
Morods et al. (2016)	Investigate how HEXACO personality factors predict and regulate fruit and vegetable consumption, using TPB variables to assess their role.	TPB & HEXACO	Attitude, Subjective Norm, Perceived Behavioral Control, Intention, HEXACO	TPB accounted for 11-17% of fruit and vegetable consumption variance, more so in healthy-weight individuals. While HEXACO personality factors don't enhance TPB constructs, conscientiousness predicts intentionality across all weight groups.
Yilmaz (2018)	Determine the critical elements in customers' intention to use online shopping sites.	TAM	Perceived Ease of Use, Perceived Usefulness, Perceived Product Risk, Intention to Use	Perceived ease of use (perceived product risk) affects positively (negatively) perceived usefulness and online buying intention. Moreover, perceived usefulness significantly influences customers' willingness to use online shopping.
Ha et al. (2019)	Examine the effects of various factors on Vietnamese consumers' online shopping intentions using TAM and TPB.	TAM & TPB	Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Ease of Use, Perceived Usefulness, Trust, Intention	Perceived usefulness, perceived ease of use, attitude, subjective norm, and trust significantly impact consumers' online purchase intentions.
Rehman et al. (2019)	Examine the relationship between parts of TPB and TAM and consumer online purchase intention.	TAM & TPB	Attitude, Subjective Norm, Perceived Behavioral Control, Perceived Ease of Use, Perceived Usefulness, Trust, Commitment, Intention, Online Shopping Behavior	Perceived usefulness, ease of use, attitude, subjective norms, and behavioral control affect consumer purchase intent. This relationship is mediated by purchase intention, with commitment and trust directly altering these variables' impact on online buying behavior
Ha et al. (2021)	Determine the elements influencing online shoppers' purchasing intentions in Vietnam.	TAM & TPB	Attitude, Subjective Norms, Perceived of Behavioral Control, Perceived Usefulness, Perceived Risks, Trust, Intention	Online purchase intentions are affected by consumers' attitude, subjective norms, perceived behavioral control, usefulness, and trust while perceived risks negatively affect intentions.
Song and Jo (2023)	Investigate intentions to continue using omnichannel platforms such as mobile apps, web, and customer information processing systems, focusing on the factors that influence consumer behavior and its importance for economic sustainability.	TAM & TPB	Attitude, Subjective Norms, Perceived Behavioral Control, Perceived of Usefulness, Perceived Ease of Use, Perceived Risks, Monetary Saving, Accessibility, Intention	Accessibility positively affects perceived ease of use, usefulness, and relative advantage. Saving money (perceived risk) positively (negatively) affects relative advantage. Relative advantage, attitude, subjective norms, and behavioral control describe continuance intention. Omnichannel practitioners should focus on saving money and perceived risks.

Despite this extensive research, HEXACO personality inventory has been only minimally integrated with major behavioral models such as TPB, TAM, and ECM on online shopping intentions. Therefore, studies examining other behavioral intentions alongside these theories are included in the table and they indicate that TPB is a strong predictor of behavior, explaining substantial variance in outcomes such as exercise behavior and fruit and vegetable consumption. However, the contribution of HEXACO personality traits are limited, with only Honesty–Humility and Conscientiousness emerging as significant predictors. These findings suggest that personality traits may offer more context-specific insights when combined with behavioral models.

3. METHODOLOGY

This article introduces a unique perspective on online consumer shopping intentions by incorporating TAM, TPB, and ECM. It also introduces HEXACO personality inventory as an exogenous factor, considering the potential differences in online shopping intentions among consumers with varying personality traits.

3.1. Hypotheses

This study expands previous research by merging these factors. The following hypotheses are tested:

H_1: Perceived usefulness of shopping online affects the intention of online shopping.
H_2: Perceived easy of using of shopping online affects the intention of online shopping.
H_3: Attitude towards shopping online affects the intention of online shopping.
H_4: Subjective norms affect the intention of online shopping.
H_5: Perceived behavioral control affects the intention of online shopping.
H_6: Expectations affect the intention of online shopping.
H_7: Satisfaction affects the intention of online shopping.
H_8: Perceived ease of use affects the intention of online shopping.
H_9: Perceived usefulness affects the intention of online shopping.
H_{10}: The effects of the model variables significantly differ across HEXACO personality groups.

3.2. Data Collection, Measurement and Sampling

A survey has been conducted online to 423 participants from various age groups, occupations, and education levels to understand factors influencing Turkish customers' online shopping intentions. The average completion time was 10 minutes, and surveys completed in less than 5 minutes were considered invalid. Fixed-choice questions were used, and incorrect answers were considered irrational. The survey includes fixed-choice questions, excluding 12 participants who responded randomly and 11 who stated they don't engage in online shopping, as a result further analysis have been conducted with 400 participants. This study analyzes users' behavioral intentions regarding online shopping by integrating three theoretical frameworks: TPB, TAM, and ECM.

In the context of TPB, all variables were taken from Ajzen's original research (Ajzen, 2015), and some variables were modified to fit the scope of our study using the results of following studies. Eroğlu (2015) strengthened **Subjective Norms**. **Perceived Behavioral Control** was developed and adapted within the framework of Ajzen's original scale. The concept of **Attitude Towards Behavior** was reinforced by following Chou et al. (2020). **Intention** was also adapted from Ajzen's original study. **Perceived Usefulness** and **Perceived Ease of Use** constructs were modified based on studies conducted by Forsythe et al. (2006) and Wu & Wang (2005) respectively. **Expectation** in ECM was derived from the research conducted by Baharum and Jaafar (2015). **Confirmation** is was modified to suit the context by Sarkar and Khare (2019), and **Satisfaction** was tailored following Liao et al. (2017). All scales received structural validity assessment through confirmatory factor analysis (CFA). The Cronbach's α was determined to be 0.95, which indicates that the scales' internal consistency is robust. To assess personality traits, **HEXACO-60**, a six-dimensional scale proven to be accurate and valid in Ashton and Lee (2001), was used.

4. RESEARCH FINDINGS

4.1. Demographics and Descriptive Statistics

The research involved 400 participants with 57.8% female, 42.3% male, and 56.5% aged 18-22. The majority were high school graduates, and 24.8% have a bachelor's degree. The sample's household income ranged from 17,001-34,000 TL to 34,001-51,000 TL, indicating that it generally reflects Turkey's demographic features. Table 2 summarizes the key findings. Table 3 provides valuable insights into customers' online purchasing habits, preferences, and experiences. The most used payment method is payment by credit card (54.8%). Additionally, 31.5% of consumers make 25 or more purchases per month, spending typically falling within two main ranges: 0-4,250 TL (20%) and 21,251 TL or more (24%).

Table 2: Descriptive Statistics

Gender	Number	Share	Education	Number	Share
Male	169	42.3%	Secondary school graduate	3	0.8%
Female	231	57.8%	High school graduate	179	44.8%
Age			Associate degree	59	14.8%
18-22	226	56.5%	Bachelor's degree	99	24.8%
23-27	55	13.8%	Master's degree	28	7.0%
28-32	21	5.3%	PhD graduate	32	8.0%
33-37	23	5.8%	**Household Income**		
38-42	47	11.8%	No Answer	70	17.5%
43-47	17	4.3%	0-17,000***** TL	58	14.5%
48-52	7	1.8%	17.001 - 34.000 TL	67	16.8%
53-57	1	0.3%	34.001 - 51.000 TL	59	14.8%
58-62	2	0.5%	51.001 - 68.000 TL	45	11.3%
63 or above	1	0.3%	68.001 - 85.000 TL	30	7.5%
			85.001 - 102.000 TL	32	8.0%
***Minimum Wage**			TL 102,001 and above	39	9.8%

Table 3: Participants' Online Purchasing Behaviors and Experiences

Spending Frequency	No.	Share	Motivation	No.	Share
1-4	84	21.0	The product is not available where I live	82	20.5
5-9	77	19.3	The product is reasonably priced online	158	39.5
10-14	52	13.0	There are more product alternatives online	99	24.8
15-19	32	8.0	Shopping online reduces my shopping time	25	6.3
20-24	29	7.2	Reviews and user comments are helpful	19	4.8
25-more	126	31.5	I don't want to leave home for shopping	15	3.8
Spending Amount	**No.**	**Share**	All of the above	2	0.5
0-4.250	80	20.0	**Challenges**	**No.**	**Share**
4.251-8.500	73	18.3	Shipping delays or delivery problems	158	39.5
8.501-12.750	68	17.0	Unexpected or poor-quality products	107	26.8
12.751-17.000	52	13.0	Difficulty of return and exchange process	55	13.8
17.001-21.250	31	7.8	Difficulty of communication with customer service	12	3.0
>21.251	96	24.0	Problems with payment transactions (card decline, incorrect payment, etc.)	10	2.5
Spending Method	**No.**	**Share**	Security issues (data security, fraud, etc.)	4	1.0
Credit cards	219	54.8	Cancelled out of stock products	40	10.0
Pay on delivery	23	5.8	Wrong product shipment	6	1.5
Bank Transfers	14	3.5	Slow or not user-friendly website	4	1.0
Debit Cards	142	35.5	Problems with after-sales services	1	0.3
Digital wallets	2	0.5	Others	3	0.8
Total	**400**	**100**	**Total**	**400**	**100**

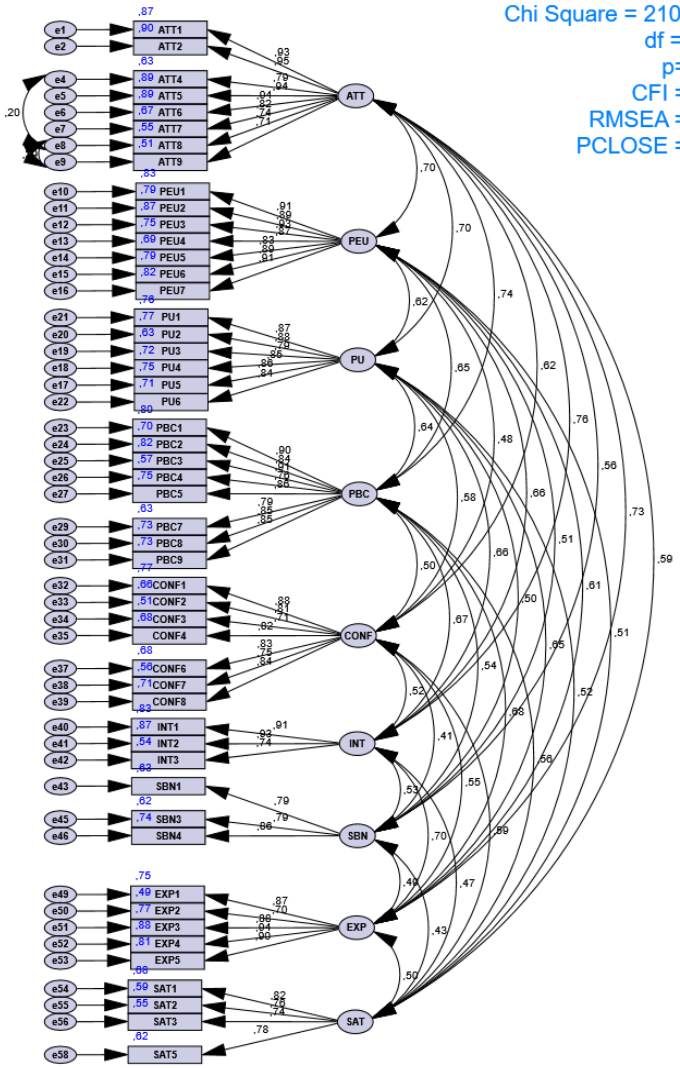
The primary motivations for shopping are access to cheaper pricing (39.5%) and a greater variety of product options (24.8%). Users are most likely to experience issues such as shipment delays and delivery complications (39.5%) and discrepancies in product expectations or substandard quality (26.8%). The survey results indicate that online shopping appeals to people thanks to price advantages and product diversity, yet logistical issues and quality concerns might be detrimental to the experience.

4.2. Assessment of Measurement and Structural Models

The research model was created by integrating TPB, TAM, and ECM, and it was tested with confirmatory factor analysis (CFA). As a result of this analysis, the factor structures of each theory were evaluated and analyzed in terms of validity and reliability criteria. Structural Equation Modeling (SEM) was used to explore the relationships among latent variables. Furthermore, HEXACO personality inventory was integrated into the research model, enabling a multi-group analysis to evaluate the model's validity and to determine

whether parameter estimates varied statistically across participants with differing personality traits.

Figure 1 shows that the model aligns with the theoretically hypothesized factor structure. The fit indices indicate that the model aligns well with the data. At the same time, the factor loadings and inter-factor interactions verify that the variables are organized and distinguished meaningfully within the established theoretical framework. The results indicate that the theoretical model suggested in the research is practically validated.



ATT= Attitude towards Behavior; PEU= Perceived Ease of Use; PU= Perceived Usefulness; PBC= Perceived Behavior Control; CONF= Confirmation; Int= Intention; SBN= Subjective Norms; EXP= Expectation; SAT=Satisfaction

Figure 1. CFA Analysis

The analyses of validity ($\boldsymbol{AVE} > \mathbf{0.50}$) and reliability ($\boldsymbol{CR} \geq \mathbf{0.70}$) indicate that all measures meet the necessary thresholds, indicating robust statistical features (Table 4). The construct validity is well-established, with the indicators aligning with their relevant variables. These findings confirm the reliability of the model in effectively representing the fundamental theoretical structures. Moreover, as seen in Table 5, ***MSV*** values for all factors are inferior to their respective ***AVE*** values, signifying that each component exhibits a stronger correlation with its indicators than other factors, thereby affirming discriminant validity.

Table 4: CFA Model Fit

Measure	Estimate	Threshold	Interpretation
CMIN	2104.323	--	--
DF	1186.000	--	--
CMIN/DF	1.774	Between 1 and 3	Excellent
CFI	0.954	>0.95	Excellent
SRMR	0.057	<0.08	Excellent
RMSEA	0.044	<0.06	Excellent
PClose	0.999	>0.05	Excellent

Table 5: Validity Analysis

	CR	AVE	MSV	MaxR(H)
ATT	**0.957**	**0.740**	0.570	0.975
PEU	**0.963**	**0.790**	0.493	0.966
PU	**0.940**	**0.722**	0.484	0.942
PBC	**0.953**	**0.716**	0.543	0.957
CONF	**0.929**	**0.653**	0.384	0.934
INT	**0.898**	**0.748**	0.570	0.927
SBN	**0.855**	**0.663**	0.319	0.861
EXP	**0.934**	**0.741**	0.539	0.950
SAT	**0.861**	**0.608**	0.351	0.864

	ATT	PEU	PU	PBC	CONF	INT	SBN	EXP	SAT
ATT	**0.860**								
PEU	0.702^{***}	**0.889**							
PU	0.696^{***}	0.623^{***}	**0.850**						
PBC	0.737^{***}	0.645^{***}	0.642^{***}	**0.846**					
CONF	0.619^{***}	0.481^{***}	0.584^{***}	0.503^{***}	**0.808**				
INT	0.755^{***}	0.657^{***}	0.658^{***}	0.671^{***}	0.517^{***}	**0.865**			
SBN	0.564^{***}	0.512^{***}	0.499^{***}	0.542^{***}	0.413^{***}	0.534^{***}	**0.814**		
EXP	0.734^{***}	0.613^{***}	0.652^{***}	0.680^{***}	0.546^{***}	0.698^{***}	0.491^{***}	**0.861**	
SAT	0.593^{***}	0.512^{***}	0.516^{***}	0.558^{***}	0.592^{***}	0.466^{***}	0.431^{***}	0.501^{***}	**0.780**

Table 6: SEM Model Fit

Measure	Estimate	Threshold	Interpretation
CMIN	2383.710	--	--
DF	1203.000	--	--
CMIN/DF	1.981	Between 1 and 3	Excellent
CFI	0.941	>0.95	Acceptable
RMSEA	0.050	<0.06	Excellent
PClose	0.586	>0.05	Excellent

Following the completion of the factor analysis and validation of the measurement model, the theoretical hypotheses of the structural model and the causal links between its components were assessed, as illustrated in Figure 2.

SEM model fit criteria presented in Table 6 show that the model is a good fit and provides accurate and reliable predictions of the relationships between variables. Key metrics such as $PCLOSE$, $CMIN/DF$, and $RMSEA$ are within optimal ranges, while CFI falls within acceptable parameters, demonstrating the model's structural resilience and validity.

The regression coefficients in Table 7 indicate that most relationships are statistically significant, with the coefficients mostly being positive. In particular, the relationship between Perceived Ease of Use (PEU) and Expectation (EXP) was found to have the highest positive effect with $\boldsymbol{\beta = 0.547}$. Moreover, the effect of Perceived Usefulness (PU) on Attitude (ATT) ($\boldsymbol{\beta = 0.542}$) and the effect of PEU on ATT ($\boldsymbol{\beta = 0.429}$) are substantial and significant. These findings indicate the important impact of PEU and PU on ATT and EXP. The effects of PEU on PU ($\boldsymbol{\beta = 0.272}$) and CONF ($\boldsymbol{\beta = 0.087}$) are significant but lower. The effect of satisfaction (SAT) on intention (INT) is negative ($\boldsymbol{\beta = -0.075}$) but insignificant ($\boldsymbol{p = 0.207}$).

Table 8 presents the hypotheses and the outcome regarding significance and effect sizes. The findings indicate that the linkages within the model generally align with the theoretical framework; nevertheless, some assumptions lack evidence.

