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Impact of Industry 4.0 Adoption on Eco-Innovation and Sustainable Development: The Automotive and Aerospace Manufacturing Sectors

Impacto de la adopción de la Industria 4.0 en la ecoinnovación y el desarrollo sostenible: sector manufacturero automotriz y aeroespacial

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ABSTRACT

This study aims to fill a gap in the literature and provide robust empirical evidence on the effects of IoT 4.0 on eco-innovation and the sustainable development of manufacturing companies by conducting a survey of 378 manufacturing companies in the automotive and aerospace industries in Mexico and validating the results using PLS-SEM. The results suggest that the adoption of Industry 4.0 has significant positive effects on both sustainable development and eco-innovation, that eco-innovation has a considerable positive impact on sustainable development, and that eco-innovation also serves as a mediating mechanism between Industry 4.0 and sustainable development.

Keywords: Industry 4.0; eco-innovation; sustainable development; automotive industry; aerospace industry.

Jel Code: M15.

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RESUMEN

Este estudio tiene como objetivo llenar el vacío existente en la literatura y aportar evidencia empírica robusta de los efectos que tiene la 4.0 en la eco-innovación y el desarrollo sustentable de las empresas manufactureras, mediante la aplicación de una encuesta a una muestra de 378 empresas manufactureras de la industria automotriz y aeroespacial de México, validando los resultados mediante el uso del PLS-SEM. Los resultados obtenidos sugieren que la adopción de la Industria 4.0 tiene efectos positivos significativos tanto en el desarrollo sustentable como en la ecoinnovación, y que la ecoinnovación tiene un efecto positivo significativo en el desarrollo sustentable, además de jugar un rol mediador entre la Industria 4.0 y el desarrollo sustentable.

Palabras clave: Industria 4.0; ecoinnovación; desarrollo sustentable; industria automotriz; industria aeroespacial.

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INTRODUCTION

The exponential growth of the global population, the surge in the consumption of goods and services, and the improvement in quality of life generated in recent decades have driven exponential increases in demand for natural resources (Strazzullo et al., 2023). However, the scarcity of natural resources is causing society, in general, and manufacturing firms in particular, to rethink their operational strategies and redesign production processes with a sustainable development (SD) perspective (Jawaad & Zafar, 2019). Furthermore, in accordance with the commitment signed by most countries to guide strategies towards sustainable consumption and production, not only as part of the United Nations 2030 Agenda to achieve the 17 Sustainable Development objectives (UN General Assembly, 2015), but also to reduce the planet's temperature by 1.5°C (UN, 2021).

To achieve this goal, the adoption and application of digital technologies in current production systems is necessary to promote the transition towards a cleaner economy that guarantees the reduction of the demand for natural resources, combined with an efficient use of consumer goods, and converges towards a regenerative economy (Strazzullo et al., 2023). The concept of Industry 4.0 (I4.0) is presented in the literature as a leading solution for harmonizing economic growth and ambitions to improve SD (Khan et al., 2023). Particularly, because I4.0 has proven to be a driver of eco-innovation (EI) of products and services derived from its rapid technological advances (Frank et al., 2019), as well as the improvement of processes (De Giovanni & Cariola, 2021), organizations (Dalenogare et al., 2018), and general business models (Ibarra et al., 2018) in different industrial sectors.

In this context, contemporary digital technologies used in I4.0, in conjunction with EI of environmentally friendly products, have proven to be a remarkable potential strategy in creating sustainable industrial value by improving economic components of manufacturing firms, such as resource efficiency, as well as overcoming environmental and social constraints necessary for SD (Bonilla et al., 2018). While I4.0 and EI are intertwined concepts, I4.0 and SD are relatively recent emerging trends in the literature that need to be analyzed more widely (Luthra & Mangla, 2018; Dubey et al., 2019; Bai et al., 2020). The relationship between I4.0 and the resulting EI, and its implications for SD, are recognized as both synergistic and overlapping concepts in the literature, but are also acknowledged as open to debate (Khan et al., 2023).

Additionally, there are recently published studies that have investigated the impact of I4.0 digital technologies and EI on different aspects of sustainability, such as I4.0 and the circular economy (Rosa et al., 2020), and SD (Dantas et al., 2021), sustainable production functions (Ching et al., 2022), maintenance management (Silvestri et al., 2020), and aspects of

organizational and social sustainability (Ghobakhloo et al., 2021). However, given the importance, relevance and timeliness of this topic, recent studies suggest a careful evaluation of the link between I4.0 and EI and its influence on the impact of SD (e.g. Bai et al., 2020; Mubarak et al., 2021), basically because the strength of the relationship between I4.0, EI, and SD is still unknown (Piccarozzi et al., 2022). Its results are too ambiguous and open to debate (Khan et al., 2023).