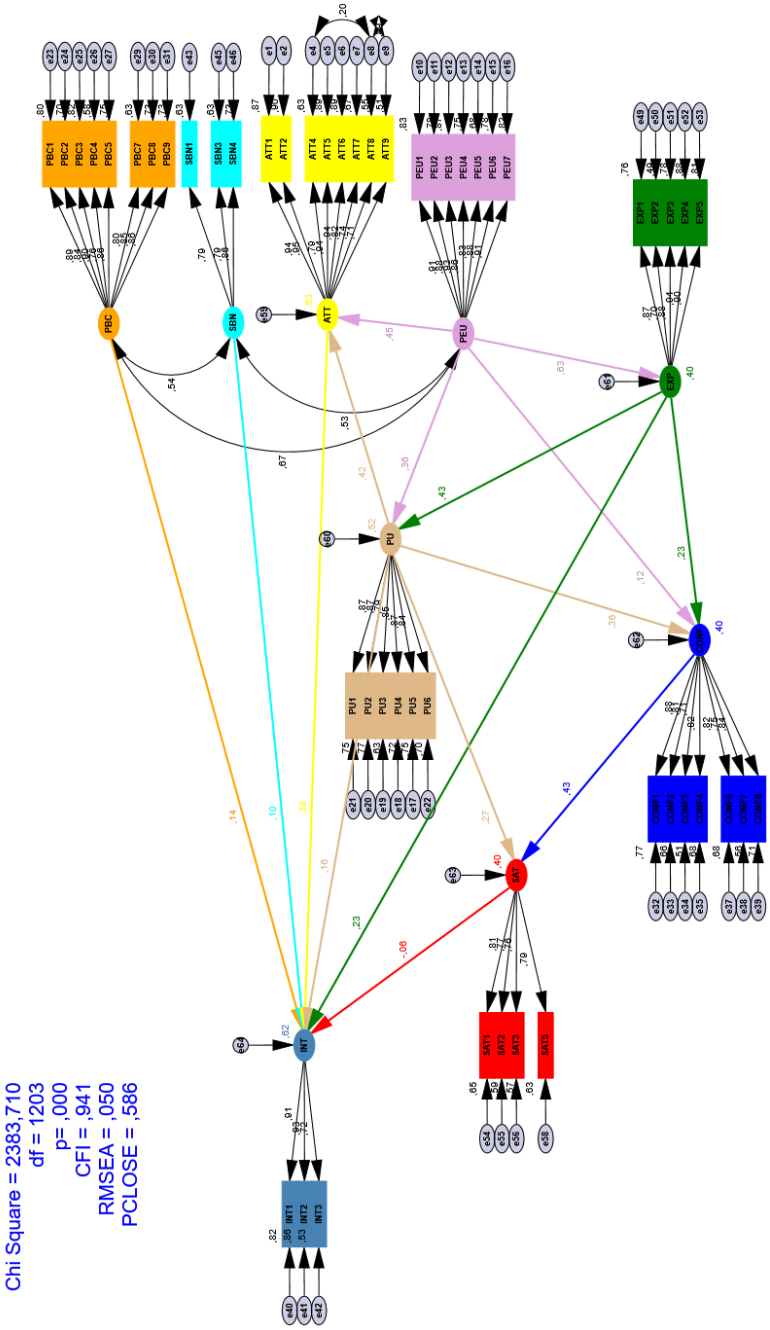


Figure 2. SEM Analysis

Regarding the explanatory power of the model analysed through squared multiple correlations (SMC), it is seen that the variances of ATT and INT variables are explained by 62.7% ($\boldsymbol{R^2 = 0.627}$) and 62.1% ($\boldsymbol{R^2 = 0.621}$), respectively. These ratios indicate that ATT and INT have an important part in the model and are powerfully explained. In addition, PU is explained by 52.1% ($\boldsymbol{R^2 = 0.521}$), EXP and CONF explained 40.1% ($\boldsymbol{R^2 = 0.401}$), and SAT explained 39.9% ($\boldsymbol{R^2 = 0.399}$). INT is affected most by ATT ($\boldsymbol{\beta = 0.383}$) and EXP ($\boldsymbol{\beta = 0.229}$). PU ($\boldsymbol{\beta = 0.163}$), perceived behavioral control (PBC) ($\boldsymbol{\beta = 0.140}$), and social norms (SBN) ($\boldsymbol{\beta = 0.100}$) have weaker but significant effects on INT. The model explains 62.0% of the variance of INT, providing a strong representation in line with the theoretical framework.

Table 7: Regression Weights

			Estimate	S.E.	C.R.	P
EXP	**<---**	**PEU**	.547	.041	13.501	***
PU	**<---**	**PEU**	.272	.039	7.023	***
PU	**<---**	**EXP**	.374	.046	8.120	***
CONF	**<---**	**PEU**	.087	.042	2.061	.039
CONF	**<---**	**PU**	.340	.062	5.520	***
CONF	**<---**	**EXP**	.187	.052	3.610	***
ATT	**<---**	**PEU**	.429	.044	9.836	***
SAT	**<---**	**CONF**	.426	.061	7.016	***
ATT	**<---**	**PU**	.542	.060	9.086	***
SAT	**<---**	**PU**	.251	.055	4.547	***
INT	**<---**	**PBC**	.134	.045	2.955	.003
INT	**<---**	**SBN**	.121	.057	2.140	.032
INT	**<---**	**ATT**	.358	.052	6,905	***
INT	**<---**	**PU**	.194	.077	2.538	.011
INT	**<---**	**EXP**	.236	.053	4,444	***
INT	**<---**	**SAT**	**-.073**	**.058**	**-1.256**	**.209**

Table 8: Hypothesis & Results

Hypothesis	Results
H_1: PU → INT	**Accepted** ($\beta = 0.163, p = 0.011$)
H_2: PEU → INT	**Rejected** (PEU had no significant effect on INT)
H_3: ATT → INT	**Accepted** ($\beta = 0.383, p < 0.001$)
H_4: SBN → INT	**Accepted** ($\beta = 0.100, p = 0.032$)
H_5: PBC → INT	**Accepted** ($\beta = 0.140, p = 0.003$)
H_6: EXP → INT	**Accepted** ($\beta = 0.229, p < 0.001$)
H_7: SAT → INT	**Rejected** ($\beta = -0.057, p = 0.209$)
H_8: PEU → ATT	**Accepted** ($\beta = 0.451, p < 0.001$)
H_9: PU → ATT	**Accepted** ($\beta = 0.424, p < 0.001$)

A multi-group analysis was performed within the HEXACO personality assessment framework to ascertain how the correlations among the model's variables vary between groups with distinct personality characteristics. This study classified individuals with high scores in the six fundamental personality dimensions of the HEXACO personality inventory into H, E, X, A, C, and O groups.

The presence of significant differences among these groups in the model was assessed using a multi-group structural equation model. Six group analyses were performed: H ($n = 97$), E ($n = 118$), X ($n = 57$), A ($n = 19$), C ($n = 57$), and O ($n = 52$) groups were assessed. Group A was excluded from the multi-group analysis due to the insufficient sample size ($n = 19$). The coefficients of each structural path were compared across the remaining five groups; significant differences were assessed using the $\Delta\chi^2$ test, and the results are presented in Table 9. The results indicate that certain structural relationships vary markedly among HEXACO personality groups, thus the hypothesis "*H10: The interactions between the variables in the HEXACO personality traits in the model reveal significant differences within the groups*" was supported.

The results presented in Table 9 can be briefly summarized and interpreted as follows. The results of the multiple-group analysis revealed significant heterogeneity across HEXACO personality groups. The most significant differences were observed in perceived utility → approval pathway ($\Delta\chi^2(4) = 47.689, p < .001$) and perceived utility → attitude pathway ($\Delta\chi^2(4) = 34.315, p < .001$). These findings suggest that personality traits significantly moderated the relationships between perceived usefulness and confirmation and attitude formation in online shopping.

- In Honesty-Humility group, perceived ease of use positively explained expectation ($B = 0.61, p < .001$). Perceived usefulness had significant and positive effects on both attitude ($B = 0.66, p < .001$) and confirmation ($B = 0.61, p < .001$). In

addition, the effect of ease of use on attitude was also significant ($B = 0.32, p < .001$). Expectation created a significant increase in perceived usefulness ($B = 0.34, p < .001$), but the path from perceived usefulness to satisfaction was positive but not statistically significant ($B = 0.23, p > .05$).

- In Emotionality group, the only significant path was for the ease of use to attitude ($B = 0.24, p < .01$); all other relationships, regardless of their positive or negative aspects, were not statistically significant ($B = 0.02 - 0.15, p > .05$).
- In Extraversion group, positive and highly significant effects were observed on perceived usefulness ($B = 0.53, p < .001$), confirmation ($B = 0.67, p < .001$), and satisfaction ($B = 0.63, p < .001$), as well as on all paths from expectation to perceived usefulness ($B = 0.67, p < .001$) and from ease of use to both expectation ($B = 0.47, p < .001$) and attitude ($B = 0.40, p < .001$).
- In Conscientiousness group, perceived usefulness had positive and significant impact on attitude ($B = 1.64, p < .001$), confirmation ($B = 1.58, p < .001$), and satisfaction ($B = 0.55, p < .05$). Ease of use significantly increased expectation ($B = 0.58, p < .001$), and expectation had a small but significant impact on perceived usefulness ($B = 0.17, p < .01$). On the other hand, the observed negative effect of ease of use on attitude was not significant ($B = -0.12, p > .05$).
- In Openness group, ease of use significantly and positively affects attitude ($B = 0.52, p < .001$) and expectation ($B = 0.49, p < .001$), while expectation significantly and positively affects perceived usefulness ($B = 0.55, p < .001$). The impact of perceived usefulness on attitude is significant ($B = 0.32, p < .001$), but its positive effects on confirmation ($B = 0.15, p > .05$) and satisfaction ($B = 0.10, p > .05$) are not found to be statistically significant.

Table 9: Multi-group Analysis

Path Name	$\Delta\chi^2$(df) - p	Group H: B	Group E: B	Group X: B	Group C: B	Group O: B
PEU → ATT	$\Delta\chi^2$ (4) =12.121 p=.016	.322 (p<.001)	.238 (p<.01)	.399 (p<.001)	**(-.115) (p>.05)**	.521 (p<.001)
PEU → EXP	$\Delta\chi^2$ (4) =19.755 p=.001	.608 (p<.001)	**.101 (p>.05)**	.467 (p<.001)	.577 (p<.001)	.488 (p<.001)
PU → ATT	$\Delta\chi^2$ (4) =34.315 p=.000	.655 (p<.001)	**.143 (p>.05)**	.533 (p<.001)	**1.638 (p<.001)**	.318 (p<.01)
PU → CONF	$\Delta\chi^2$ (4) =47.689 p=.000	.607 (p<.001)	**.019 (p>.05)**	.665 (p<.001)	**1.582 (p<.001)**	**.145 (p>.05)**
PU → SAT	$\Delta\chi^2$ (4) =9.706 p=.046	**.230 (p>.05)**	**.054 (p>.05)**	.628 (p<.001)	.550 (p<.05)	**.098 (p>.05)**
EXP → PU	$\Delta\chi^2$ (4) =13.557 p=.009	.343 (p<.001)	**.176 (p>.05)**	.673 (p<.001)	.174 (p<.01)	**.**551 (p<.001)

***No statistically significant relations were identified in the pathways not referenced in the table.**

5. DISCUSSION AND IMPLICATIONS

The main finding of the study is that the integrated model, in which TPB, TAM, and ECM approaches are used together, is successful in explaining online consumer behavior.

- As predicted by TPB, the positive effect of attitude (the positive/negative evaluation towards e-commerce use) on behavioral intention is statistically significant. This result confirms the attitude-intention relationship emphasized in Ajzen (1991). Similarly, the effect of subjective norm (the expectations of the social environment regarding the individual's e-commerce use) on intention is positive and significant. However, this effect is weaker than that of attitude. This finding supports the role of social influence in technology acceptance, as also stated in Venkatesh and Davis (2000), and shows that, especially at the beginning of the use of new technology, support or pressure from the social environment can affect intention. Perceived behavioral control (the perception of control, skills, and resources over using e-commerce) has also positive impact, as expected showing that an individual's sense of competence and external opportunities increases e-commerce intention. This result is consistent with findings in TPB literature on the importance of perceived control directly on intention and indirectly on behavior. As a result, hypotheses based on the three basic components of

TPB were supported; this again revealed that **TPB provides a valid framework for explaining online shopping decisions**.

- The findings regarding TAM are also consistent with general expectations. Perceived usefulness (the extent to which users find the e-commerce platform useful and efficient) affected both attitude and intention to use. As users perceive that the platform makes their work easier or creates value, their attitudes towards the platform become more positive, and their intention to use the platform increases. This result confirms the importance of the concept of 'benefit' highlighted in Mustafa and Garcia (2021). Perceived ease of use, as expected, increased perceived usefulness and positively affected user attitude. In other words, the easier the platform's interface and operations are to understand and use, the more useful it is found and the more positively users rate it. This finding aligns with numerous TAM studies; ease of use ensures that users warm up to technology both directly and indirectly (via perceived usefulness) (Davis, 1989; Venkatesh and Davis, 2000). These perceptual variables from TAM have a significant role in explaining intention through their effects on attitude. Indeed, perceived ease of use and usefulness together predicted attitude at a significant level (approximately 88%) and explained an acceptable portion of the total variance related to user intention in the model (approximately 16%). In similar studies where TAM and other theories were integrated, the models reach higher explanatory power (Mustafa and Garcia, 2021). Therefore, our findings both confirm **the core arguments of TAM and show that TAM and TPB can work complementarily: individuals are willing to use a system that they find easy to use and useful if they receive support from their social environment and feel in control**.
- The expectation and confirmation dimensions are strong determinants of user satisfaction in the analysis conducted within the integrated model. On the other hand, the study findings indicate that the effect of satisfaction on intention is not significant (and surprisingly negative). This unexpected finding conflicts with ECM's prediction of "high satisfaction means increased usage intention" (Bhattacherjee, 2001). This conflict can be interpreted as users simply are not basing their online shopping decisions on past satisfaction, but they are responding to future expectations and perceived usefulness. In other words, although users report low satisfaction levels, they do not experience a significant decrease in behavioral intentions due to expectations and perceived benefits such as dynamic product range, price advantages, and promotions. This suggests that **online shopping intentions are based more on rational, future-oriented pragmatic considerations than on emotional or past experience-based satisfaction**.
- The results of the multi-group analysis reveal that **HEXACO personality traits play a critical differentiating role in online shopping behavior**. The findings show that the online shopping process differs according to personality traits and that this differentiation is statistically significant.
    - The findings obtained in honesty-humility group show that individuals with this personality trait exhibit a balanced approach to technology acceptance. The strong effect of perceived ease of use on expectation supports the original TAM in Davis (1989). This finding reveals that **honest and humble individuals primarily focus on ease of use when evaluating technological innovations, and this evaluation shapes their future expectations**. The strong positive effects of perceived usefulness on both attitude and confirmation are consistent with the extended TAM in Venkatesh and Davis (2000). However, the lack of statistical significance of the path from perceived usefulness to satisfaction differs from ECM in Oliver (1980). This suggests that **perceived usefulness for honest and humble individuals is not a direct determinant in the formation of satisfaction, and other factors may come into play**.
    - In emotionality group, only the effect of perceived ease of use on attitude was significant, indicating that this group exhibited a very different profile in technology acceptance. The fact that all other paths were not statistically significant suggests that emotionally sensitive individuals do not follow the relationship patterns predicted by traditional models in their technology evaluations. This finding shows that the emotionality dimension in HEXACO model in Ashton and Lee (2007) functions differently in technology acceptance processes. **Factors such as psychological safety and emotional comfort may**

be more effective in facilitating technology acceptance by emotionally sensitive individuals.

- The findings obtained in extraversion group show that individuals with this personality trait exhibit the most consistent and strong relationship patterns in technology acceptance. In particular, the strong effects of perceived usefulness on attitude, confirmation, and satisfaction are consistent with the predictions of Five-Factor Model in McCrae and Costa (2008). The high coefficient on the path from expectation to perceived usefulness strongly supports ECM of Bhattacherjee (2001). **Extroverted individuals have higher expectations from technological experiences due to their social interaction-oriented nature, and these expectations strongly affect their perception of usefulness**.
- The most striking finding for the conscientiousness group is the unusually high coefficients of perceived usefulness on attitude and confirmation. Unstandardized regression coefficients greater than 1 indicate that these individuals respond very strongly to benefit-oriented evaluations in line with the definition of conscientiousness in McCrae and Costa (2008). These high coefficients reveal that **conscientious individuals are highly sensitive in their evaluations of technology and that perceived usefulness disproportionately affects attitudes and approval processes**. The fact that the negative effect of ease of use on attitude is not significant suggests that this group makes evaluations focused on results rather than convenience. The strong effects of ease of use on attitude and expectation in the openness group are consistent with Diffusion Innovation Theory of Rogers (2003). Individuals who are open to innovation evaluate technological ease as an opportunity for experience. However, the effects of perceived usefulness on confirmation and satisfaction were not significant, indicating that different mechanisms come into play in translating open-minded individuals' perception of benefit into behavioral outcomes.
- These findings reveal that personality differences are critical in technology acceptance research. A single model cannot be valid for all individuals, and approaches differentiated according to personality traits are necessary. Then, it is suggested segmentation strategies should be developed based on demographic and psychographic characteristics, especially in e-commerce and digital marketing. These findings have important strategic implications for e-commerce platforms and digital service providers. Benefit-oriented messaging strategies should be developed for conscientious users, social features should be emphasized for extroverted users, special support systems and security-focused approaches should be adopted for emotionally sensitive users, and innovation- and discovery-focused experiences should be designed for open-minded users.

6. CONCLUSION

This study presents significant findings in explaining online purchase intentions through an integrated approach combining TPB, TAM, ECM, and the moderating role of HEXACO personality traits. Attitude is found to be the strongest predictor of intention among TPB variables, perceived behavioral control also to have a positive impact, while the effect of subjective norms is limited. Within the framework of TAM, perceived usefulness strongly predicts both intention and attitude, whereas perceived ease of use affects only attitude and does not exhibit a direct significant relationship with intention. Regarding ECM, expectation positively affects intention, while confirmation significantly increases satisfaction; however, satisfaction does not have a statistically significant effect on intention.

The main theoretical contribution of the study is that it demonstrates that technology acceptance processes are not universal and that individuals differ according to their personality traits. Multi-group analyses show that perceived usefulness, especially within the conscientiousness dimension, have strong effects; technology acceptance relationships are more consistent in case of extraversion, whereas these relationships are weaker in case of emotionality. The findings emphasize the importance

of enriching technology acceptance models by considering personality differences and suggest that each personality group may have its own technology acceptance dynamics.

The study on personality traits and online shopping behaviors has limitations, including the underrepresentation of older adults and high-income groups, as well as not addressing demographic differences in online shopping intention. Future studies should consider these variables and regional factors to provide more comprehensive insights for e-commerce platforms and digital marketing strategies.

This research is among the limited studies examining the effects of personality traits on online shopping behavior, making significant contributions to the field. Future studies should test the validity of this model with larger and more diverse samples and across different cultural contexts. Longitudinal studies could evaluate changes in personality traits over time and their effects on shopping behavior, particularly regarding consumer loyalty, re-purchase intention, and brand loyalty. Neuromarketing techniques may be used to develop more effective approaches that consider individual differences in marketing strategies.

Information on Plagiarism
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Ethics committee approval was not required.

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REFERENCES

Ajzen, I. (1991). *The Theory of Planned Behavior*. Organizational Behavior and Human Decision Processes. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (2011). The Theory of Planned Behaviour: Reactions and Reflections. Psychology and Health, 26(9), 1113–1127. https://doi.org/10.1080/08870446.2011.613995

Ajzen, I. (2015). Consumer Attitudes and Behavior. Handbook of Consumer Psychology, January 2008. https://doi.org/10.4324/9780203809570.ch20

Anglim, J., & O'Connor, P. (2019). Measurement and research using the Big Five, HEXACO, and narrow traits: A primer for researchers and practitioners. Australian Journal of Psychology, 71(1), 16–25. https://doi.org/10.1111/ajpy.12202

Ashraf, A. R., Thongpapanl, N., & Auh, S. (2014). The application of the technology acceptance model under different cultural contexts: The case of online shopping adoption. Journal of International Marketing, 22(3), 68-93. https://doi.org/10.1509/jim.14.0065

Ashton, M. C., & Lee, K. (2001). A theoretical basis for the major dimensions of personality. European Journal of Personality, 15(5), 327–353. https://doi.org/10.1002/per.417

Ashton, M. C., & Lee, K. (2007). Empirical, Theoretical, and Practical Advantages of the HEXACO Model of Personality Structure. Personality and Social Psychology Review, 11(2), 150–166. https://doi.org/10.1177/1088868306294907

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A short measure of the major dimensions of personality. Journal of Personality Assessment, 91(4), 340–345. https://doi.org/10.1080/00223890902935878

Baharum, A., & Jaafar, A. (2015). User interface design: A study of expectation-confirmation theory, Proceedings of the 5th International Conference on Computing and Informatics, ICOCI 2015, 064, 17–24.

Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. MIS Quarterly, 25(3), 351–370.

Cheung, C. M., Chan, G. W., & Limayem, M. (2005). A critical review of online consumer behavior: Empirical research. Journal of electronic commerce in organizations (JECO), 3(4), 1-19. https://doi.org/10.4018/978-1-59904-813-0.ch017

Chou, S. F., Horng, J. S., Sam Liu, C. H., & Lin, J. Y. (2020). Identifying the critical factors of customer behavior: An integration perspective of marketing strategy and components of attitudes. Journal of Retailing and Consumer Services, 55(September 2019), 102113. https://doi.org/10.1016/j.jretconser.2020.102113

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly: Management Information Systems, 13(3), 319–339. https://doi.org/10.2307/249008

Eroğlu, E. (2015). Geçmişten Günümüze Sosyal Normlar. Akademik Bakış Uluslararası Hakemli Sosyal Bilimler Dergisi, 299–308.

Fayad, R., & Paper, D. (2015). The Technology Acceptance Model E-Commerce Extension: A Conceptual Framework. Procedia Economics and Finance, 26(961), 1000–1006. https://doi.org/10.1016/s2212-5671(15)00922-3

Forsythe, S., Liu, C., Shannon, D., & Gardner, L. C. (2006). Development of a scale to measure the perceived benefits and risks of online shopping. Journal of interactive marketing, 20(2), 55-75. https://doi.org/10.1002/dir.20061

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in Online Shopping: An Integrated Model. MIS Quarterly: Management Information Systems, 27(1), 51–90.

Ha, N. T., Nguyen, T. L. H., Nguyen, T. P. L., & Nguyen, T. D. (2019). The effect of trust on consumers' online purchase intention: An integration of TAM and TPB. Management Science Letters, 9(9), 1451-1460. https://doi.org/10.5267/j.msl.2019.5.006

Ha, N. T., Nguyen, T. L. H., Pham, T. Van, & Nguyen, T. H. T. (2021). Factors Influencing Online Shopping Intention: An Empirical Study in Vietnam. Journal of Asian Finance, Economics and Business, 8(3), 1257–1266. https://doi.org/10.13106/jafeb.2021.vol8.no3.1257

Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. Journal of Business Research, 62(5), 565–571. https://doi.org/10.1016/j.jbusres.2008.06.016

Harorlı, E. (2021). Personalization is possible. In Mehmed Zahid Çögenli (Ed.), Digitalization in Organizations, Cambridge Scholars Publishing, 44-60.

Hossain, M. A., & Quaddus, M. (2011). Expectation–confirmation theory in information system research: A review and analysis. Information systems theory: Explaining and predicting our digital society, Vol. 1, 441-469. https://doi.org/10.1007/978-1-4419-6108-2_21

Hozhabri, A., Raeesi, R., Nor, K. M., Salimianrizi, H., & Tayebiniya, J. (2014, April). Online re-purchase intention: Testing expectation confirmation model ECM on online shopping context in Iran. In 8th International Conference on e-Commerce in Developing Countries: With Focus on e-Trust, 1-7. https://doi.org/10.1109/ECDC.2014.6836757

Hsu, M. H., Yen, C. H., Chiu, C. M., & Chang, C. M. (2006). A longitudinal investigation of continued online shopping behavior: An extension of the theory of planned behavior. International journal of human-computer studies, 64(9), 889-904. https://doi.org/10.1016/j.ijhcs.2006.04.004

Huda, M. N. (2023). Analysis the critical factors of M-government service acceptance: An integrating theoretical model between TAM and ECM. Policy & Governance Review, 7(2), 109-124.

Lee, K., & Ashton, M. C. (2009). Hexaco Personality Inventory. https://hexaco.org/hexaco-inventory

Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. Electronic commerce research and applications, 8(3), 130-141. https://doi.org/10.1016/j.elerap.2008.11.006

Lee, M. C. (2010). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation-confirmation model. Computers and Education, 54(2), 506–516. https://doi.org/10.1016/j.compedu.2009.09.002

Lee, W. O., Huam, H. T., & Raja Yusof, R. N. (2024). Determinants of Mobile Shopping Apps Continuance Intention: A Review and Proposed Conceptual Model. Journal of Entrepreneurship and Business, 12(1), 77–90. https://doi.org/10.17687/jeb.v12i1.1193

Liao, C., Lin, H. N., Luo, M. M., & Chea, S. (2017). Factors influencing online shoppers' repurchase intentions: The roles of satisfaction and regret. Information and Management, 54(5), 651–668. https://doi.org/10.1016/j.im.2016.12.005

Luo, Y., Ye, Q., & Meng, L. (2017). An Empirical Research on Influence Factor of College Students' Continued Intentions of Online Self-Regulated Learning Based on the Model of ECM and TAM. 99, 521–528. https://doi.org/10.2991/icsshe-17.2017.132

MacCann, C., Todd, J., Mullan, B. A., & Roberts, R. D. (2015). Can Personality Bridge the Intention-behavior Gap to Predict Who Will Exercise? American Journal of Health Behavior, 39(1), 140–147. https://doi.org/10.5993/AJHB.39.1.15

McCrae, R. R., & Costa, P. T. (2008). The five-factor theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), Handbook of personality: Theory and research (3rd ed., pp. 159–181). The Guilford Press.

Monds, L. A., MacCann, C., Mullan, B. A., Wong, C., Todd, J., & Roberts, R. D. (2016). Can personality close the intention-behavior gap for healthy eating? An examination with the HEXACO personality traits. Psychology, Health & Medicine, 21(7), 845–855. https://doi.org/10.1080/13548506.2015.1112416

Moshrefjavadi, M. H., Rezaie Dolatabadi, H., Nourbakhsh, M., Poursaeedi, A., & Asadollahi, A. (2012). An Analysis of Factors Affecting on Online Shopping Behavior of Consumers. International Journal of Marketing Studies, 4(5). https://doi.org/10.5539/ijms.v4n5p81

Mothersbaugh, D. L., Hawkins, D., Kleiser, S. B., Mothersbaugh, L. L., & Watson, C. (Casey) F. (2019). Consumer Behavior: Building Marketing Strategy. McGraw-Hill Education.

Mustafa, A. S., & Garcia, M. B. (2021). 2021 1st Conference on Online Teaching for Mobile Education, OT4ME 2021.

Oliver, R. L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. Journal of Marketing Research, 17(4), 460. https://doi.org/10.2307/3150499

Petrosyan, A. (2024). Number of Internet and Social Media Users Worldwide as of October 2024. https://www.statista.com/statistics/617136/digital-population-worldwide/

Qin, M. (2007). Consumer behavior towards continued use of online shopping: An extend expectation disconfirmation model. In Integration and Innovation Orient to E-Society Volume 1: Seventh IFIP International Conference on e-Business, e-Services, and e-Society (I3E2007), October 10–12, Wuhan, China (pp. 400-407). https://doi.org/10.1007/978-0-387-75466-6_45

Rehman, S. U., Bhatti, A., Mohamed, R., & Ayoup, H. (2019). The Moderating Role of Trust and Commitment Between Consumer Purchase Intention and Online Shopping Behavior in the Context of Pakistan. Journal of Global Entrepreneurship Research, 9(1). https://doi.org/10.1186/s40497-019-0166-2

Rogers, E. M. (2003). Diffusion of innovation. Free Press.

Rouibah, K., Thurasamy, R., & May, O. S. (2009). User Acceptance of Internet Banking In Malaysia: Test of Three Competing Models. International Journal of E-Adoption (IJEA), 1(1), 1–19. https://doi.org/10.4018/jea.2009010101

Ruangkanjanases, A., Khan, A., Sivarak, O., Rahardja, U., & Chen, S.-C. (2024). Modeling the Consumers' Flow Experience in E-commerce: The Integration of ECM and TAM with the Antecedents of Flow Experience. Sage Open, 14(2). https://doi.org/10.1177/21582440241258595

Rudolph, T., Rosenbloom, B., & Wagner, T. (2004). Barriers to Online Shopping in Switzerland. Journal of International Consumer Marketing, 16(3), 55–74. https://doi.org/10.1300/J046v16n03_04

Samaradiwakara, G. D. M. N., & Gunawardena, C. G. (2014). Comparison of existing technology acceptance theories and models to suggest a well improved theory/model. International Technical Sciences Journal, 1(1), 21–36.

Sarkar, S., & Khare, A. (2019). Influence of Expectation Confirmation, Network Externalities, and Flow on Use of Mobile Shopping Apps. International Journal of Human-Computer Interaction, 35(16), 1449–1460. https://doi.org/10.1080/10447318.2018.1540383

Sheth, J. N., Sethia, N. K., & Srinivas, S. (2011). Mindful Consumption: A Customer-Centric Approach to Sustainability. Journal of the Academy of Marketing Science, 39(1), 21–39. https://doi.org/10.1007/s11747-010-0216-3

Singh, D. P. (2015). Integration of TAM, TPB, and Self-image to Study Online Purchase Intentions in an Emerging Economy. International Journal of Online Marketing, 5(1), 20–37. https://doi.org/10.4018/ijom.2015010102

Song, H. G., & Jo, H. (2023). Understanding the Continuance Intention of Omnichannel: Combining TAM and TPB. Sustainability, 15(4), 3039. https://doi.org/10.3390/su15043039

Statista. (2024). e - Commerce - Worldwide. https://www.statista.com/outlook/emo/ecommerce/worldwide

Tong, X. (2010). A cross-national investigation of an extended technology acceptance model in the online shopping context. International Journal of Retail & Distribution Management, 38(10), 742–759. https://doi.org/10.1108/09590551011076524

Tsao, W., & Chang, H. (2010). Exploring the Impact of Personality Traits on Online Shopping Behavior. African Journal of Business Management, 4(9), 1800–1812.

Uşaklı, H. (2020). A Study on Personality Traits and Shopping Online. Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach. Seria: Administracja i Zarządzanie, 48(48). https://doi.org/10.34739/zn.2019.48.05

Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions Subject Areas: Design Characteristics, Interventions. Decision Sciences, 39(2), 273–315. http://www.vvenkatesh.com/wp-content/uploads/2015/11/Venkatesh_Bala_DS_2008.pdf

Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. Management Science, 46(2), 186–204. https://www.jstor.org/stable/2634758

Vijayasarathy, L. R. (2004). Predicting consumer intentions to use on-line shopping: the case for an augmented technology acceptance model. Information & Management, 41(6), 747–762. https://doi.org/10.1016/j.im.2003.08.011

Wu, J. H., & Wang, S. C. (2005). What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. Information and Management, 42(5), 719–729. https://doi.org/10.1016/j.im.2004.07.001

Wu, W. Y., & Ke, C. C. (2015). An Online Shopping Behavior Model Integrating Personality Traits, Perceived Risk, and Technology Acceptance. Social Behavior and Personality, 43(1), 85–98. https://doi.org/10.2224/sbp.2015.43.1.85

Yılmaz, Ö. (2018). Tüketicilerin Online Alışveriş Niyetlerinin Teknoloji Kabul Modeli Bağlamında İncelenmesi. Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi, December, 331–346. https://doi.org/10.32709/akusosbil.478718

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Revisiting "Post-Neoliberalism" in Latin America's Pink Tide: Brazil and Venezuela Compared[*]

Research Article / Araştırma Makalesi

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ABSTRACT

This article critically reassesses the "post-neoliberal" nature of Latin America's Pink Tide through a comparative analysis of Brazil and Venezuela. Emerging in the 2000s with anti-neoliberal rhetoric, these governments initially pursued redistributive policies, seemingly diverging from their predecessors' neoliberal agendas. However, following the 2008 global financial crisis, the sustainability of these welfare-oriented programs was compromised, prompting the introduction of austerity measures. These policy shifts led to widespread public discontent and large-scale protests, reflected in electoral defeats beginning around 2015, often described as a "right turn" or a "return to neoliberalism." By comparatively analyzing Brazil and Venezuela, often seen as representing the moderate and radical poles of the Pink Tide, this article challenges the notion of a coherent and lasting "post-neoliberal" phase. It argues that the Pink Tide's redistributive initiatives were fundamentally dependent upon a favorable economic environment marked by surging commodity prices and abundant international liquidity. Consequently, the end of this favorable global economic context, rather than an external ideological shift, triggered policy reversals and austerity measures. Ultimately, the study contends that the alleged "right turn" in Latin America began not after the Pink Tide, but within it.

Keywords: *Pink Tide, post-neoliberalism, Latin America, Brazil, Venezuela*.

1. INTRODUCTION

Following the wave of popular unrest and mobilizations against neoliberal governments across many Latin American countries beginning in the late 1990s, several left-wing political formations with anti-neoliberal platforms came to power. These governments were commonly referred to as the "Pink Tide." The term "pink," rather than "red," reflected their position within the left: they were closer to the center-left than the radical left and pursued relatively moderate political programs (Gonzalez, 2019). Indeed, in the first decade of the new century, these left-wing administrations implemented redistributive policies that marked a departure from the neoliberal agenda of their predecessors, though they did not represent a radical break from the neoliberal legacy. However, in the second decade, under the strain of the global capitalist crisis, these governments were unable to sustain their welfare programs and began adopting austerity measures, which, in turn, fueled public discontent and led to the alienation of their voter base.

This discontent began to manifest itself in the form of electoral defeats for these governments or large-scale popular mobilizations starting around 2015. In Argentina, the 12-year rule of the Kirchner administration ended with a defeat in the 2015 elections to center-right candidate Mauricio Macri. In Brazil, the Workers' Party (*Partido dos Trabalhadores*, PT) lost the 2018 elections to far-right candidate Jair Bolsonaro. In Venezuela, Chavismo's 17-year streak of electoral success came to an end with the loss of the 2015 parliamentary elections. The Maduro government's refusal to recognize these results and its subsequent authoritarian turn triggered a popular uprising in 2017,

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which was violently repressed. Similar examples of electoral defeats or popular unrest can be found in other countries as well, leading many to characterize this period as the end of the Pink Tide and to describe it as a "right turn in Latin America" or a "neoliberal turn after post-neoliberalism." (Frens-String and Velasco, 2016; Vivanco, 2018). However, this "right turn" would not last as long as the Pink Tide itself and would soon begin to retreat, as the left reclaimed electoral victories in several countries.

Today, we find ourselves in a new phase marked by both the resurgence of what some describe as a second Pink Tide as well as the emergence of distinct cases such as the recent electoral victory of far-right candidate Javier Milei in Argentina. In this context, the present study offers a critical analysis of the first Pink Tide, focusing on the experiences of Brazil and Venezuela. More specifically, it questions the nature of these governments' so-called "post-neoliberalism." Was it an ideological and institutional break from the previous neoliberal agenda, or merely a conjunctural policy adjustment within broader structural changes? Did the continent truly experience a long-lasting, consistent period of "post-neoliberalism"? Considering the austerity programs that many Pink Tide governments began implementing shortly after the global financial crisis of 2008, this study argues that there was no single, coherent, and enduring "post-neoliberal period" under these administrations. It demonstrates that the moderate welfare programs of these governments largely depended on the extraordinary rise in commodity and raw material prices in the 2000s, as well as on the inflow of hot money enabled by low global interest rates. With the end of this favorable economic context following the Great Recession, the study contends that the "right turn" in Latin America had already begun, under the Pink Tide governments themselves.

Using qualitative comparative analysis, this study draws on an extensive body of primary and secondary materials, encompassing scholarly literature, government and party documents, speeches, and detailed media analyses. It begins by unpacking the Pink Tide governments, analyzing what the left itself meant in this context, highlighting its internal heterogeneity. Within this framework, it also explores the relationship between the left and populism, a concept frequently invoked in analyses of these governments. The study then examines how neoliberalism took shape in the Latin American context and how left-wing parties and governments framed both neoliberalism and their own alternative policies. After analyzing the economic and social policies of the Pink Tide governments, along with their contradictions and dynamics of transformation, the focus shifts to two case studies often considered polar opposites within the Latin American left: Brazil and Venezuela. It compares the economic policies of Brazil, considered a moderate example of the Pink Tide under the leadership of Lula and later Rousseff, with those of Venezuela's *Chavismo*, typically regarded as a radical example, assessing both similarities and differences. The study concludes by situating its main arguments within a broader trajectory that includes the preceding neoliberal wave, the Pink Tide itself, and the subsequent rise of "right-turn" governments.