Therefore, the objective of this study is to analyze the adoption of I4.0 digital technologies in manufacturing firms in the automotive and aerospace industries in Mexico, as well as their effect on EI and SD, using a sample of 378 companies and the statistical technique of Partial Least Squares Structural Equation Modelling (PLS-SEM), with the use of SmartPLS 4.10.9 software (Ringle et al., 2024). Likewise, this study contributes to filling the existing gap in the literature on the link between I4.0, EI, and SD (Bai et al., 2020; Mubarak et al., 2021; Piccarozzi et al., 2022), and in providing robust empirical evidence on the adoption of I4.0 digital technologies in manufacturing firms in the automotive and aerospace industries in a developing country, such as Mexico (Khan et al., 2023). The rest of the paper is structured as follows: Section 2 presents the literature review and hypotheses; Section 3 introduces the research methodology; the analysis and interpretation of esentthe results are included in Section 4; lastly, Section 5 provides the conclusions, limitations, and future research directions.

LITERATURE REVIEW

Industry 4.0 and Sustainable Development

In the last two decades, the concept of sustainability is gaining more interest in the scientific and academic community (Sadhukhan et al., 2020), mainly due to the implementation of global environmental protection policies promoted in various countries (Fuso Nerini et al., 2019; Zhang et al., 2019), as well as the establishment of the Sustainable Development Agenda by the United Nations, which guarantees the well-being of people and a more sustainable planet for the entire society (Rosa, 2017; Pollitzer, 2018). The concept of I4.0 appears in the literature as an approach and strategy that can significantly increase the wealth of manufacturing firms (Fakhrul et al., 2022), as well as industrial development linked to SD objectives (Hidayatno et al., 2019; Schroeder et al., 2019), and creativity that is a prerequisite for SD (Silvestre & Tirca, 2019).

Therefore, I4.0 substantially improves the SD of manufacturing firms through the automation and digitalization of production processes (Pacchini et al., 2019), as well as bulk customization and servitization (Oztemel & Gursev, 2020). Other benefits of I4.0 include real-time tracking and traceability of transactions in supply chains (Upadhyay et al., 2021),

waste reduction and recycling, and the facilitation of circular economy outcomes (Nascimento et al., 2019). Therefore, by adopting I4.0, both production agility and production cost efficiency (Raj et al., 2020; Upadhyay et al., 2020) are exponentially improved, as is the SD of manufacturing firms (Mukhuty et al., 2022). Despite recognition of these benefits, adoption of I4.0 has been slow in the manufacturing industry (Fantini et al., 2020; Raj et al., 2020; Nankervis et al., 2021).

Additionally, the literature shows that the use of smart sensors extends product lifecycles and reduces the use of natural resources, thereby promoting both recycling and SD (Blömeke et al., 2020). In this sense, new sensor-based digital technologies of I4.0 help manufacturing firms constantly monitor the use of machinery and equipment and the organization's energy needs, thereby increasing the level of SD (Strazzullo et al., 2023). In addition, advanced digital technologies of I4.0 improve the efficiency of production processes and reduce the level of industrial waste (Strazzullo et al., 2023) by eliminating existing defects in production processes (Moeuf et al., 2018; Bigliardi et al., 2022), which increases the SD level of manufacturing firms by a high percentage (Strazzullo et al., 2023).

According to Ghobakhloo (2020), I4.0 enables companies to introduce new business models, such as crowd-sourced innovation, manufacturing as a service, and production as a service, which offer significant opportunities to improve the social and economic sustainability of SD (Ákerman et al., 2018; Birkel et al., 2019). In terms of improving the environmental aspect of SD, the adoption of I4.0 offers opportunities to reduce CO_2 emissions from manufacturing firms (Kamble et al., 2018), which accounted for a quarter of global emissions in 2021 (IEA, 2022). However, despite the above examples, relatively few studies published in the literature have analyzed and discussed the symbiosis between I4.0 and SD (Ghobakhloo, 2020; Beltrami et al., 2021). Thus, based on the information presented above, we propose the following research hypothesis.

H_1: The higher level of adoption of I4.0, the higher level of sustainable development

Industry 4.0 and Eco-innovation

The push towards sustainable production in the last decade stems from the increasing pressure that global manufacturing firms face from environmental groups, suppliers, public administration, and society in general, who demand environmental responsibility (Liu et al., 2021; Srhir et al., 2023). Therefore, manufacturing firms have to modify their current strategies to adapt them to the development of green capabilities that allow a reduction of their environmental impact (Sahoo et al., 2024), a transformation that is often challenging due to the changes required in production processes, supply chains, and eco-product innovation (Bag et al., 2021; Kannan et al., 2022), as well as the high costs of investment in technological transformation and unpredictable customer demand (Bai & Satir, 2020).