2. THE MEANING OF THE LEFT AND ITS INTERNAL VARIATIONS IN LATIN AMERICA

Following the electoral victories of left-wing parties across Latin America since the beginning of the new century, a vast body of literature has emerged, examining various aspects of this phenomenon. Initially, scholars focused on classifying leftist governments and exploring the reasons behind their rise to power (Castañeda, 2006; Cleary, 2006; Petkoff, 2005). As these parties continued to win elections in the second half of the decade, the literature shifted toward analyzing their economic policies and democratic performance (Flores-Macías, 2012; Levitsky and Roberts, 2011; Weyland et al., 2010). Then, as left governments began to lose elections and public support, scholarly attention turned to the causes behind the decline of the Pink Tide (Grugel and Riggirozzi, 2018a; Petras, 2015; Svampa, 2017). In addition, numerous comparative and case studies have explored specific dimensions of these governments and their trajectories.

It is entirely understandable that the categorization and conceptualization of left-wing governments have become central themes in the literature, given the significant

differences among these governments across various dimensions. A widely accepted view holds that, in terms of their economic, foreign, and institutional policies, left governments can be broadly divided into two groups: the "moderate" and the "contestatory" or "radical" (Weyland, 2010)[1]. The governments of Brazil, Chile, and Uruguay are typically seen as representing the moderate wing of the Pink Tide, as they adopted policies more aligned with free-market principles. In contrast, the governments of Venezuela, Bolivia, and Ecuador followed more radical approaches. Meanwhile, countries such as Argentina, Nicaragua, Paraguay, and El Salvador have oscillated between these two tendencies. For instance, Raúl Madrid (2010, p. 587) classified these two groups as the "liberal" and "interventionist" lefts. In addition to their economic policies, he argues that they also differ in their political strategies, as well as in their foreign and social policies. They also vary in terms of organizational structure: the liberal left is made up of older, institutionalized parties, while the interventionist left consists of newer, more fluid, and highly personalistic movements.

Levitsky and Roberts (2011, p. 12), on the other hand, propose a more nuanced typology of the left, based on the organizational characteristics of political parties. Their typology is structured around two dimensions: (1) the level of institutionalization and (2) the locus of political authority. The first dimension distinguishes between established party organizations and newer parties or movements, while the second contrasts organizations that concentrate power in the hands of a dominant personality with those that distribute authority more broadly within the organization. Based on these dimensions, they identify four categories: *the institutionalized partisan left*, closely resembling European social democratic parties (e.g., PT in Brazil, the Socialist Party of Chile [*Partido Socialista de Chile*, PS], and the Broad Front [*Frente Amplio*] in Uruguay); *the populist machine,* blending institutionalized parties with power concentrated in a dominant leader (e.g., Kirchnerism in Argentina and the Sandinista National Liberation Front [*Frente Sandinista de Liberación Nacional*, FSLN] in Nicaragua); the populist left, denoting weak party organization and top-down political mobilization (e.g., Hugo Chávez in Venezuela and Rafael Correa in Ecuador), and the movement left, outsiders like the populist left but led by figures emerging directly from social movements rather than institutional politics (e.g., the Movement for Socialism [*Movimiento al Socialismo*, MAS] in Bolivia).

What explains this differentiation within the Latin American left? According to Levitsky and Roberts (2011), this variation is rooted in distinct historical experiences and party traditions. In other words, national trajectories shaped by authoritarianism, democratization, and economic liberalization have influenced and constrained the characteristics of left alternatives and their political strategies. For example, the failure of Allende's government in Chile and the subsequent experience of military rule led to the moderation of the country's once radical left. Similar processes unfolded in Uruguay and Brazil. In contrast, the parties belonging to the "movement left" or "populist left" did not exist during the era of military dictatorships in their respective countries. These parties emerged under new democratic regimes, in contexts where neoliberal governments were implementing austerity programs. As a result, differing historical experiences contributed significantly to the internal variation of the contemporary Latin American left. Madrid (2010) also adopts a historical perspective to explain this differentiation and argues that older left parties have tended to be more moderate and market-oriented than newer left formations. These older parties were pushed toward moderation under intense political and economic pressure to adopt market-oriented policies during the 1980s and 1990s. By contrast, "interventionist" left formations emerged in countries where traditional left parties had already come to power and implemented neoliberal reforms during the 1990s, prompting the rise of new, more radical alternatives.

[1] Weyland prefers the term "contestatory", instead of "radical" because "although clearly more radical than its moderate counterparts, the contestatory left is not nearly as radical as its forefathers in the 1960s and 1970s" (Weyland, 2010, p. 3).

Beyond categorizing it and identifying its internal variations, understanding the very meaning of the left is a crucial aspect of the discussion. In the 1960s and 1970s, Marxist and other radical factions held a dominant position within the Latin American left. However, following the fall of the Berlin Wall and the onset of an ideological crisis within the left, a more moderate, electoralist, and pragmatic wing emerged as the predominant tendency (Weyland, 2010). As a result, the mainstream left, more specifically Pink Tide governments, no longer advocate for the expropriation of the means of production or for a clearly defined socialist program. Instead, they reject certain elements of the neoliberal agenda and seek to reduce social and economic inequalities through redistributive policies (Levitsky and Roberts, 2011). In a similar vein, Cleary (2006, p. 36) defines the left as sharing, at least rhetorically and often substantively, a commitment to redistribution and social justice, drawing mass support from segments of the population that are severely disadvantaged under the existing economic order.

An important dimension of the debates surrounding the identification and categorization of the left involves its relationship with "populism". Since there is no universally accepted definition of populism, its conceptualization in relation to the left varies considerably. From a liberal democratic perspective, populism is often used in a pejorative sense, branding "radical" left governments as threats to democracy and free-market mechanisms (Grigera, 2017). Some scholars adopt the ideational approach, defining populism as an ideology that opposes "a virtuous and homogeneous people" to corrupt elites and dangerous "others" (Mudde, 2004). Within this framework, the governments of Chávez, Morales, Correa, and Kirchner are frequently cited as examples. However, a major critique of this approach is that it places leaders like Fujimori in Peru and Menem in Argentina, who pursued neoliberal policies, into the same category as those who promoted "post-neoliberal" agendas during their time in office (Hadiz and Chryssogelos, 2017).

Other scholars, by contrast, define populism through its organizational and institutional characteristics rather than the discourse or ideology of leaders and parties. For instance, Mouzelis (1985) defines populism as a style of organization and leadership that systematically seeks to bypass formal political institutions that have grown detached from the concerns of ordinary people. Levitsky and Roberts (2011, p. 6) adopt this conceptualization, defining populism as "the top-down political mobilization of mass constituencies by personalistic leaders who challenge established political or economic elites on behalf of an ill-defined *pueblo*". According to this definition, the Pink Tide includes both populist and non-populist forms of politics. For instance, the leadership styles of Chávez and Correa are considered populist because they bypass partisan intermediaries and appeal directly to mass constituencies. In contrast, leaders such as Morales in Bolivia, Lula in Brazil, Lagos in Chile, and Vázquez in Uruguay are seen as non-populist, as they emerged from and remained accountable to autonomous social movements or political parties.

Grigera (2017), on the other hand, identifies two key elements in defining populism: institutions and economic redistribution. First, he argues that populist regimes play a central role in (re)institutionalizing social conflict by creating new channels through which "the people" can articulate their identity. Second, populist governments rely on redistributive policies as tools for mediating and arbitrating social tensions. From this political economy perspective, Grigera conceptualizes the Pink Tide as a form of "neopopulism" and highlights the commodity boom of the 2000s as a crucial enabling condition for the endurance of neopopulist regimes in Latin America for over a decade. While these debates on populism can be revealing in terms of the ideological, organizational, and socio-economic aspects of the Pink Tide governments, the term populism is used so variably in the literature that, rather than offering clarity, it often leads to confusion. After addressing the meaning of the left in the Latin American context, its categorization, and its linkage to populism as a controversial category, the next section turns to another key debate in the literature: the Pink Tide's engagement with neoliberalism.

3. CHALLENGING NEOLIBERALISM? PINK TIDE'S "POST-NEOLIBERALISM" IN PRACTICE

Neoliberalism, much like populism, is a widely used term that is often defined in significantly different ways. Since the 1980s, its usage has expanded across various contexts, referring to different aspects such as political ideology, economic philosophy, and institutional reforms (Rutar, 2023). Despite ongoing conceptual controversies, the term is most often associated with free trade, deregulation, privatization, and cuts in public services. These principles were most clearly codified in the Washington Consensus agenda promoted by international financial institutions in the late twentieth century (Grugel et al., 2008). In this context, Harvey's (2005, p. 2) widely cited definition remains a particularly insightful and useful point of reference.

> *Neoliberalism is, in the first instance, a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade. The role of the state is to create and preserve an institutional framework appropriate to such practices.*

Conceptualized by Harvey as "a theory of political economic practices," neoliberalism was first implemented in Chile after the Pinochet coup and later spread to other countries across the continent during the 1980s. Its significance in the Latin American context thus becomes even more apparent. In particular, the implementation of neoliberalism in the region by military dictatorships and authoritarian regimes, coupled with its impact in eroding purchasing power and social rights for the masses, has imbued the term with a distinctly pejorative connotation. The mass mobilizations and political upheavals that took place in the early 2000s in countries like Argentina, Bolivia, and Ecuador highlighted the extent of popular discontent with these policies. Left-wing parties capitalized on this widespread dissatisfaction, rising to power by mounting political campaigns against neoliberal reforms (Yates and Bakker, 2014).

Scholars have used a variety of terms to describe the Pink Tide governments, which came to power with anti-neoliberal rhetoric. While the term "post-neoliberalism" is the most commonly used, other labels such as "New Left," "reconstituted neoliberalism," "after neoliberalism," "not-quite-neoliberal," "twenty-first-century socialism," (Harnecker, 2015) and "anti-neoliberal" have also been employed (Ruckert et al., 2017, p. 1585). Given the lack of scholarly consensus on the definition of neoliberalism itself, it is even less likely that there would be agreement on what constitutes post-neoliberalism. Nevertheless, the framework proposed by Ruckert et al. (2017) offers an insightful starting point for understanding this concept. According to them, the concept of post-neoliberalism "remains useful if we understand it not as a complete break with neoliberalism, but rather as a tendency to depart from certain aspects of neoliberal policy prescriptions, without constituting a strict set of policies or a clearly identifiable policy regime" (Ruckert et al., 2017, p. 1584). A key limitation of their approach, however, is the lack of distinction between the policies of left governments during and after the commodity boom, which played a decisive role in shaping their economic and social agendas. As a result, they overlook the important setbacks experienced by these "post-neoliberal" governments in economic, social, and democratic terms following the end of the commodity boom and the onset of the global crisis.

Building on this conceptualization of post-neoliberalism, Ruckert et al. (2017) analyze the performance of Pink Tide governments across six policy dimensions: economic policy, social policy, gender and sexuality, institutional reform, state-society relations, and environmental policy. They conclude that the most notable break from neoliberalism occurred in the area of social policy. In the other dimensions, however, there are considerable internal differences among leftist governments. These findings indicate that focusing on the economic and social policy dimensions, rather than on

value-based policies, provides a more feasible and realistic framework for operationalizing post-neoliberalism. Accordingly, this study adopts a more parsimonious framework that centers on these two dimensions.

The commodity boom was a key factor in shaping the economic and social policies of Pink Tide. In response to the 2001 stock market crisis, the United States, and to a similar extent Europe, implemented expansionary monetary policies to stimulate economic recovery. Simultaneously, the rapid growth of Asian export industries, particularly in China, fueled a global surge in demand for commodities, from which Latin American countries benefited significantly (Petras, 2009). Under these favorable global market conditions, both left- and right-wing governments in Latin America experienced relatively high economic growth. According to World Bank (2025) data, the average growth rate across the continent reached 4.45% between 2003 and 2008. However, left-wing governments set themselves apart from their center-right counterparts by deviating from market orthodoxy and increasing social spending (Flores-Macías, 2012).

Left-wing governments financed their expansive social spending programs thanks to rising tax revenues under the commodity boom. Although overall tax revenues in Latin American countries remained relatively low (around 21% of GDP compared to the OECD average of 34.4%) these governments boosted public income by increasing royalties and taxes on resource exports (Grugel and Riggirozzi, 2018a, p. 553). Consequently, instead of implementing progressive income tax systems, typically a hallmark of leftist fiscal policy, they relied heavily on extractivism and the export of raw materials (Gudynas, 2009; Acosta, 2013; Ruckert et al., 2017, p. 1588). In some cases, this dependence deepened over time. For example, when Chávez first came to power, less than half of Venezuela's export revenues came from oil; by 2013, over four-fifths were derived from petroleum exports. In Argentina, soybeans and their by-products increasingly came to dominate the country's overall export value (Rojas, 2017, p. 74).

Within this economic context, Pink Tide governments shared certain common approaches to social policy. One of the defining features of this period was the expansion of Conditional Cash Transfer (CCT) programs. In fact, these programs were originally introduced by neoliberal governments in the region, and it remains controversial whether CCTs help alleviate poverty or merely perpetuate it. However, by inheriting these programs from their predecessors, left governments expanded their scope by increasing budgets and relaxing eligibility criteria for beneficiaries (Papadopoulos and Leyer, 2016). For instance, in Ecuador, the Correa administration reformed existing CCTs by raising the allowance from US$15 to US$35 and introducing a pension scheme for citizens over the age of 65 (Flores-Macías, 2012, p. 38). In Bolivia, the Morales government reorganized the *Bonosol* program, originally providing a yearly transfer of US$250 to those over 65, by lowering the age threshold to 60, increasing the benefit to US$330, and eliminating all conditions. The government also launched a new initiative to promote school attendance, offering an annual grant of US$27 to families with children enrolled in primary or secondary education (Flores-Macías, 2012, p. 40). In Brazil, Lula's administration consolidated existing CCTs under the umbrella of *Bolsa Família* (Family Allowance), gradually increasing the number of beneficiaries. Similarly, the Vázquez government in Uruguay implemented a CCT program modeled after those in neighboring countries, while governments in Argentina and Nicaragua maintained their CCTs under different names (Grugel and Riggirozzi, 2018b).

To advance their redistributive goals, Pink Tide governments implemented a range of social policies. In Argentina, the Kirchner administration expanded social insurance and health coverage to informal workers and introduced a child benefit program (Grugel and Riggirozzi, 2018a, p. 554). In Ecuador, the Correa government launched a disability support program (*Ecuador sin Barreras*), while in Uruguay, the Vázquez administration introduced a care provision initiative for the elderly (Grugel and Riggirozzi, 2018b). During this period, minimum wages rose significantly in countries such as Brazil and Argentina (CEPAL, 2011, p. 59), and real wages increased across the region throughout the 2000s. At the same time, both the share of informal workers and

unemployment rates declined (Burchardt and Diez, 2014, p. 474). In Argentina and Uruguay, governments strengthened trade unions and facilitated collective bargaining (Levitsky and Roberts, 2011, p. 23). Overall, increased social spending during the 2000s contributed to a marked reduction in social inequality. Between 2003 and 2012, the poverty rate declined from 41.6% to 25.3%, while the percentage of people living in extreme poverty fell from 24.5% to 12.3% (Grugel and Riggirozzi, 2018a, p. 555).

However, this period of "social welfare" was short-lived. Latin American countries were quickly affected by the consequences of the Great Recession. In 2009, economic growth across the region fell to -1.8% (World Bank, 2025). Although the economic growth continued between 2010 and 2013, largely due to exceptionally low interest rates in the U.S. and Europe, by early 2014 the region entered a new and more severe economic crisis. The heavy reliance on primary exports and extractivist models made Latin American economies highly vulnerable to fluctuations in the global economy (Ruckert et al., 2017). As demand for raw materials declined and inflows of speculative capital slowed, many economies began to contract, placing Pink Tide governments at a crossroads. They faced a critical choice: either continue funding expansive social programs despite worsening macroeconomic indicators, which would risk confrontation with domestic and international creditors, or adopt austerity measures to ensure the repayment of public debt (Sorans and Rodríguez Porras, 2018; Loureiro and Saad-Filho, 2019). Without exception, left-wing governments opted for the latter path, implementing austerity in various forms and reducing social spending (Petras, 2015).

During her second term between 2014 and 2016, President Rousseff in Brazil began implementing budget cuts in health, education, and public investment (Cerdeira, 2018). In Venezuela, a sharp decline in oil prices, combined with severe governance failures, triggered a full-scale economic collapse (Corrales, 2015). In Argentina, under the Kirchner administration, gasoline and water prices surged in 2014. Inflationary policies and a major devaluation of the national currency drastically eroded the purchasing power of wage earners, sparking mass protests and strikes against the government's economic agenda (Avanzada Socialista, 2014; Koch, 2014). In Bolivia and Ecuador, governments responded to falling commodity prices by intensifying extractivist policies, which led to widespread protests and the alienation of Indigenous communities, once core supporters of the left in those countries (Restrepo Botero and Peña Galeano, 2017; Fuentes, 2014). In 2010, Bolivia's Morales government attempted to remove subsidies on gas prices, resulting in an 82% price increase. This sparked a national uprising and general strike, ultimately forcing Morales to reverse the decision (Smink, 2010). Across the continent, unemployment rose in the second decade of the century, and the decline in the proportion of people living in extreme poverty came to a halt (Grugel and Riggirozzi, 2018a, p. 556).

As a result, left-wing governments ultimately bore the consequences of their failure to diversify their economies and their continued dependence on extractivism and the export of primary commodities (Burchardt and Dietz, 2014). The social progress achieved during the 2000s began to unravel in the early 2010s. These economic and social setbacks combined with widespread corruption scandals and increasing authoritarianism, led to a decline in popular support and a series of electoral defeats for the Pink Tide, beginning around 2015. In the following sections, we will examine this broader regional trend in greater detail by focusing on the specific cases of Brazil and Venezuela.

4. BRAZIL: BETWEEN "SOCIAL NEOLIBERALISM" AND "NEODEVELOPMENTALISM"

The PT came to power in 2002 following the collapse of the neoliberal program implemented by center-right parties throughout the 1990s. This program had led to lower growth rates, rising unemployment, the expansion of informal labor, increasing precarity, and, ultimately, the outbreak of the 1999 exchange rate crisis (Saad-Filho and Morais, 2018, pp. 55–68). Founded in 1980 by trade union leaders as a socialist party, the PT

gradually transformed into a center-left social democratic party during the 1990s becoming one of Brazil's major political forces (Cerdeira, 2016).

In the aftermath of the neoliberal collapse, the PT and its former trade union leader, Luiz Inácio Lula da Silva -known as- Lula, emerged as the leading contenders in the presidential elections. Despite the party's shift toward social democracy, financial elites, large corporations, the upper-middle class, and international actors expressed deep concern about the potential for a "radical left turn" under Lula's leadership. Nonetheless, the Lula administration adopted a non-confrontational approach toward these sectors, embracing the "rules of the game" of the capitalist system and pursuing moderate economic and social policies (Carvalho, 2007).

Despite this general characterization, the fourteen years of PT governance can be divided into distinct periods marked by shifts in economic and social policy. The first term is often referred to as "social neoliberalism" (Martins, 2006) or simply the continuation of neoliberalism (Morais and Saad-Filho, 2005). "Social neoliberalism" denotes the expansion of social assistance to the poor without breaking from the neoliberal legacy (Dorlach, 2015). Indeed, during his first term, Lula largely adhered to the "economic orthodoxy" of previous administrations. For example, his government maintained fiscal surpluses, even exceeding the targets set by the IMF; in the name of combating inflation, the Central Bank raised interest rates, and Lula further liberalized capital flows (Astarita, 2018). At the same time, he extended the CCT programs under a new name, *Bolsa Família*, which led to a decrease of extreme poverty and income inequality rates in the country[2].

Despite these contractionary economic policies, Brazil experienced economic growth during this period, largely due to a surge in exports as well as increased foreign direct investment and portfolio inflows (Loureiro and Saad-Filho, 2019, pp. 68–69). During Lula's first term, Brazil's average economic growth rate was 3.4%. While this represented a modest improvement, it was not sufficient for the PT to fully consolidate its political power. In its second term, the PT government combined orthodox macroeconomic policies with selective "neodevelopmentalist" initiatives (Morais & Saad-Filho, 2012). Unlike social neoliberalism, neodevelopmentalism refers to a model characterized by strategic state interventions aimed at promoting industrial development, the implementation of selective protectionist policies, and public investment in infrastructure and innovation (Ban, 2012). Within this framework, Lula adopted a more self-confident and ambitious policy agenda. Public spending increased without undermining macroeconomic stability, and the administration launched the "Growth Acceleration Program." The state-owned development bank BNDES was actively employed to finance public investments, while the role of the mixed-ownership oil company Petrobras in the economy was significantly expanded (Saad-Filho, 2019). At the same time, income transfer programs were broadened, the minimum wage was increased, new jobs were created, public investment grew, and household debt levels rose. As a result, Brazil's average economic growth rate climbed to 4.4% between 2006 and 2011 (Loureiro and Saad-Filho, 2019; Astarita, 2018).

This growth period, however, was heavily dependent on favorable global economic conditions and masked underlying structural weaknesses. The deepening reprimarization of the economy coincided with persistently low investment in high-tech industries. Although the lowest income groups saw gains through social programs and wage increases, deep-rooted social inequalities persisted, and the wealthiest sectors of society retained their privileges. As global demand for primary commodities declined and speculative capital inflows slowed, Brazil's economy entered a sharp downturn: between 2012 and 2015, the average growth rate dropped to just 0.3% (Antunes et al., 2019; Astarita, 2018).

[2] In the first term of Lula's administration, *Bolsa Família* program covered approximately 11 million low-income families with children. In exchange for sending their children to school and having them vaccinated, families received about 35 dollars per month in financial assistance (World Bank, 2007).

Meanwhile, neodevelopmentalist policies continued under President Rousseff. When she took office in 2011, interest rates were lowered to stimulate industrial activity and private investment. Public investment also increased, particularly in infrastructure and the oil industry. However, these measures were not sufficient to halt or reverse the country's economic downturn (Saad-Filho, 2019). As a result, the Rousseff administration faced dual pressure. On the one hand, popular sectors affected by the economic deterioration demanded the strengthening of social policies; on the other, domestic and international financial institutions, creditors, and the business community called for fiscal discipline and the improvement of macroeconomic indicators.

In 2013, the Rousseff administration shifted toward a more orthodox economic stance, raising interest rates and cutting public spending in an effort to improve fiscal balance and attract foreign capital back to the country. Nevertheless, these contractionary policies further slowed economic growth, hindered job creation, and reduced income levels among the poor, ultimately fueling growing public discontent with the PT government (Loureiro and Saad-Filho, 2019).

Aware of growing public discontent, especially following the mass mobilizations of June 2013, the PT adopted a more left-leaning discourse during the 2014 election campaign, warning voters of the risks posed by a potential center-right, neoliberal government if the party were to lose power. In the presidential election, the PT secured 52% of the popular vote. However, shortly after the election, President Rousseff appointed Joaquim Levy, a prominent banker known for his commitment to neoliberal policies, as Minister of Finance and announced a stringent austerity program aimed at stabilizing the economy (Astarita, 2018). The austerity measures had a direct impact on public services, including cuts to healthcare and education (Armendariz, 2015), restrictions on unemployment insurance, and reductions in the Social Integration Program. Simultaneously, the government raised electricity tariffs by 40% and increased the prices of gasoline and petroleum products (Cerdeira, 2018). In September 2015, the Rousseff administration introduced a new adjustment plan that further affected pensions, raised taxes, and included budget cuts to public housing programs (Opinión Socialista, 2015) as well as to *Bolsa Família* (Castagna, 2015).

The economic crisis and the implementation of austerity measures alienated the PT's popular base, just as right-wing parties were preparing to impeach President Dilma Rousseff over alleged irregularities in government spending. During this period, the PT once again adopted a non-confrontational strategy. Rather than mobilizing its grassroots supporters, the party leadership sought to negotiate a deal with right-wing parties in Congress (Friedmann and Puty, 2020). However, this approach proved ineffective. In June 2016, Rousseff was impeached by Congress, and her vice president, Michel Temer, the leader of the centrist Brazilian Democratic Movement Party (PMDB), assumed the presidency (Loureiro and Saad-Filho, 2019). Ultimately, in the 2018 presidential elections, the PT's candidate, Fernando Haddad, was defeated by far-right candidate Jair Bolsonaro. After fourteen years of PT rule, Brazil came under the leadership of a far-right president.

5. VENEZUELA: FROM "STATE CAPITALISM" TO "AUTHORITARIAN NEOLIBERALISM"?

Hugo Chávez won the 1998 presidential election on a leftist platform, amid the collapse of Venezuela's traditional political parties, which had lost credibility due to the neoliberal policies they implemented throughout the 1980s and 1990s. The impact of these neoliberal reforms was so severe on the working class that it sparked a massive and spontaneous popular uprising in 1989, known as *Caracazo* (Gonzalez, 2019). Amid the political turmoil of the 1990s, Chávez, then a lieutenant colonel, first came to public attention by leading a failed military coup in 1992. After receiving a presidential pardon, he founded the Fifth Republic Movement (*Movimiento Quinta República*) and ran for office as part of the left-wing electoral alliance, the Patriotic Pole (*Polo Patriótico*). His campaign platform strongly criticized IMF-backed economic programs and the

entrenched corruption of the political regime. He also called for a moratorium on Venezuela's external debt and the nationalization of the oil industry (Chávez Frías, 2014).

After winning the election, Chávez called for a constituent assembly to draft a new constitution. Due to an opposition boycott, the Patriotic Pole secured nearly all the seats in the assembly (Handlin, 2018, p. 84). The resulting constitution was approved in a popular referendum, receiving 71% of the vote. Following its adoption, Chávez won the 2000 presidential election with 59.7% of the popular vote, and his electoral alliance secured an absolute majority in the National Assembly.

In 2001, President Chávez enacted a series of decree-laws under an Enabling Act (*Ley Habilitante*), primarily focused on economic reform. These measures included the expropriation of land holdings larger than 5,000 hectares for redistribution to poor peasants; the empowerment of artisanal fishermen; mandatory quotas requiring private banks to allocate more credit to small and medium-sized enterprises and agricultural producers; and an increase in oil taxes for multinational and private companies (Corrales, 2010; Flores-Macías, 2012). Chávez's economic policies triggered immediate backlash from powerful sectors, including business associations, particularly Fedecámaras (the Venezuelan Federation of Chambers of Commerce and Production), the leadership of Confederation of Workers of Venezuela (CTV), right-wing political parties, the Catholic Church, and the administration of U.S. President George W. Bush. These groups launched a coordinated political campaign against the reforms, beginning with a lockout and general strike at the end of 2001. When this effort failed, they orchestrated a military coup in 2002. Chávez was briefly ousted from power for three days, during which the president of Fedecámaras was installed as interim president by the military junta. However, a massive and unexpected wave of popular mobilization against the coup led to its collapse, allowing Chávez to return to office. Later that year, a second attempt at a general strike and lockout in the oil sector was also thwarted by widespread worker mobilization (Gonzalez, 2019; Sorans and Rodríguez Porras, 2018).

Following the failure of these attempts to remove him from power, Chávez launched a series of ambitious social programs in 2003, known as *Misiones*. Funded by extraordinary oil revenues, these initiatives were highly effective, at least until the onset of the global economic crisis. In the health sector, for instance, *Misión Milagro* enabled approximately 2.5 million citizens with visual impairments to receive free surgeries in Cuba. *Misión Barrio Adentro* provided healthcare services in impoverished neighborhoods with the support of Cuban doctors, while *Misión Mercal* offered subsidized food to low-income populations through government-run convenience stores (Flores-Macías, 2012, pp. 34–35). Through *Misión Robinson*, 2.8 million Venezuelans achieved literacy (Sorans and Rodríguez Porras, 2018, p. 60). Between 1998 and 2012, life expectancy at birth increased from 72 to 74 years, while infant mortality rates declined (Wilson, 2015).

The Chávez administrations implemented more "heterodox" economic policies than any other left-wing government of the Pink Tide era. In the oil sector, the government restructured the state-owned company *Petróleos de Venezuela* (PDVSA) and expanded its role through joint ventures with private companies. While this did not amount to a full nationalization of the sector, PDVSA became the majority stakeholder in oil fields, holding between 60% and 80% ownership. Additionally, in 2006, income taxes on oil companies were raised to 50%. Chávez also announced nationalizations in other key sectors, including telecommunications, utilities, steel, and cement (Gonzalez, 2019).

In terms of fiscal policy, budget deficits increased during the Chávez administration despite rising oil revenues, as the government placed little importance on meeting the IMF's demands for fiscal surpluses, unlike its predecessors. The Chávez government also introduced currency and price controls, imposed various restrictions on foreign exchange transactions and established a system of "preferential dollars" to

regulate currency trade. Additionally, the government implemented price controls on essential consumer goods as part of its effort to combat inflation (Flores-Macías, 2012).

These ambitious measures, combined with the support of the popular movement that had defeated the coup attempt, Chávez's strong anti-imperialist and leftist rhetoric, and the political backing of Cuban President Fidel Castro, turned Chávez into a political figure who inspired hope not only in Latin America but also within the global left by the mid-2000s. Indeed, in 2005, Chávez announced that Venezuela was embarking on the construction of "twenty-first-century socialism." (Rojas, 2006). However, the content of this socialism remained quite vague and did not entail a definitive break from capitalism.

In fact, during this period, Chávez's economic and social policies, often described as "state capitalism" as an alternative to neoliberalism (Bremmer, 2008; Clò, 2020), lacked a coherent political strategy or long-term plan. Instead, they were frequently reactive, abrupt, and arbitrary. The radical stance of the political opposition, exemplified by the coup attempt, along with the mass mobilization that emerged in its aftermath, and the aggressive posture of the Bush administration toward Chávez's government, pushed the Chávez administration into a more radical position than it had originally taken. Within this political context, the government's socioeconomic policies contained significant contradictions and vulnerabilities, many of which were temporarily masked by the windfall of extraordinary oil revenues.

The central problem of the Venezuelan economy was its growing dependence on oil. Despite Chávez's promises to diversify the economy, oil exports during his presidency accounted for approximately 95% of export earnings, 60% of government revenue, and 12% of GDP (Buxton, 2018). Paradoxically, oil production declined during this period due to underinvestment in infrastructure and the deteriorating performance of PDVSA. In 1998, daily oil production exceeded 3 million barrels; by 2015, it had dropped to 2.6 million barrels, and by December 2017, it had fallen to just 1.6 million (Sorans & Rodríguez Porras, 2018, p. 128).

Another major issue was the "preferential dollar system" in foreign exchange, which contributed significantly to the collapse of Venezuela's manufacturing sector. Business groups selected by the Chávez administration were allowed to import goods using an overvalued bolívar, a policy that undermined domestic production and accelerated deindustrialization (Ellner, 2018). Additionally, the arbitrary allocation of overvalued dollars in foreign exchange markets gave rise to the so-called *boliburguesía*, a privileged business class with close ties to the government that accumulated substantial wealth under Chavista rule (Ellner, 2023). Another significant contradiction concerned the role of the public sector in the economy. Despite nationalizations in certain sectors and the dominant role of PDVSA in the economy, the public sector's share of GDP remained virtually unchanged during Chávez's presidency. According to data from the Central Bank of Venezuela, the public sector accounted for 35.14% of GDP in 1999 and 35.54% in 2014 (Sutherland, 2016, p. 42).

Due to these major economic vulnerabilities, Venezuela was immediately impacted by the global economic crisis, with the economy contracting by 3.9% in 2009. In response to this downturn, the Chávez administration began implementing budget cuts in 2010. Salaries were frozen, collective bargaining processes were suspended for three years, the national currency was devalued, and inflation soared to 30%. As oil prices declined, the budgets for social programs were also reduced, given their heavy dependence on PDVSA funding. Consequently, the *Misiones* programs steadily deteriorated from 2009 onward. At the same time, corruption scandals became increasingly widespread within government circles, further disillusioning the social base of *Chavismo* (Sorans and Rodríguez Porras, 2018, pp. 171–173).

Under these circumstances, in the 2010 National Assembly elections, President Chávez and his party, the United Socialist Party of Venezuela (*Partido Socialista Unido de Venezuela*, PSUV), for the first time received fewer votes (5,399,390) than the center-right opposition alliance (5,628,488). Although *Chavismo* managed to retain a majority

in the Assembly thanks to the electoral system, the results were a clear signal to Chávez that his social support was waning. In response, and despite the worsening economic situation, the government engaged in massive public spending ahead of the 2012 presidential elections to maintain the loyalty of its social base. As a result, Chávez was re-elected with 55% of the popular vote. However, by that time, his health had significantly deteriorated, and since 2011 he had already named Nicolás Maduro as his chosen successor in the event of his death. Shortly after the election, Chávez passed away in 2013, and Maduro inherited an already deeply troubled economy. He went on to win the presidential election by a very narrow margin (50.61% to 49.12%), which triggered widespread accusations of electoral fraud (Prados, 2013).

Under Maduro's presidency, the economic and social collapse accelerated dramatically. The surge in public spending during the 2012 election campaign further deepened the fiscal deficit, while continued imports at an overvalued exchange rate depleted the Central Bank's foreign currency reserves. In an effort to continue servicing foreign debt, Maduro implemented further budget cuts, maintained salary freezes, and fueled runaway inflation by printing money without adequate reserves (Ellner, 2019). Meanwhile, as the country became increasingly dependent on imports for nearly all consumer goods, the government halted the importation of essential items such as food, medicine, and paper. This led to the near collapse of Venezuela's social services. According to a 2015 survey, there was a 68% shortage of surgical instruments and a 70% shortfall in available medicines. Additionally, only 30% of the health centers under the *Barrio Adentro* program were still operational (Wilson, 2015).

Under these conditions, *Chavismo* suffered a historic defeat in the parliamentary elections of December 2015. For the first time, the right-wing coalition won a majority in the National Assembly and secured control of most governorships. In response to this electoral loss, Maduro, backed by the Supreme Court, declared a state of emergency and an "economic emergency," effectively stripping the parliament of its powers through decree-laws. During this period, the country's economic and social conditions deteriorated even further. Between January and September 2015, monetary liquidity increased by 325%, while inflation skyrocketed from 68.5% in 2014 to 180.9% in 2015, 700% in 2016, and over 1,800% in 2017 (Sorans and Rodríguez Porras, 2018, p. 189). In 2015, nearly 45% of Venezuelans reported being unable to afford food at times; by March 2018, that figure had risen to 79% (Graham-Harrison and Zuñiga, 2018). As a result, approximately 2.5 million people, nearly 8% of Venezuela's population, left the country between 2015 and 2018 (Phillips, 2018). Due to the significant reduction in social spending and the accompanying authoritarian turn under Maduro's administration, some scholars have characterized this period as a return to authoritarian and neoliberal patterns of the past (Sánchez, 2023; Hetland, 2025).

The economic catastrophe and the government's autocratic turn led to a popular rebellion all over the country in April 2017. The government used the military in order to repress the rebellion and more than 120 people were killed during the protests. Popular protests declined in August 2017, and Maduro was able to maintain the power, making a convocation for a new Constituent Assembly. While the opposition boycotted the elections, PSUV won almost all the seats in the parliament. As a result, during this period, *Chavismo* lost much of the popular support it once held but managed to remain in power through repressive measures and the backing of the military leadership (Lander, 2024).

After analyzing the trajectories of the Brazil and Venezuela cases up to 2018, the next section will discuss the limits of the Pink Tide's post-neoliberalism by examining the commonalities and differences between these two cases.

6. DISCUSSION AND CONCLUSION

The two previous sections have shown that Brazil and Venezuela, often regarded as two contrasting cases within the Pink Tide, exhibited both significant similarities and differences in their approaches to economic and social policy. In Brazil, the PT

government preserved the core elements of the neoliberal macroeconomic framework while progressively expanding social spending and state intervention. Over its fourteen years in office, the PT fluctuated between models of "social neoliberalism" and "neo-developmentalism." In contrast, Chavismo in Venezuela, particularly after the failed coup attempt of 2002, pursued a trajectory that more directly challenged the neoliberal paradigm, both in rhetoric and practice, through a model commonly referred to as "state capitalism."