These obstacles often lead to initial reluctance as manufacturing firms weigh the lack of a required return on investment against the long-term benefits the organization would gain (Kannan et al., 2022; Isensee et al., 2023). However, the lack of development of green product EI capabilities generates various risks for manufacturing firms, including environmental damage, competitive disadvantages, and neglect of lucrative business opportunities (Quintana-García et al., 2021; Jafari et al., 2022; Buadit et al., 2023). Therefore, to mitigate these risks, it is necessary for manufacturing firms to incorporate I4.0 digital technologies in the creation and development of EI activities of products and services (Nayal et al., 2021; Malacina & Teplov, 2022), which could minimize the carbon footprint and ensure sustainability (Bui et al., 2023).

Recently published studies in the literature argue that manufacturing firms that have adopted and applied I4.0 digital technologies as a strategic resource have significantly improved their value creation, visibility, supply chain transparency with their partners, and EI activities (e.g., Qader et al., 2022). Particularly because the adoption of I4.0 involves integrating advanced technologies into traditional production processes to create an intelligent production system, thereby improving efficiency, productivity, decision-making, and EI (Bag et al., 2021; Venanzi et al., 2023), in this sense, the literature suggests that the integration of digital technologies that make up I4.0 is a fundamental enabler for manufacturing firms to improve EI activities (Di Maria et al., 2022; Erboz et al., 2022).

Additionally, two main justifications in the literature have been proposed for analyzing the relationship between I4.0 and EI (Sahoo et al., 2024). First, with growing customer and consumer commitment to environmental care and protection, demand for environmentally friendly products is increasing (Bui et al., 2023; Luo et al., 2023). This trend is leading manufacturing firms to invest increasingly larger amounts of economic resources in the development of EI products, which requires new technologies and production processes (Nayal et al., 2021; Wang et al., 2022). Second, I4.0 is transforming production and supply chain processes, improving their efficiency, reducing industrial waste, and improving the development of EI in collaboration with supply chain partners (Patrucco et al., 2022). Therefore, considering the information presented above, the following research hypothesis is proposed.

H_2: The higher level of adoption of I4.0, the higher level of eco-innovation.

Eco-innovation and Sustainable Development

In the literature, innovation is considered a fundamental driver of SD, and the United Nations Sustainable Development Goals (SDGs) provide a comprehensive framework for addressing the different dimensions (people, planet, prosperity, partnerships, and peace) of global challenges (Dzhunushalieva & Teuber, 2024). Progress towards achieving some SDGs is lagging, particularly in developing countries (Dzhunushalieva & Teuber, 2024), but it is still possible to reach them (Sachs et al., 2023). However, Schot and Steinmueller (2018) argued that the complex nature of both SDGs and SD requires transformative solutions that go beyond adopting innovation activities, which require manufacturing firms to implement a combination of innovation activities and advanced technologies to develop eco-innovative products (Islam, 2025).

In this context, EI is considered essential in the literature for promoting and achieving the SDGs and the SD of manufacturing firms, because it plays a central role in promoting environmental sustainability and economic prosperity of companies (Islam, 2025). By focusing on green technologies and practices, EI helps manufacturing firms reduce greenhouse gas emissions and combat climate change, which are essential to significantly improving SD (Wang et al., 2022; Khan & Idrees, 2023). In addition, EI includes advances in energy efficiency, industrial waste reduction, and sustainable resource management, which together contribute to more sustainable economic growth and environmental management, substantially improving the level of SD (Islam, 2025).

Additionally, the synergy between EI and SD, together with technological advances, facilitates the progress of several SDGs, including those related to clean water and sanitation, affordable and clean energy, and sustainable cities and communities (Shahzad et al., 2022; Yikun et al., 2022). Therefore, the adoption and implementation of EI in manufacturing firms not only improves SD but also drives social development by creating new economic opportunities and improving the quality of life of society (Islam, 2025). However, to achieve the full potential of EI, manufacturing firms often also need to strengthen other complementary factors, such as sustainable performance levels and supporting policies, to effectively and in the long term obtain benefits (Younas et al., 2023).

In this regard, Calabrese et al. (2021) highlighted the mediating role of EI in manufacturing firms' SD achievement. Delving deeper into the community level, Imaz and Eizagirre (2020) analyzed how manufacturing firms can contribute to the SD agenda through enhancing EI activities. Meanwhile, Alarcón et al. (2021) and Nogueira et al. (2022) highlighted the pivotal role of EI activities in addressing and achieving the SDGs, particularly in rural firms. Meanwhile, Khan et al. (2022) found that EI moderates the correlation between financial performance and SD improvement. Zhou et al. (2020) and Wei et al. (2023) explored the

promotion of EI in sustainable supply chains, while Wang et al. (2022) highlighted the role of EI knowledge management in improving the SD of organizations. Thus, considering the information presented above, the following research hypothesis is proposed.

H_3: The higher level of adoption of eco-innovation, the higher level of sustainable development

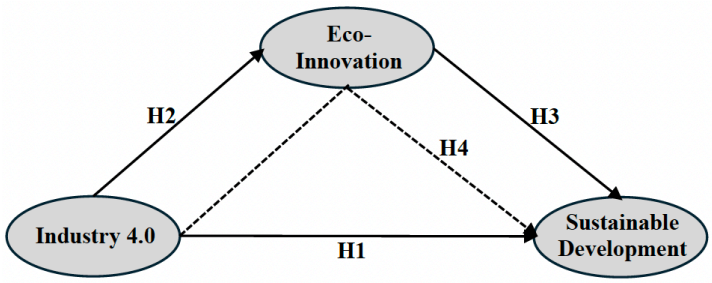
In the last decade, the scientific and academic community has not limited itself to analyzing the I4.0 paradigm and its link with EI activities. Still, it has gone a step further and is currently focusing on creating more sustainable industrial value (Khan et al., 2023). Thus, from an economic point of view, EI activities for products and services improve the relationship between I4.0 and SD by reducing social inequalities, climate change, and global environmental problems (UN DESA, 2020; UN News, 2021). Therefore, the adoption of EI in manufacturing firms has contributed to improving the results of new I4.0 technologies throughout the entire value chain, from the robustness of production processes (Sánchez et al., 2020; Tripathi et al., 2022) to the transformation of a more scalable and flexible supply chain (Hahn, 2020).

Additionally, Liu and De Giovanni (2019) demonstrated through mathematical models that I4.0 significantly improves SD by incorporating EI into production processes, while Dev et al. (2020) showed how I4.0 can simplify the supply chain in an environment of diffusion of SD-enhancing products. Chen et al. (2021) found that EI derived from implementing I4.0 technologies increased the energy efficiency and SD level of manufacturing firms. Ghobakhloo and Fathi (2021) found that EI activities can contribute to a greater adoption and implementation of I4.0 technological advances in manufacturing firms, which would significantly increase both energy sustainability and SD level.

In this context, current research trends in the literature show an essential interrelation of I4.0, EI of products, processes and management and SD from different perspectives such as, for example, the implications of sustainability for society, economy, and environment (Müller, 2021), sustainable supply chain (Luthra & Mangla, 2018), circular economy (Rajput & Singh, 2019; Yu et al., 2022), and sustainable business models (De Man & Strandhagen, 2017). However, the literature provides a limited view of the interaction and interpretation of EI, I4.0, and SD. It lacks a systematic analysis of the mediating role of EI in the implications of I4.0 and SD (Khan et al., 2023). Thus, considering the information presented above, the following research hypothesis is proposed.

H_4: Eco-innovation plays a mediating role between I4.0 and sustainable development.

Figure 1
Research Model



Source: Own elaboration.

METHODOLOGY

To respond to the hypotheses raised in the research model, the business directories of the Mexican Automotive Industry Association (AMIA), which had a registry of 950 companies, and the Mexican Aerospace Industry Federation (FEMIA), which had a registry of 350 companies, were considered as a reference framework as of January 30, 2023. It is important to note that the manufacturing firms of AMIA and FEMIA belong to different national and international business associations and chambers, which is why this study was not focused on a particular group or business chamber. In addition, this study focused exclusively on manufacturing firms in the automotive and aerospace industries, given that these industries have not received extensive attention in the literature relative to other sectors.

Manufacturing firms in the automotive and aerospace industries were selected through simple random sampling, with a maximum error of ±4% and a reliability level of 95%, obtaining a sample of 320 firms. The survey used to collect the data was distributed to 500 manufacturing firms in both industries in Mexico, and 378 responded. This ensured the final sample accurately represented both sectors. The survey, administered from February to June 2023, was directed to firms' managers, who, in turn, identified the most suitable individuals to respond to the various questionnaire sections—given their pivotal role in decision-making, general managers, well-informed about the study, adeptly identified individuals with the requisite expertise to address the questionnaire's diverse sets of questions (Yu & Tsai, 2018; Kuo & Chang, 2021).