These divergences were likewise reflected in their political strategies. The PT adhered to a logic of "low-conflict progressivism," adopting a conciliatory and incremental approach that sought to avoid direct confrontation with political and economic elites. In Venezuela, by contrast, an initial polarization, spurred by the radical stance of the political opposition, deepened over time. While Rousseff's administration in Brazil ultimately lost power through an impeachment process backed by allied right-wing parties, Maduro's government responded to electoral defeat by refusing to recognize the results and initiating the construction of an autocratic regime.

Despite these major differences, however, the similarities in the rise and fall of both administrations proved to be the defining dynamics. Both Brazil and Venezuela initially benefited from the global commodity boom of the 2000s, which created the fiscal space necessary for expanded social spending. In both cases, left-wing governments capitalized on favorable terms of trade to implement redistributive policies that significantly reduced poverty and improved access to social services. CCT programs, such as *Bolsa Família* in Brazil and *Misiones* in Venezuela, became emblematic of the Pink Tide's turn toward social policy, albeit with differing levels of institutionalization and political framing.

It was the commodity boom which gave the Pink Tide governments benefited a maneuvering space, unlike the leftist governments of the 1990s (Levitsky & Roberts, 2011). The latter, constrained by foreign debt, inflationary crises, and fiscal deficits, had limited room to implement statist or redistributive policies within the framework of the global capitalist system. Despite their leftist promises in their election campaigns, such as Menem in Argentina or Paz Zamora in Bolivia, when they took the power, they implemented neoliberal programs in line with the Washington Consensus (Grigera, 2017).

Within a favorable economic context, both the Lula and Chávez administrations inherited and further deepened economic policies rooted in extractivism and commodity exports. Despite their rhetorical opposition to neoliberalism, neither the Lula/Rousseff nor the Chávez/Maduro governments made serious efforts to diversify their economies or reduce their reliance on volatile external markets. As a result, their development strategies remained structurally vulnerable to fluctuations in global demand and commodity prices, a weakness that became particularly evident after the global financial crisis.

With the onset of the Great Recession, both governments began implementing austerity programs, just like their predecessors in the 90s, albeit at different times and in different forms. These programs resulted in a rollback of the social gains achieved during the previous period. Due to Venezuela's overwhelming dependence on oil and the collapse of its manufacturing sector, the impact of the economic crisis was more immediate and severe there than in Brazil. The Chávez administration had already initiated austerity measures in 2010. Although public spending was increased in 2012 to secure electoral victory, the country entered a full-blown economic catastrophe by 2013. Unlike the Kirchner administration in Argentina and the PT governments in Brazil, *Chavismo* managed to remain in power, but at a tremendous cost. The economic collapse, combined with escalating authoritarianism, sparked a wave of popular rebellion, which was met with brutal repression by the government.

In the case of Brazil, the PT government managed to withstand the consequences of the global crisis for a few additional years; however, from 2013 onward,

the Rousseff administration gradually reduced social spending. Following its re-election victory in 2014, the government implemented a severe adjustment program, which ultimately alienated its popular support. Although much harsher attacks on social gains occurred under the Temer administration and later under Bolsonaro, the "right turn" or "the end of post-neoliberalism" had already begun in 2013 in Brazil (and in 2010 in Venezuela).

On the other hand, during the period of economic hardship that continued under the ongoing effects of the Great Recession, the "right turn" that replaced the Pink Tide proved entirely unsuccessful in achieving political stability. In Argentina, the center-right Macri administration, which came to power in 2015, deepened austerity measures, signed an agreement with the IMF, and pursued a pro-U.S. foreign policy. Nevertheless, its project of improving macroeconomic indicators completely collapsed, and in 2019, Macri was replaced by Fernández, the joint candidate of the right and left factions of Peronism. In Brazil, far-right candidate Bolsonaro, who won the 2018 elections, was defeated by Lula in the 2022 elections. During this period, electoral volatility increased throughout the continent, and public support for traditional political parties steadily declined. Much like the late 1990s and early 2000s, mass mobilizations and popular uprisings once again began to reshape the political landscape.

The popular uprising that erupted in Chile in 2019 upended the traditional party system, ultimately leading to the election of Gabriel Boric, a young leader emerging from the student movement, as president in 2022. In Colombia, which had also been shaken by mass mobilizations in 2019, a left-leaning candidate, Gustavo Petro, was elected president in 2022 for the first time in the country's history. In contrast, in Argentina, far-right candidate Javier Milei succeeded in winning the presidential election in 2023. Similar examples could be drawn from other countries as well. Overall, this landscape points not toward a revival of the "pink" or "moderate" politics of the 2000s, but rather toward a new scenario in which more radical alternatives, both on the right ("brown") and on the left ("red"), have come to the forefront.

Focusing on two cases, Brazil and Venezuela, this study critically examined Latin America's Pink Tide experience through the lens of "post-neoliberalism." Through qualitative comparative analysis and extensive primary and secondary research, it questioned the idea of a coherent and lasting "post-neoliberal" phase. The study contends that the Pink Tide's redistributive initiatives were rooted primarily in a favorable economic climate, marked by soaring commodity prices and ample international liquidity, rather than in an ideological departure from neoliberalism. In other words, the "post-neoliberalism" of the Pink Tide governments represented only a partial departure from certain neoliberal policies, facilitated by favorable global economic conditions, and did not amount to genuine "anti-neoliberalism" (Ruckert et al., 2017; Yates & Bakker, 2014). This analysis was limited to two countries and to the period up to 2018. Further research could extend these critical assessments of Pink Tide "post-neoliberalism" by applying them to other cases or by exploring the ruptures and continuities in the post-2018 period.

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REFERENCES

Acosta, A. (2013). Extractivism and neoextractivism: Two sides of the same curse. In M. Lang & D. Mokrani (Eds.), Beyond development: Alternative visions from Latin America (pp. 61–86). Amsterdam: Transnational Institute.,

Antunes, R., Santana, M. A., & Praun, L. (2019). Chronicle of a defeat foretold: The PT administrations from compromise to the coup. *Latin American Perspectives*, *46*(1), 85–104. https://doi.org/10.1177/0094582X18807210

Astarita, R. (2018). Brasil: La economía del PT. *Sin Permiso*. http://www.sinpermiso.info/textos/brasil-la-economia-del-pt

Avanzada Socialista. (2014). Tarifazo y ajuste frente a una coyuntura económica muy complicada. *Liga Internacional de los Trabajadores - Cuarta Internacional*. https://litci.org/es/menu/mundo/latinoamerica/argentina/tarifazo-y-ajuste-frente-a-una-coyuntura-economica-muy-complicada/

Ban, C. (2012). Brazil's liberal neo-developmentalism: New paradigm or edited orthodoxy? Review of International Political Economy, 20(2), 298–331. https://doi.org/10.1080/09692290.2012.660183

Bremmer, I. (2008). The Return of State Capitalism. Survival, 50(3), 55–64. https://doi.org/10.1080/00396330802173198

Burchardt, H., & Dietz, K. (2014). (Neo-)Extractivism - A new challenge for development theory from Latin America. Third World Quarterly, 35(3), 468–486. https://doi.org/10.1080/01436597.2014.893488

Buxton, J. (2018). Venezuela: Deeper into the abyss. Revista de Ciencia Política (Santiago), 38(2). https://doi.org/10.4067/s0718-090x2018000200409

Castagna, E. (2015). Al fin de cuentas, ¿qué es el ajuste fiscal? Liga Internacional de los Trabajadores - Cuarta Internacional. https://litci.org/es/menu/lit-ci-y-partidos/partidos/pstu-brasil/al-fin-de-cuentas-que-es-el-ajuste-fiscal/

Castañeda, J. (2006). Latin America's left turn. Foreign Affairs, 85(3), 28–43. http://class.povertylectures.com/CastenadaJorgeLatinAmericasLeft.pdf

CEPAL. (2011). Panorama social de América Latina 2011. Santiago de Chile: Publicaciones de Naciones Unidas. https://repositorio.cepal.org/bitstream/handle/11362/1241/1/S1100927_es.pdf

Cerdeira, B. (2018). La responsabilidad del PT en el ascenso de Bolsonaro. Liga Internacional de los Trabajadores - Cuarta Internacional. https://litci.org/es/la-responsabilidad-del-pt-ascenso-bolsonaro/

Cerdeira, B. (2016). PT: El balance de un fracaso. Liga Internacional de los Trabajadores - Cuarta Internacional. https://litci.org/es/menu/mundo/latinoamerica/brasil/pt-el-balance-de-un-fracaso/

Cleary, M. (2006). A "Left Turn" in Latin America? Explaining the left's resurgence. Journal of Democracy, 17(4), 35–49. https://www.journalofdemocracy.org/articles/a-left-turn-in-latin-america-explaining-the-lefts-resurgence

Clo, S. (2020). Varieties of state capitalism and reformed state-owned enterprises in the new millenium. In A. Musacchio & M. A. Flores-Macias (Eds.), The Routledge handbook of state-owned enterprises. Routledge.

Corrales, J. (2010). The Repeating Revolution: Chávez's New Politics and Old Economics. In K. Weyland, R. L. Madrid, & W. Hunter (Eds.), Leftist governments in Latin America: Successes and shortcomings (pp. 28–56). chapter, Cambridge: Cambridge University Press.

Corrales, J. (2015, May 7). Don't blame it on the oil. Foreign Policy. https://foreignpolicy.com/2015/05/07/dont-blame-it-on-the-oil-venezuela-caracas-maduro/

Dorlach, T. (2015). The prospects of egalitarian capitalism in the global South: Turkish social neoliberalism in comparative perspective. Economy and Society, 44(4), 519–544. https://doi.org/10.1080/03085147.2015.1090736

Ellner, S. (2018). Class strategies in Chavista Venezuela: Pragmatic and populist policies in a broader context. Latin American Perspectives. https://doi.org/10.1177/0094582X18798796

Ellner, S. (2019). Explanations for the current crisis in Venezuela: A clash of paradigms and narratives. Venezuelanalysis. https://venezuelanalysis.com/analysis/14530/

Ellner, S. (2023). Left government strategies toward business groups and the outcomes: The Mexican and Venezuelan cases. Latin American Perspectives, 50(2), 130–150. https://doi.org/10.1177/0094582X231153875

Flores-Macías, G. A. (2012). After neoliberalism? The left and economic reforms in Latin America. Oxford: Oxford University Press.

Frens-String, J., & Velasco, A. (2016). Right Turn. NACLA Report on the Americas, 48(4), 301–302. https://doi.org/10.1080/10714839.2016.1258269

Frías, C. H. (2014). Agenda alternativa bolivariana. Caracas: Ediciones Correo del Orinoco.

Friedmann, G. C., & Puty, C. A. C. B. (2019). Sailing against the wind: The rise and crisis of a low-conflict progressivism. Latin American Perspectives, 47(1), 83–99. https://doi.org/10.1177/0094582X19884361

Fuentes, F. (2014). South America: How 'anti-extractivism' misses the forest for the trees. Green Left Weekly. https://www.greenleft.org.au/content/how-anti-extractivism-misses-forest-trees

Graham-Harrison, E., & Zuñiga, M. (2018, March 6). Over half of young Venezuelans want to flee as economy collapses, poll finds. The Guardian. https://www.theguardian.com/world/2018/mar/06/young-venezuelans-want-to-flee-as-economy-collapses-poll-finds

Grigera, J. (2017). Populism in Latin America: Old and new populisms in Argentina and Brazil. International Political Science Review, 38(4), 441–455. https://doi.org/10.1177/0192512117701510

Grugel, J., & Riggirozzi, P. (2018a). Neoliberal disruption and neoliberalism's afterlife in Latin America: What is left of post-neoliberalism? Critical Social Policy, 38(3), 547–566. https://doi.org/10.1177/0261018318765857

Grugel, J., & Riggirozzi, P. (2018b). New directions in welfare: Rights-based social policies in post-neoliberal Latin America. Third World Quarterly, 39(3), 527–543. https://doi.org/10.1080/01436597.2017.1392084

Gudynas, E. (2009). Diez tesis urgentes sobre el nuevo extractivismo: Contextos y demandas bajo el progresismo sudamericano actual. Centro Andino de Acción Popular (CAAP) & Centro Latino Americano de Ecología Social (CLAES). In Extractivismo, política y sociedad (pp. 187–225). CAAP & CLAES: Quito.

Hadiz, V. R., & Angelos, C. (2017). Populism in world politics: A comparative cross-regional perspective. International Political Science Review, 38(4), 399–411. https://doi.org/10.1177/0192512117693908

Handlin, S. (2018). The logic of polarizing populism: State crises and polarization in South America. American Behavioral Scientist, 62(1), 75–91. https://doi.org/10.1177/0002764218756922

Harnecker, M. (2015). A world to build: New paths toward twenty-first century socialism. New York: Monthly Review Press.

Harvey, D. (2005). A brief history of neoliberalism. Oxford: Oxford University Press.

Hetland, G. (2025). Capitalism and authoritarianism in Maduro's Venezuela. New Labor Forum. Advance online publication. https://doi.org/10.1177/10957960251332582

Koch, M. (2014, February 6). Argentina struggling—again—with inflation. Deutsche Welle. https://www.dw.com/en/argentina-struggling-again-with-inflation/a-17429229

Lander, E. (2024). Against authoritarianism and neoliberalism in Venezuela: A view from the critical left. Transnational Institute. https://www.tni.org/en/article/against-authoritarianism-and-neoliberalism-in-venezuela

Levitsky, S., & Roberts, K. (2011). Introduction: Latin America's "left turn": A framework for analysis. In S. Levitsky & K. Roberts (Eds.), The resurgence of the Latin American left (pp. 1–30). Baltimore, MD: Johns Hopkins University Press.

Loureiro, P. M., & Saad-Filho, A. (2019). The limits of pragmatism: The rise and fall of the Brazilian Workers' Party (2002–2016). Latin American Perspectives, 46(1), 66–84. https://doi.org/10.1177/0094582X18805093

Madrid, R. L. (2010). The Origins of the Two Lefts in Latin America. Political Science Quarterly, 125(4), 587–609. http://www.jstor.org/stable/25767091

Martins, C. E. (2006). Lula government and the Brazilian political scenario. Economic and Political Weekly, 41(8), 679–681. http://www.jstor.org/stable/4417861

Morais, L., & Saad-Filho, A. (2005). Lula and the continuity of neoliberalism in Brazil: Strategic choice, economic imperative or political schizophrenia? Historical Materialism, 13(1), 3-32. https://doi.org/10.1163/1569206053620924

Morais, L., & Saad-Filho, A. (2012). Neo-developmentalism and the challenges of economic policy-making under Dilma Rousseff. Critical Sociology, 38(6), 789-798. https://doi.org/10.1177/0896920512441635

Mouzelis N (1985) On the Concept of Populism: Populist and Clientelist Modes of Incorporation in Semiperipheral Polities. Politics & Society 14 (3): 329–348.

Mudde, C. (2004). The populist zeitgeist. Government and Opposition, 39(3), 541–563. https://doi.org/10.1111/j.1477-7053.2004.00135.x

Opinión Socialista. (2015). El gobierno de Dilma anuncia nuevos cortes. Liga Internacional de los Trabajadores - Cuarta Internacional. https://litci.org/es/el-gobierno-de-dilma-anuncia-nuevos-cortes/

Papadopoulos, T., & Leyer, R. V. (2016). Two decades of social investment in Latin America: Outcomes, shortcomings and achievements of conditional cash transfers. Social Policy and Society, 15(3), 435–449. 10.1017/S1474746416000117

Petkoff, T. (2005). Las dos izquierdas. Nueva Sociedad, 197(May–June), 114–128. https://nuso.org/articulo/las-dos-izquierdas/

Petras, J. (2009). Latin America: Perspectives for socialism in a time of a world capitalist recession/depression. Critique, 37(3), 441–463. https://doi.org/10.1080/03017600902989864

Petras, J. (2015, December 16). The demise of incumbents: Resurgence of the far right, absence of the 'consequential left'. Global Research. http://www.globalresearch.ca/the-demise-of-incumbents-resurgence-of-the-far-right-absence-of-the-consequential-left/5487151

Phillips, T. (2018, August 19). Fleeing Venezuelans face suspicion and hostility as migration crisis worsens. The Guardian. https://www.theguardian.com/world/2018/aug/19/fleeing-venezuelans-suspicion-hostility-migration-crisis-ecuador

Prados, L. (2013, April 10). Fraud and manipulation claims tarnish post-Chávez election. El País. https://english.elpais.com/elpais/2013/04/10/inenglish/1365607401_841893.html

Restrepo Botero, D. I., & Peña Galeano, C. A. (2017). Territories in dispute: Tensions between 'extractivism', ethnic rights, local governments and the environment in Bolivia, Colombia, Ecuador and Peru. International Development Policy, 9. http://journals.openedition.org/poldev/2374

Rojas, R. (2017). The ebbing "Pink Tide": An autopsy of left-wing regimes in Latin America. New Labor Forum, 26(2), 70–82. https://doi.org/10.1177/109579601770013

Rojas, P. R. (2006). Hacia el socialismo del siglo XXI. Aporrea. https://www.aporrea.org/ideologia/a27356.html

Ruckert, A., MacDonald, L., & Proulx, K. (2016). Post-neoliberalism in Latin America: A conceptual review. Third World Quarterly, 38(7), 1583–1602. https://doi.org/10.1080/01436597.2016.1259558

Rutar, T. (2023). What is neoliberalism really? A global analysis of its real-world consequences for development, inequality, and democracy. Social Science Information, 62(3), 295-322. https://doi.org/10.1177/05390184231202950

Saad-Filho, A. (2019). Varieties of neoliberalism in Brazil (2003–2019). Latin American Perspectives, 47(1), 9-27. https://doi.org/10.1177/0094582X19881968

Sánchez, R. L. (2023). The Bolivarian process in Venezuela: socialism, populism or neoliberalism? In R. Munck, M. Mastrangelo, & P. Pozzi (Eds.), Populism: Latin American perspectives (pp. 121–138). Newcastle upon Tyne: Agenda Publishing.