Variables and Data Analysis

To measure the concepts of I4.0, SD, and EI, an extensive literature review was conducted, identifying the Gastaldi et al. (2022) scale as the most appropriate for measuring I4.0 digital technologies, which was measured using five items. To measure SD, the scale proposed by D'Amato et al. (2017), consisting of 9 items, was used. Finally, to measure EI, the scale

proposed by Segarra et al. (2011) and Doran and Ryan (2012), comprising five items, was used. All items on the scales were measured using a five-point Likert scale, with 1 = strongly disagree and 5 = strongly agree as the limits.

Additionally, given that data were collected using the same instrument with the same informant (company manager), this can introduce bias that alters responses, potentially leading to Type I (false positive) or Type II (false negative) errors. The evaluation of standard method variance (CMV) was used, following the recommendations of Podsakoff et al. (2003). Traditionally, the method most used by researchers to verify the possible effect of CMV is Harman's one-factor test (Podsakoff et al., 2003), which consists of subjecting practically all the items of the scales to exploratory factorial analysis, forcing extraction to a single factor.

To verify the suitability of the data and the potential effect of CMV, an exploratory factorial analysis (EFA) was conducted using the principal components method with varimax rotation, and the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's sphericity test were calculated. The results support the use of EFA with data from this sample, with a KMO value of 0.884 and a statistically significant Bartlett test [X2 (171) = 6,459.85, $p < 0.000$]. If there is a CMV problem, common factor extracted should have a value greater than 50% of the variance (Podsakoff et al., 2003), but common factor extracted from data is 41.96%, which is lower than the recommended value, which suggests that CMV is not a threat to sample data of this study, and does not seem to affect the relationships between variables of the research model significantly (Podsakoff et al., 2003).

Finally, the data collected through the survey application were analyzed using PLS-SEM with SmartPLS 4.10.9 (Ringle et al., 2024). Fundamentally, PLS-SEM was used because this study is based on a composite model of indicators (Sarstedt et al., 2016; Rigdon et al., 2017), which are essential in the operational definition of the emerging construct that mediates all its effects (Henseler et al., 2015). Furthermore, PLS-SEM was used because the indicators lack standard error terms, unlike studies with causal formative indicators (Hair et al., 2021). Commonly, these types of indicators yield the same results even when they are not unidimensional and do not share the same conceptual unit (Henseler, 2017), so composite indicators can represent different aspects of the concept (Hair et al., 2021).

RESULTS

The use of the PLS-SEM statistical technique to answer the research hypotheses raised in this study is primarily due to two essential issues: (1) it is the most appropriate statistical technique for the analysis of theories that have not been widely developed in the literature

(Hair et al., 2019), in the different disciplines of knowledge (Sarstedt et al., 2014; do Valle & Assaker, 2015; Richter et al., 2016); (2) it is the most appropriate statistical technique when the essential objective of the study is the prediction and explanation of the concepts analyzed (Rigdon, 2012). In this sense, the PLS-SEM statistical technique facilitates the explanation of the measurement error of the concepts used in the study, as well as the multiple regression of the range of scores of the link between I4.0, SD, and EI of manufacturing firms (Hair *et al*., 2021).

Measurement Model

To assess the reliability of the measurement scales, the four indicators most commonly used in the literature were employed: Cronbach's alpha, Dijkstra-Henseler rho (2015), Composite Reliability Index (CRI), and Average Variance Extracted (AVE). Table 1 (Panel A) indicates that the values of Cronbach's alpha, Dijkstra-Henseler rho, and CRI are higher than the value of 0.80 recommended in the literature. In comparison, the AVE values exceed the 0.50 recommended in the literature, thereby ensuring the validity of the constructs used (Hair et al., 2021). Additionally, discriminant validity was assessed using the two most widely recommended criteria in the literature: the Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT).

Table 1
Measurement Model. Reliability, Validity, and Discriminant Validity

PANEL A. Reliability and Validity				
Variables	**Cronbach's Alpha**	**Dijkstra-Henseler rho**	**CRI**	**AVE**
Industry 4.0	0.928	0.933	0.945	0.776
Sustainable Development	0.936	0.948	0.949	0.684
Eco-innovation	0.873	0.871	0.910	0.671

PANEL B. Fornell-Larcker Criterion				**Heterotrait–Monotrait ratio (HTMT)**		
Variables	**1**	**2**	**3**	**1**	**2**	**3**
1. Industry 4.0	**0.881**					
2. Sustainable Development	0.288	**0.827**		0.308		
3. Eco-innovation	0.348	0.442	**0.819**	0.377	0.489	

Note: PANEL B: Fornell-Larcker Criterion: Diagonal elements (bold) are the square root of the variance shared between the constructs and their measures (AVE). For discriminant validity, diagonal elements should be larger than off-diagonal elements.