Smink, V. (2010, December 27). El precio social y político del "gasolinazo" en Bolivia. BBC Mundo. https://www.bbc.com/mundo/noticias/2010/12/101227_bolivia_combustible_repercusion_smink

Sorans, M., & Porras, S. R. (2018). Por qué fracasó el chavismo? Buenos Aires: Centro de Estudios Humanos y Sociales.

Svampa, M. (2017). Del cambio de época al fin de ciclo. Buenos Aires: Edhasa.

Vivanco, P. (2018, October 25). Latin America's right-wing turn. Jacobin. https://jacobin.com/2018/10/latin-america-right-turn-bolsonaro-middle-class

Weyland, K. (2010). The performance of leftist governments in Latin America: Conceptual and theoretical issues. In K. Weyland, R. Madrid, & W. Hunter (Eds.), Leftist governments in Latin America (pp. 1–27). New York: Cambridge University Press.

Wilson, P. (2015, April 27). The collapse of Chávezcare. Foreign Policy. https://foreignpolicy.com/2015/04/27/chavez-maduro-healthcare-venezuela-cuba/

World Bank. (2007, August 22). Bolsa Família: Changing the lives of millions in Brazil. World Bank. https://www.worldbank.org/en/news/feature/2007/08/22/bolsa-familia-changing-the-lives-of-millions-in-brazil

World Bank. (2025). GDP growth (annual %) – Latin America & Caribbean. World Development Indicators. https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=ZJ

Yates, J., & Bakker, K. (2014). Debating the 'post-neoliberal turn' in Latin America. Progress in Human Geography, 38(1), 62–90. https://doi.org/10.1177/0309132513500372

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Fuzzy Integrated Approach for Selecting Investment Projects in R&D Departments[*]

Research Article / Araştırma Makalesi

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ABSTRACT

Making sound decisions is essential for companies to sustain their operations profitably. In this context, the objective of this study is to develop an integrated quantitative approach to support decision-making processes by accounting for multiple, and often conflicting, criteria in the selection of investment projects within an R&D center. The proposed approach consists of three stages. In the first stage, project evaluation criteria are identified and weighted using the Full Consistency Method (FUCOM), which combines methodological simplicity with analytical reliability. Since experts also expressed their evaluations through linguistic variables, the weights of the criteria were additionally determined using the Fuzzy FUCOM and the results of these two methods were compared. In the second stage, projects were assessed according to the defined criteria using the Multi-Attributive Ideal-Real Comparative Analysis (MAIRCA) method. This method commonly used for multi-alternative decision-making problems in the literature, was used here to rank 17 alternative projects. The third stage involved selecting the optimal set of projects for investment. Knapsack algorithm was formulated under multiple constraints to identify the most beneficial combination of projects for the company. As a result, four main categories of criteria—economic, institutional, technological, and strategic—along with their sub-criteria, were defined. While some inconsistencies were observed between the weights derived from the FUCOM and Fuzzy FUCOM methods, the ranking of the main criteria remained unchanged. Furthermore, investment alternatives were ranked under various scenarios. The findings of this study provide a practical framework that can guide R&D centers in enhancing their decision-making processes and achieving a sustainable competitive advantage.

Keywords: *FUCOM, Fuzzy FUCOM, MAIRCA, Knapsack Algorithm, Multi Criteria Decision Making.*

1. INTRODUCTION

With the rapid evolution of living conditions and consumer preferences, the dynamics of the business world are also transforming swiftly. In this environment of constant change, companies must carefully determine their investment areas or projects. Project selection has become a critical factor for sustaining competitiveness and long-term viability in today's increasingly challenging business landscape. However, businesses do not have unlimited resources. They operate under various resource constraints such as financial, human, and technical ones. As such, project selection represents a complex and time-consuming decision-making process influenced by numerous criteria and performance metrics. Some of these criteria may conflict with one another, while others may involve uncertainty. This study focuses on project selection within the R&D center of a company engaged in the production of durable consumer goods. The objective is to ensure that the R&D activities are conducted efficiently and evaluated in a manner that will be most beneficial to the company. Within this scope, various equipment and

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machinery investments are being considered, each contributing to R&D operations to differing extents (Yıldız, 2014).

In order to study the project selection within the R&D center of a company engaged in the production of durable consumer goods, the study is organized as follows. First, a comprehensive literature review was conducted to identify the most frequently employed criteria in project selection problems. These criteria were then assessed in collaboration with experts in the domain to select the most critical criteria for the company. As a result, nine key criteria were established for this project. During the criteria-weighting stage, the **Full Consistency Method (FUCOM)** was applied. Additionally, linguistic variables were incorporated into the weighting procedure, and weights were determined using the **Fuzzy FUCOM** method. At the second stage, the **Multi-Attribute Ideal-Real Comparative Analysis (MAIRCA)** method was used to rank the 17 proposed projects taking into account the identified criteria. Finally, at the third stage, the projects that offered the greatest benefit to the company while satisfying budget constraints were selected using the **knapsack algorithm**. This study contributes to the existing literature by integrating novel multi-criteria decision-making approaches and optimization techniques, particularly in the context of **R&D project selection**, where empirical applications remain limited.

2. LITERATURE REVIEW

2.1. R&D project selection

The topic of R&D project selection began to gain popularity, especially in the 1950s and 1960s. Over time, as the number of models proposed in the literature has increased, user interest in these approaches has also grown. A review of studies on project selection in R&D centers reveals that a wide range of methods has been employed. According to an analysis of research articles published between 1977 and 2019 in the **ScienceDirect** and **Wiley** databases, the distribution of methods used across 86 studies on R&D project selection is illustrated in Figure 1 below (Türkmen and Topçu, 2021).

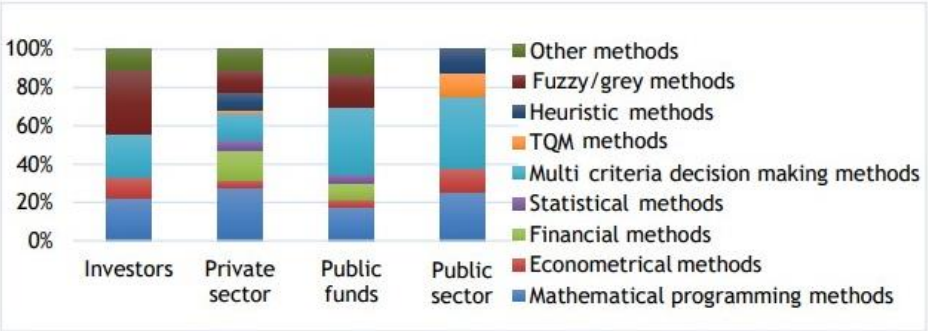

Figure 1. Distribution of methods used in R&D project selection (1977-2019)

Based on Figure 1, the methods most frequently employed across organizations are primarily Multi-Criteria Decision-Making (MCDM) techniques, followed by Mathematical Programming approaches. The most common trend involves the integration of mathematical programming models with MCDM methods (Türkmen & Topçu, 2021, p. 34). To apply MCDM techniques effectively, it is essential to define evaluation criteria that are directly related to the decision context. In the assessment of R&D project selection, a variety of criteria have been proposed in the literature. While some overlap across studies, the specific criteria often vary depending on the sector and the nature of the projects under consideration. A summary of the criteria identified in previous research is presented below in Table 1.

2.2. Multi Criteria Decision Making

There is a general structure when setting up Multi Criteria Decision Making (MCDM) problems, which involve selecting the best alternative among many criteria. Assuming

there are n alternatives and m criteria, the mathematical structure of an MCDM problem is as follows: $A = \{A_1, A_2, A_3, \dots, A_n\}$ represents the set of alternatives to be chosen to solve the problem. $C = \{C_1, C_2, C_3, \dots, C_m\}$ represents the set of specific criteria used for the assessment of A. The problem structure is visualized in the matrix in Figure 2 (Taherdoost and Madanchian, 2023, p. 79).

Table 1. Criteria Based on Sectors.

Sector	Project Name	Criteria	Reference
Petroleum industry	Project selection in oil fields development using AHP and fuzzy TOPSIS method	- Size/Complexity - Reasonableness of cost estimates - Scope adequacy - Level of detail - Duration - Technology - Location	Amiri (2010)
R&D Center	AHP-based formal system for R&D project evaluation	- Technical - Strategic - Organizational - Financial	Kumar (2004)
Development Agencies	Investment project evaluation by decision-making methodology based on type-2 fuzzy sets	- Sectoral - Economic - Institutional - Social - Political	Kılıç and Kaya (2014)
Air Defence Industry	Selection of air defence industry investment projects	- Project budget - Project duration - Dependency status - Number of employees - Contribution to domestic economy	Uçakcıoğlu and Eren (2017)
R&D Center	R&D project selection using the Analytic Network Process	- Technical - Organizational - Market based	Meade (2002)
Customer Centric Innovation	A fuzzy MCDM approach to support customer-centric innovation in virtual reality (VR) metaverse headset design	- Functionality - Materials - Comfort - Usability	Kwok and Tang (2023)
Defence Industry	R&D project selection in defence industry investment decisions	- Technological - Competitiveness - Domestic sourcing - Joint operations compliance - Effectiveness - Lead time - Threatening power - Personnel Need - Need for organizational change	Dağıstanlı (2024)
Cosmetics Industry	R&D project selection with Gray-WASPAS method	- Applicability of the project - Measures against risks - Market analysis - Strategic alignment cost - Investment payback period - Expected return	Şen (2023)

MCDM Matrix	C_1	C_2	...	C_n
A_1	x_{11}	x_{12}	...	x_{1n}
A_2	x_{21}	x_{22}	...	x_{2n}
...	...	...	x_{ij}	...
A_m	x_{m1}	x_{m2}	...	x_{mn}

Figure 2. MCDM Matrix.

In this context, x_{ij} signifies the value of alternative A_i based on C_j. The primary steps of MCDM problems begin with the definition of criteria. Main criteria, and if any, sub-criteria are identified and defined. In the next stage, the weighting of alternative resources used to address the problem, is determined. A variety of weighting methods

have been proposed and applied in the literature. In the final stage, the alternatives weighted through criteria, are ranked (Dua et al., 2024).

3. METHODOLOGY

3.1. The Full Consistency Method (FUCOM)

In facing challenges, companies make decisions by selecting among specific criteria. It is crucial for the company to analyse these criteria in detail and determine their priorities. There are many models in the literature for prioritizing criteria and calculating their weights. These models are classified depending on their application style. In this study, the FUCOM method, a novel approach, has been applied (Demir and Bircan, 2020). The FUCOM method is classified as a subjective method. However, its most notable characteristic is its attempt to minimize subjectivity by reducing deviations within the model towards zero. The major benefits of the FUCOM method are minimizing the effect of experts on the criteria, being a fast method because it requires only $(n-1)$ criterion comparisons and being adaptable to different measurement scales, thus providing a flexible structure (Pamučar et al., 2018).

Consistency means that the deviation from full consistency (DFC) or the error value for the obtained weight vectors is minimized and it is achieved only when the mathematical consistency condition is applied. Based on the literature DFC in the range of [0; 0,25] can be acceptable. The model of FUCOM method is given below by Equation 1:

$$Min\ \chi \tag{1}$$

$$\text{s.t. } \left|\frac{\omega_{j(k)}}{\omega_{j(k+1)}} - \varphi_{k/(k+1)}\right| \leq \chi,\ \forall j$$

$$\left|\frac{\omega_{j(k)}}{\omega_{j(k+2)}} - \varphi_{k/(k+1)} \otimes \varphi_{(k+1)/(k+2)}\right| \leq \chi,\ \forall j$$

$$\sum_{j=1}^{n} \omega_j = 1,\ \forall j$$

$$\omega_j \geq 0,\ \forall j$$

After the model is solved, $\omega_1, \omega_2, \ldots, \omega_n$ are determined.

3.2. Fuzzy Full Consistency Method (F-FUCOM)

In classical logic, there is a clear distinction between what is true and what is false. However, as we delve into the complexities of the real world, propositions are rarely as clear-cut as they are in classical logic. Environments characterized by uncertainty and ambiguity, where such clarity is lacking, are referred to as *fuzzy*. In situations where classical logic proves inadequate, **fuzzy logic** plays a crucial role in enabling more nuanced analyses and achieving more realistic results.

The Azerbaijani scientist Lotfi Zadeh observed in 1965 that classical logic was insufficient for handling subjective or imprecise data and therefore introduced the concept of **fuzzy sets**. Although literature on fuzzy sets emerged in 1965, it initially received little attention in the Western world and even faced skepticism. However, interest in fuzzy logic began to grow in Japan and other Eastern countries during the 1970s, eventually gaining widespread acceptance (Garrido, 2018).

Humans perceive and interpret their surroundings by comparing new information with their existing understanding of the external world. Many aspects of daily life inherently reflect a fuzzy structure. For instance, when classifying people, we often use qualitative descriptors such as *young*, *middle-aged*, and *elderly*. Such classifications are inherently uncertain and cannot be represented precisely through numerical values, yet they are intuitively accepted by the human mind. As in classical logic, it is not possible to assign an exact numerical boundary to a category like *elderly* (Özan, 2010).

The **FUCOM** method evaluates alternatives using precise numerical values derived from classical logic. However, in real-life decision-making, processes are rarely so exact, they are uncertain, complex, and often involve subjective judgment. Consequently, constraining such evaluations to a single precise value can be problematic. The **Fuzzy FUCOM** method offers a more flexible and realistic representation of real-world uncertainty. Moreover, individuals often express preferences through linguistic terms such as *more important* rather than through exact numerical scales. While these linguistic expressions cannot be directly modeled using FUCOM, they can be effectively represented within the Fuzzy FUCOM framework.

Since the criteria used in this study involve subjective judgments and are open to interpretation, the **Fuzzy FUCOM** method is adopted to provide greater flexibility. This approach is particularly suitable in contexts characterized by high uncertainty, limited information, and significant human perception in decision-making (Hacısüleyman, 2019). The purpose of the Fuzzy FUCOM method is to identify the most suitable alternative among a set of options. Weighting in this process can be either objective or subjective, and it serves two main purposes: to indicate the importance of each criterion and to demonstrate its impact on the final outcome. In this method, linguistic expressions are represented by **triangular fuzzy numbers**, and the overall model structure remains consistent with that of the classical FUCOM approach.

3.3. Multi Attributive Ideal-Real Comparative Analysis (MAIRCA)

The **MAIRCA (Multi-Attributive Ideal-Real Comparative Analysis)** method is a multi-criteria decision-making (MCDM) approach introduced to the literature by Gigović et al. (2016). It facilitates the selection among alternatives by identifying the gaps between ideal and actual (empirical) rankings. The MAIRCA method is mathematically straightforward, conceptually clear, and relatively easy to apply. It can be used with both qualitative and quantitative criteria and yields reliable results even when dealing with a large number of alternatives and evaluation parameters. Moreover, comparative studies have shown that MAIRCA produces consistent and dependable outcomes relative to other MCDM methods (Yazgan and Agamyradova, 2021). The MAIRCA method consists of six main steps.

Step 1 Evaluation of alternatives: In the first step, alternatives defined by experts are evaluated based on the established criteria. The criteria may be either quantitative or qualitative. When the criteria are measurable, their real (numerical) values are used. For qualitative criteria, a standardized scoring system is applied to assess each alternative. It is essential that the decision-makers express their priorities accurately at this stage. The initial decision matrix is then constructed as shown in Figure 3 (Lukić, 2023, p. 56).

$$X = \begin{array}{c} \\ A_1 \\ A_2 \\ \cdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \end{array} \\ \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \end{array}$$

Figure 3. Initial Decision Matrix.

Step 2 Determination of P_{A_i}:

$$P_{A_i} = \frac{1}{m}; \sum_{i=1}^{m} P_{A_i} = 1, i = 1,2,\dots,m \tag{2}$$

where m is the total number of alternatives and P_{A_i} represents the preference relation over the values of alternatives. Decision maker is neutral for all alternatives in this step. In this situation, P_{A_i} values are equal.

Step 3 Creation of the theoretical rating matrix (T_p): The rating matrix is created by multiplying preferences values (P_{A_i}) with criteria weight values. It is shown in Figure 4 (Lukić, 2023, p. 57).

$$T_p = \begin{matrix} \\ P_{A_1} \\ P_{A_2} \\ \cdots \\ P_{A_m} \end{matrix} \begin{matrix} \begin{matrix} w_1 & w_2 & \cdots & w_n \end{matrix} \\ \begin{bmatrix} t_{p11} & t_{p12} & \cdots & t_{p1n} \\ t_{p21} & t_{p22} & \cdots & t_{p2n} \\ \cdots & \cdots & \cdots & \cdots \\ t_{pm1} & t_{pm2} & \cdots & t_{pmn} \end{bmatrix} \end{matrix} = \begin{matrix} \\ P_{A_1} \\ P_{A_2} \\ \cdots \\ P_{A_m} \end{matrix} \begin{matrix} \begin{matrix} w_1 & w_2 & \cdots & w_n \end{matrix} \\ \begin{bmatrix} P_{A_1}.\, w_1 & P_{A_1}.\, w_2 & \cdots & P_{A_1}.\, w_n \\ P_{A_2}.\, w_1 & P_{A_2}.\, w_2 & \cdots & P_{A_a}.\, w_n \\ \cdots & \cdots & \cdots & \cdots \\ P_{A_m}.\, w_1 & P_{A_m}.\, w_2 & \cdots & P_{A_m}.\, w_n \end{bmatrix} \end{matrix}$$

Figure 4. Theoretical Rating Matrix.

Step 4 Creation of the real rating matrix (T_r): The form of the real rating matrix is shown below in Figure 5 where n represents the total number of criteria and m shows the total number of alternatives (Lukić, 2023, p. 57).

$$T_r = \begin{matrix} \\ A_1 \\ A_2 \\ \cdots \\ A_m \end{matrix} \begin{matrix} \begin{matrix} C_1 & C_2 & \cdots & C_n \end{matrix} \\ \begin{bmatrix} t_{r11} & t_{r12} & \cdots & t_{r1n} \\ t_{r21} & t_{r22} & \cdots & t_{r2n} \\ \cdots & \cdots & \cdots & \cdots \\ t_{rm1} & t_{rm2} & \cdots & t_{rmn} \end{bmatrix} \end{matrix}$$

Figure 5. Real Rating Matrix.

Values in the initial decision matrix are evaluated at the following formulas in Equations 3 to 6 depending on whether the criteria are to be maximized or minimized, and the real rating matrix values are obtained. For preferred criteria that are beneficial and therefore to be maximized, the formula is

$$t_{rij} = t_{pij}\left(\frac{x_{ij} - x_i^-}{x_i^+ - x_i^-}\right) \tag{3}$$

and for cost type criteria that are to be minimized, we have the following formula

$$t_{rij} = t_{pij}\left(\frac{x_{ij} - x_i^+}{x_i^- - x_i^+}\right) \tag{4}$$

where x_{ij}, x_i^+ and x_i^- are the elements of the initial decision matrix (X), and x_i^+ and x_i^- are defined as follows:

$$x_i^+ = \max(x_1, x_2, \ldots, x_m) \tag{5}$$

$$x_i^- = min(x_1, x_2, \ldots, x_m) \tag{6}$$

Step 5 Calculation of the gap matrix (G): The total gap matrix is obtained by taking difference between theoretical rating matrix and real rating matrix as given by Equation 7.

$$g_{ij} = t_{pij} - t_{rij} \tag{7}$$

Step 6 Final gap values of alternatives (Q_i): Final gap values are obtained by summing g_{ij} values for each alternative as it is defined in the following Equation (8).

$$Q_i = \sum_{j=1}^{n} g_{ij}\,, i = 1,2, \ldots, m \tag{8}$$

where n is the total number of criteria and m is the total number of alternatives.

3.4. Knapsack Problem

Knapsack problems aim to fill a container (the *knapsack*) of limited capacity in the most optimal manner. In the basic form of the knapsack problem, n items are defined, each with a weight or volume b_j and an associated benefit or value c_j. The objective is to select a combination of items that maximizes the total benefit without exceeding the knapsack's total capacity B.

The mathematical formulation of the **0–1 knapsack problem** is expressed by Equations (9) and (10), where each item can either be included ($x_j = 1$) or excluded

($x_j = 0$). The objective function seeks to maximize the total value of the selected items while respecting the capacity constraint.

$$Min\ z = \sum_{j=1}^{n} c_j x_j \tag{9}$$

$$\text{s.t.} \sum_{j=1}^{n} b_j x_j \leq B \tag{10}$$

Other variants of knapsack problems are also defined in the literature under different names. However, within the scope of this study, the 0-1 knapsack problem has been used. Therefore, other models have not been extensively reviewed, for example see Berberler **(**2009).

4. RESULTS

This study has been conducted at the R&D center of a company operating in the durable consumer good sector. Since a specific investment budget is allocated to the center; the available resources may be insufficient to finance all proposed projects. Accordingly, this study aims to develop a systematic and quantitative framework for selecting investment projects that maximize overall organizational benefits.

The first step was to define the evaluation criteria based on expert opinions and a comprehensive review of the relevant literature, ensuring consistency with contemporary research trends. At the second step, these criteria were weighted using the Full Consistency Method (FUCOM) and its fuzzy extension, the Fuzzy FUCOM (F-FUCOM) method. Following the weighting process, project alternatives were evaluated and ranked according to the defined criteria. Finally, at the third step, the optimal set of projects was determined under three distinct scenarios to guide investment decisions within the company's budget constraints.

Four main criteria and their corresponding sub-criteria were identified, resulting in a total of nine evaluation criteria. The main criteria are Economic, Institutional, Technological, and Strategic. The selection of these criteria was based on both a comprehensive review of the literature and expert consultations. The hierarchical structure of the criteria is illustrated in Figure 6 below.

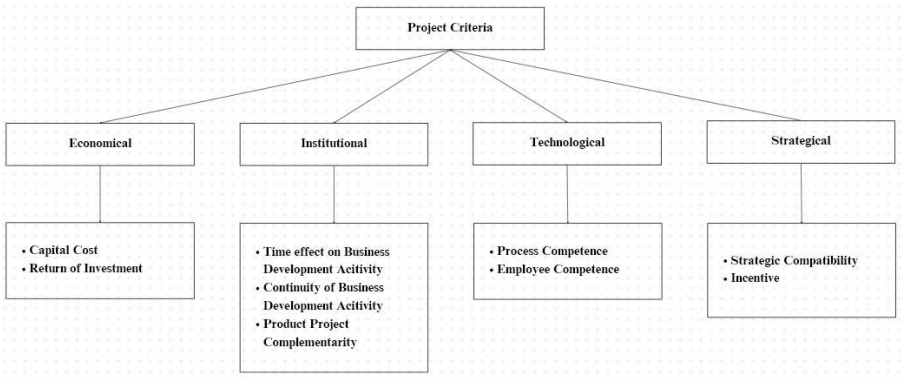

Figure 6. Project Criteria.

After defining the criteria, the Full Consistency Method (FUCOM) was applied, and two experts were asked to rank the criteria according to their relative importance. During this process, it was observed that the experts experienced some difficulty in assigning precise numerical rankings. Therefore, they were invited to express their prioritization using linguistic variables. Following the FUCOM procedure, the Fuzzy FUCOM (F-FUCOM) method was also applied in a similar manner. The results obtained from both methods are presented in Table 2 below.

When comparing the final values obtained from the Fuzzy FUCOM (F-FUCOM) and FUCOM methods, a ranking discrepancy was identified between the

criteria *Continuity of Business Development* and *Process Competence*. No differences in the importance ranking were observed among the remaining criteria. Consequently, further analysis was conducted using the FUCOM results, as this approach is less complex while still ensuring reliable outcomes. In agreement with the company's experts, it was decided to proceed with the FUCOM-derived weights.

Table 2. Final Weights of Criteria (F-FUCOM).

Symbol	Criteria	Final Weights	Rank F-FUCOM	Final Weights	Rank FUCOM
C11	Capital cost	0.11	4	0.14	4
C12	Return of investment	0.16	2	0.22	2
C21	Time effect on business development activity	0.04	8	0.04	8
C22	Continuity of business development activity	0.13	3	0.25	1
C23	Product-project complementarity	0.07	6	0.06	6
C31	Process competence	0.17	1	0.15	3
C32	Employee competence	0.07	7	0.05	7
C41	Strategic compatibility	0.09	5	0.07	5
C42	Incentive	0.03	9	0.01	9

In the second stage of the study, the project alternatives were evaluated according to the defined criteria using the MAIRCA method. The results obtained from the MAIRCA model are presented in Table 3.

Table 3. Final Values (Q_i)

Alt.	C11	C12	C21	C22	C23	C31	C32	C41	C42	Q_i	Rank
1	0.006	0.013	0.000	0.015	0.003	0.009	0.003	0.003	0.001	0.053	17
2	0.000	0.013	0.002	0.000	0.000	0.009	0.003	0.004	0.001	0.033	4
3	0.002	0.013	0.000	0.015	0.003	0.009	0.003	0.003	0.001	0.049	16
4	0.002	0.013	0.002	0.015	0.003	0.004	0.002	0.004	0.001	0.046	15
5	0.000	0.013	0.002	0.007	0.003	0.006	0.003	0.004	0.001	0.038	7
6	0.002	0.013	0.000	0.015	0.001	0.004	0.001	0.000	0.001	0.037	6
7	0.005	0.013	0.001	0.011	0.002	0.004	0.003	0.004	0.001	0.045	14
8	0.002	0.013	0.002	0.007	0.002	0.008	0.003	0.001	0.001	0.039	8
9	0.001	0.013	0.001	0.000	0.002	0.007	0.003	0.004	0.001	0.031	3
10	0.001	0.013	0.001	0.011	0.001	0.007	0.003	0.004	0.001	0.041	11
11	0.001	0.000	0.001	0.015	0.003	0.003	0.002	0.003	0.000	0.028	2
12	0.002	0.007	0.001	0.007	0.001	0.000	0.000	0.001	0.000	0.018	1
13	0.000	0.000	0.002	0.015	0.004	0.007	0.002	0.004	0.001	0.034	5
14	0.000	0.007	0.002	0.015	0.004	0.007	0.002	0.003	0.001	0.039	9
15	0.008	0.013	0.001	0.011	0.003	0.006	0.002	0.000	0.001	0.044	13
16	0.005	0.013	0.001	0.011	0.003	0.006	0.002	0.000	0.001	0.040	10
17	0.005	0.013	0.000	0.015	0.002	0.003	0.003	0.002	0.001	0.043	12

It is expected that the total gap values (Q_i) approach zero, and the alternative with the lowest gap is selected as the most favorable option. Accordingly, the first project chosen for investment is *Project 12*, followed by *Project 11* and *Project 9*. The least preferred alternative is *Project 1*.

After determining the criteria weights using the FUCOM method, the project priority rankings were obtained through the MAIRCA method. However, directly

relying on the MAIRCA-based ranking may not adequately address the company's investment decision-making process, as the company operates under a specific budget constraint. Therefore, the priority order derived from the MAIRCA method was used as an input to the knapsack algorithm. By integrating MAIRCA with the knapsack approach, both the relative importance of projects and the company's financial limitations were considered.

Within this framework, the objective was to maximize the overall benefit based on project prioritizations, using the knapsack model to achieve the best possible investment outcome. Three scenarios have been created:

- **Scenario 1:** The total available budget was considered as 500 T€. The optimal investment to be made was found as 476.5 T€, yielding a total benefit of 145. Under this scenario, all projects except *Project 1*, *Project 3*, and *Project 15* were selected for investment.
- **Scenario 2:** The available budget was reduced by 15%, to 425 T€. The total investment amounted to 423.5 T€, and the total benefit achieved was 143. In this case, all projects except *Project 1*, *Project 7*, and *Project 15* were selected.
- **Scenario 3:** A project dependency rule was introduced, based on output of MAIRCA method and stipulating that *Project 11* could not be selected without *Project 12*. With this dependency incorporated and an available budget of 500 T€, the total investment was 495.5 T€ and the total benefit 143. Under these conditions, all projects except *Project 1*, *Project 3*, *Project 4*, and *Project 7* were chosen for investment.

5. CONCLUSION

Understanding a company's characteristics and identifying its critical points are are highly for effective decision-making. Therefore, this study aims to replace and improve an experience-based decision process with a quantitative, structured approach. The proposed methodology is implemented in three main stages.

In the first stage, the selection criteria were defined based on the characteristics of the R&D center, and their corresponding weights were calculated. During this process, the focus was placed specifically on project selection problems within R&D centers, distinguishing the study from general project selection approaches. Both the literature and expert opinions were used in defining the criteria. The selected criteria were found to be consistent with those frequently used in the literature, where *budget*, *technology*, and *technical* factors are among the most common. Similar studies using the criteria are shown in Table 1.

The second stage involved the application of the FUCOM method for the initial evaluation. Since fuzzy logic is effective in environments where judgments are imprecise or uncertain, the F-FUCOM method was also employed to better express uncertainty in subjective evaluations (Liu et al., 2020). The results obtained from FUCOM and F-FUCOM were compared to determine the weights of each criterion. Although some differences were observed in the weights and rankings, these variations were not significant.

In the third stage, projects were evaluated according to the defined criteria and ranked using the MAIRCA model. The use of the MAIRCA method in R&D project selection is still limited in the literature, which enhances the contribution of this study. Finally, projects were selected using the knapsack algorithm under three budget scenarios.

As a result, the company has gained the ability to adapt effectively to changing conditions. According to the FUCOM results, *Continuity of Business Development Activity* was identified as the most important criterion, while *Incentive* had the lowest weight. The MAIRCA model prioritized *Project 12* as the top investment, followed by *Project 11* and *Project 9*, while *Project 1* was the least preferred.

Using the knapsack algorithm, benefit values of 145, 143, and 143 were obtained for the three scenarios, with total investment costs of 476.5 T€, 423.5 T€, and 495.5 T€, respectively. In all scenarios, *Project 1* was not selected, which is consistent with the MAIRCA ranking. However, in Scenario 2, *Project 3* was selected instead of *Project 15*, despite *Project 15* having a higher priority in the MAIRCA results. This highlights the importance of evaluating projects under different scenarios, as varying constraints can significantly influence outcomes.

The proposed approach in this study, which integrates MCDM methods with mathematical optimization, is supported by the literature and has been demonstrated to have practical advantages. The methodology developed in this research can be applied to other R&D centers. To improve reliability, two experts were involved in the evaluation process instead of relying on a single decision-maker, and a flexible decision-support mechanism was established to enable rapid assessment under multiple scenarios. In future research, new criteria can be introduced to address emerging needs, and involving more experts can enhance the diversity of evaluations. However, careful selection of experts remains essential to maintain consistency with the study's objectives.

Beyond the specific R&D case, the comparison between FUCOM and F-FUCOM revealed no major differences, indicating that the approach can be effectively applied in complex environments. The methods require a limited number of comparisons, incorporate subjective judgments, and ensure consistency. Thus, the proposed methodology can be adapted to different sectors. The originality of this study lies in the integration of FUCOM/Fuzzy FUCOM with the MAIRCA and knapsack approaches, a combination rarely explored in the literature. This integration demonstrates their applicability in R&D project prioritization and establishes a foundation for extending the approach to other industries, provided that sector-specific criteria are appropriately defined.

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This article was scanned with plagiarism detection software. No plagiarism was detected.

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REFERENCES

Amiri, M. P. (2010, February 21). *Project selection for oil-fields development by using the AHP and Fuzzy Topsis Methods*. ELSEVIER. https://www.sciencedirect.com/science/article/pii/S0957417410001429

Berberler, M. E. (2009). *Knapsack type problems and applications*. Ulusal Tez Merkezi Anasayfa. https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=VmPREawttxuE056IU7Jw2A&no=ZlbIfWhj3X iBSDUk1FpGYg

Dağıstanlı, H. A. (2024). An Interval-Valued Intuitionistic Fuzzy VIKOR Approach for R&D Project Selection in Defense Industry Investment Decisions. https://jscda-journal.org/index.php/jscda/article/view/28/23

Demir, G., & Bircan, H. (2020). *Comparison of BMW and FUCOM Methods of Criteria Weighting Methods and an Application*. ResearchGate.

Dua, T. V., Duc, D. V., Bao, N. C., & Trung, D. D. (2024). Integration of Objective Weighting Methods for Criteria and MCDM methods: Application in Material Selection. *EUREKA: Physics and Engineering*, (2), 131–148. https://doi.org/10.21303/2461-4262.2024.003171

Garrido, A. (2018). *A Brief History of Fuzzy Logic*. Academia.edu. https://www.academia.edu/35782229/A_Brief_History_of_Fuzzy_ Logic

Hacısüleyman, V. (2019). *Optimization of Reservoir Operation by Using Fuzzy Logic and Dynamic Programming Methods* (thesis).

Kılıç, M., & Kaya, İ. (2014, December 3). *Investment Project Evaluation by a decision-making methodology based on type-2 fuzzy sets.* Applied Soft Computing. https://www.sciencedirect.com/science/article/pii/S1568494614005900

Kumar, S. S., (2004). "AHP- based formal system for R&D Project evaluation" Journal of Scientific&Industrial vol.63 ss.888-896

Kwok, C. P., & Tang, Y. M. (2023, March 4). *A fuzzy MCDM approach to support customer-centric innovation in virtual reality (VR) metaverse headset design*. Advanced Engineering Informatics.https://www.sciencedirect.com/science/article/pii/S1474034623000381

Liu, Y., Eckert, C. M., & Earl, C. (2020). A review of Fuzzy AHP methods for decision-making with subjective judgements. *Expert Systems with Applications*, *161*, 113738.

Lukić, R. (2023). Application of DIBR and MAIRCA Methods in the e-Evaluation of the Economic Performance of the Economy of Bosnia and Herzegovina. *Economic Review, XXI*(1), 53–64. https://doi.org/10.51558/2303-680x.2023.21.1.53

Meade, L. (2002). *R&D project selection using the Analytic Network Process*. ResearchGate. https://www.researchgate.net/publication/3076710_RD_project_selection_using_the_analytic_network_process

Özan, M. H. (2010). *İşletmelerde Alınan Finansal Kararların Yatırımcı Davranışları Üzerindeki Etkilerinin İncelenmesi*. YÖK Açık Bilim. https://acikbilim.yok.gov.tr/handle/20.500.12812/553760

Pamučar, D., Stević, Ž., & Sremac, S. (2018). A New Model for Determining Weight Coefficients of Criteria in MCDM Models: Full Consistency Method (FUCOM). *Symmetry*, *10*(9), 393. https://doi.org/10.3390/sym10090393

Şen, H. (2023, March 11). *R&D Project Selection with Gray-WASPAS Method.* View of R&D Project Selection with Gray-WASPAS Method. https://journals.orclever.com/ejrnd/article/view/224/126

Taherdoost, H., & Madanchian, M. (2023). Multi-criteria Decision making (MCDM) Methods and Concepts. *Encyclopedia*, *3*(1), 77–87. https://doi.org/10.3390/encyclopedia3010006

Türkmen, G. F., & Topçu, Y. I. (2021). Research and Development Project Selection: A comprehensive analysis of the trends and methods. *South African Journal of Industrial Engineering*, *32*(4), p. 34. https://doi.org/10.7166/32-4-2452

Uçakcıoğlu, B., & Eren, T. (2017). Hava Savunma Sanayinde Yatırım Projelerinin Çok Ölçütlü Karar Verme ve Hedef Programlama ile Seçimi. *Journal of Aviation*, *1*(2), 39–63. https://doi.org/10.30518/jav.334675

Yazgan, A. E., & Agamyradova, H. (2021). SWARA ve MAIRCA Yöntemleri ile Bankacılık Sektöründe Personel Seçimi. *Sosyal Bilimler Araştırmaları Dergisi*, *16*(2), 281–290. https://doi.org/10.48145/gopsbad.999847

Yıldız, A. (2014), Analysis of Project Selection Process Applying with Fuzzy VIKOR Method. *Anadolu University Journal of Social Sciences*, *14*(1). https://doi.org/10.18037/ausbd.79954

Yılmaz, S. (2006). *Application of AHP and Fuzzy AHP to aircraft selection criterias*. Ulusal Tez Merkezi.