Source: Own elaboration.

Table 1 (Panel B) presents the results of the discriminant validity assessment, indicating that the square roots of the AVE values exceed the correlations with the other constructs in the respective rows and columns, suggesting discriminant validity for the three measurement

scales. Additionally, Henseler *et al*. (2015) established that an HTMT value between 0.1 and 1.0 indicates discriminant validity. The results obtained from the discriminant validity using the HTMT ratio suggest that the minimum and maximum values range between 0.308 and 0.489, respectively, which confirms the existence of discriminant validity (Table 1 Panel B) and indicates that the study has an excellent fit to the data (Bagozzi & Yi, 1988; Hair *et al.*, 2019).

Evaluation of Outer Model/ Measurement Model

An outer model analysis was conducted to ensure the measurement was appropriate for use. Measurement model testing shows convergent and discriminant validity. If the reflexive correlation exceeds 0.70, it is considered high. However, for early-stage research in scale creation, an external filling value of 0.5–0.60 is considered sufficient.

Structural Model

The structural model was evaluated using the coefficient of determination (Adjusted R2), effect size (f2), multicollinearity tests (VIF), t-test statistics, and p-values (Hair & Sarstedt, 2021). In addition, the bootstrapping procedure was used with 5,000 subsamples with the support of the SmartPLS 4.10.9 software (Ringle et al., 2024), and the results indicate that the data obtained have acceptable statistical levels (Table 2), finding Adjusted R2 values (0.221 for SD and 0.124 for EI) higher than the recommended value of 0.10 (Henseler et al., 2014; Hair & Sarstedt, 2021). Regarding the f2 values, Cohen (2013) classified the effect into three groups: (1) between 0.02 and 0.14 as small; (2) between 0.15 and 0.34 as medium; and (3) greater than 0.35 as large. The results indicate that the effect sizes for the I4.0-SD (0.030) and I4.0-EO (0.146) relationships are small, whereas for the EI-SD (0.179) relationship, the effect size is medium (Table 2).

Multicollinearity was assessed using the internal VIF, and the results show that the minimum and maximum values were 1.246 and 4.979, respectively, confirming the absence of multicollinearity (Pallant, 2020). Regarding significance, it was assessed using the t-test and the p-value, which are considered significant when the t-statistic exceeds 1.96 and the p-value is less than 0.05 (Hair & Sarstedt, 2021).

The results obtained from the data analysis indicate that the values of the t statistics of all the relationships are greater than 1.96 (I4.0-SD: 2.791; I4.0-EI: 7.614; EI-SD: 7.175; I4.0-EI-SD: 5.412), while the p values (I4.0-SD: 0.005; I4.0-EI: 0.000; EI-SD: 0.000; I4.0-EI-SD: 0.000) are less than 0.05, which establishes the acceptance of the hypotheses of the research model. Table 2 shows these results in greater detail.

Table 2
Structural Equation Model

Paths	Path (*t-value; p-value*)	95% Confidence Interval	f^2	Support
I4.0 → SD (H1)	0.154 (2.791; 0.005)	[0.048 – 0.262]	0.030	Yes
I4.0 → EI (H2)	0.352 (7.614; 0.000)	[0.251 – 0.430]	0.146	Yes
EI → SD (H3)	0.392 (7.175; 0.000)	[0.286 – 0.494]	0.179	Yes
Indirect Effects				
I4.0 → EI → SD (H4)	0.238 (5.412; 0.000)	[0.091 – 0.191]		Yes
Endogenous Variables	**Adjusted R^2**	**Model Fit**	**Value**	**HI99**
		SRMR	0.037	0.044
SD	0.221	dULS	0.256	0.372
EI	0.124	dG	0.138	0.180
		NFI	0.809	

Source: Own elaboration.
Note: I4.0: Industry 4.0; SD: Sustainable Development; EI: Eco-innovation. One-tailed t-values and p-values in parentheses; bootstrapping 95% confidence intervals (based on n = 5,000 subsamples) SRMR: standardized root mean squared residual; dULS: unweighted least squares discrepancy; dG: geodesic discrepancy; HI99: bootstrap-based 99% percentiles

Table 2 also shows that the fit assessment of the structural model was carried out through the SRMR, unweighted least squares discrepancy (dULS), and geodesic discrepancy (dG), which if they have values lower than those obtained in HI99, indicate that the structural model has a good fit to the data (Dijkstra & Henseler, 2015), as well as through the NFI which suggests that if it has a value greater than 0.70 it is indicative of a good fit of the structural model (Hair & Sarstedt, 2021). The results indicate that the values of SRMR (0.037), dLUS (0.256), and dG (0.138) are lower than the values of HI99 (0.044; 0.372; 0.180, respectively), while the value of NFI (0.809) is higher than the value of 0.70, indicating that the adoption of I4.0 improved both SD and EI of manufacturing firms in the automotive and aerospace industries.

DISCUSSION

The results found in this study support our argument of the existence of a significant positive link between I4.0 and DS; these results are in line with those found by Ákerman et al. (2018), Birkel et al. (2019), and Ghobakhloo (2020), as well as with the level of EI; these results being similar to those found by Nayal et al. (2021), Malacina and Teplov (2022), and Bui et al. (2023). The main reasons that could explain these results are, on the one hand, that the executives of manufacturing firms in the automotive and aerospace industries are clear about the advantages generated by I4.0 and, on the other hand, that its adoption not only allows the production of eco-products, but also an improvement in the SD of organizations, which allows I4.0 to be characterized not only as a technological leap, but as a strategic asset that reconceptualizes the dynamics of production processes that promote automated and interactive relationships with the members of the supply chain.

Furthermore, the results support our argument that EI is closely related to SD, and they align with those reported by Wang et al. (2022), Khan and Idrees (2023), and Islam (2025). The main reasons that could explain the relationship between these two concepts are, on the one hand, the development of eco-products (vehicles and aircraft parts) that are more environmentally friendly, which would not only allow them to comply with environmental regulations but also to be recognized as green companies. On the other hand, the use of new I4.0 technologies would facilitate both the development of new eco-products, and the achievement of the SD objectives set by the United Nations, through the recycling, reuse, and repurposing of materials from vehicles and aircraft that have completed their useful life cycle in the remanufacturing of new eco-products, thereby reducing the generation of greenhouse gases.

Finally, the results also support our argument that EI plays a mediating role between I4.0 and SD, and they align with those reported by Dev et al. (2020), Chen et al. (2021), and Ghobakhloo and Fathi (2021). The main reasons that could explain these results are, on the one hand, the implementation of EI activities significantly conditions the interaction and outcomes of I4.0 and SD, which highlights the multifaceted nature of the role that EI plays in manufacturing firms. On the other hand, the complexity of these interdependencies demands a deeper analysis of the moderating EI activities that govern the relationship between advanced I4.0 technologies and SD outcomes, not only in organizations in the automotive and aerospace industries but also in other sectors of the economy.

Additionally, the main reason for the findings of this study could be that manufacturing firms in the automotive and aerospace industries are currently moving towards an innovative technological culture, particularly because, as most of the organizations are suppliers of the large vehicle and aircraft manufacturing firms, they are required to change their organizational culture to continue in the supply chain, thereby generating the adoption of I4.0 and EI as a strategy that facilitates the improvement of the SD level. Therefore, manufacturing firms in the automotive and aerospace industries are currently facing unique challenges that make the adoption of I4.0 and EI activities a necessary strategy, not only to remain in the supply chain but also to achieve SD objectives.

Practical Implications

The data estimated in our study is relevant for executives, policymakers, business practitioners, and public administration. Firstly, the link between I4.0, SD, and EI advocates transitioning manufacturing firms in the automotive and aerospace industries from a traditional business strategy to a new technology strategy, which poses a challenge for industrial organizations. However, the level of difficulty varies among manufacturing firms, so managers must implement a technologically sophisticated model in the search for

organizational results, to meet the demands posed by large companies that allow them to continue in the supply chain, as well as to be more proactive and innovative in the inclusion of sustainability activities that improve their business strategies oriented towards recycling that generates sustainable production.

Secondly, these findings further support the notion that EI activities are essential to consolidate the long-term competitive position of manufacturing firms, and therefore, managers need to advocate for an innovative spirit that relentlessly seeks new applications of I4.0 digital technologies to amplify integration at all levels of the supply chain. However, company managers should consider that even when organizations face several barriers to the adoption of I4.0 technologies, this should not influence the results and benefits obtained, particularly because I4.0 digital technologies are not only facilitators, but enablers that intensify communication, collaboration, and coherence within the supply chain which allow for improved SD and EI levels.

Ultimately, the integration of I4.0 technologies into SD and EI generates greater transparency, adaptability, and resilience, which are essential requirements to foster trust and value creation throughout the supply chain (Parviziomran & Elliot, 2023; Prataviera et al., 2023). However, company managers should emphasize to their staff that I4.0 technologies are a means to an end, not an end in themselves. In this context, the adoption of I4.0 digital technologies should be a relevant topic for policymakers, business practitioners, and public administration, in the development of policies and support programs to encourage more manufacturing firms in all industrial sectors to adopt new I4.0 technologies, as well as provide the infrastructure and necessary policies to expedite the preparation of workers for the adoption and application of I4.0, SD and EI.

Theoretical Implications

This study offers critical theoretical implications by providing robust evidence that companies can enhance the capabilities that give them a competitive advantage and leverage the benefits of adopting I4.0 digital technologies. Therefore, this research advances the theory of resources and capabilities by demonstrating how the strategic alignment of manufacturing firms' resources and capabilities with organizational objectives can serve as the basis for achieving competitive advantage in a technologically complex business environment. Therefore, the benefits of adopting I4.0 and EI activities in manufacturing firms outweigh the associated costs.

Furthermore, this study offers substantial theoretical evidence that bridges the existing gap in the literature by highlighting the indispensable role of adopting I4.0 digital technologies in manufacturing firms in achieving their organizational objectives, amid the accelerated pace of technological advancements and the relentless pursuit of environmental stewardship

and sustainability. These findings reinforce the idea that the adoption of I4.0 and EI activities is essential to consolidating the long-term competitive position of manufacturing firms. In this sense, the findings of this study empirically validate the theory that advocates the relentless pursuit of new applications of I4.0 digital technologies and the adoption of innovations that are compatible with both firms' economic performance and improved sustainability.

Finally, the theoretical findings of this study also highlight the fundamental role of internal integration in strengthening collaborative relationships with suppliers and customers of manufacturing firms. Therefore, by delving beyond the traditional view, this study reveals that the adoption of I4.0 and EI digital technologies significantly impacts technological integration by aligning organizational economic objectives with environmental stewardship goals. This can lead manufacturing firms worldwide to greater transparency, adaptability, and resilience, fundamental prerequisites for fostering value creation throughout the entire supply chain (Parviziomran & Elliot, 2023; Prataviera et al., 2023).

CONCLUSIONS

The information obtained in this study allows us to draw several conclusions, among which the following stand out. Firstly, this study reveals that I4.0 exerts an implicit transformative effect on SD of manufacturing firms, which is mediated by EI activities, thus constituting a fundamental axis in the innovation activities of organizations, which allows companies to strengthen their innovation capacity in the field of sustainability, which will enable us to conclude that the scientific, academic, and business community needs to direct future studies that provide robust empirical evidence of the relationship between these three concepts, particularly in manufacturing firms in developing countries, where the adoption of new I4.0 technologies as well as the achievement of SD objectives is very slow.

Secondly, the findings of this study highlight the importance of adopting I4.0 not only to foster innovation-focused, sustainable production but also to develop new, eco-innovative products and processes. This knowledge is poised to serve as an invaluable precursor for manufacturing firms interested in expanding their sustainability outcomes and the scope of their innovation activities. Therefore, it is possible to conclude that the transition from a conventional industrial environment to an intelligent industry environment will allow manufacturing firms in the automotive and aerospace industries to develop sustainable production practices, as this will help organizations to more quickly improve their production capacity and develop eco-products, which will increase both their financial resources and care for the environment and sustainability.

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Local Cultural Values, Managerial Overconfidence, and SME Performance: The Mediating Role of Debt Financing

Valores culturales locales, exceso de confianza gerencial y desempeño de las PYME: el papel mediador del financiamiento de deuda

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ABSTRACT

This study examines the relationship between local cultural values, managerial overconfidence, small and medium enterprise (SME) performance, and the use of debt in funding decisions. The indicators of the constructs were measured using a 7-point semantic differential scale. Data were collected from 140 handicraft SME owners in Central Lombok and analysed using SEM PLS. The results of this study reveal that Tastura culture does not directly affect SME performance. The use of debt in funding decisions fully mediates the influence of the Tastura culture on SME performance, and funding decisions partially mediate the impact of managerial overconfidence on SME performance. These findings indicate that local cultural values are insufficient without funding decisions. The findings provide insights into the role of cultural values in influencing financing decisions that ultimately enhance firm performance. Furthermore, this study gives valuable information to the government to develop plans for SMEs in Central Lombok that are grounded in local culture.

Keywords: Local cultural values; Tastura culture; Managerial overconfidence; SME performance; Debt financing.
Jel Code: L2, G4, Z1

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RESUMEN

Este estudio examina el efecto de la cultura Tastura y el exceso de confianza gerencial en el desempeño de las pequeñas y medianas empresas (pymes). Los indicadores de los constructos se midieron mediante una escala diferencial semántica de 7 puntos. Los datos se recopilaron de 140 propietarios de pymes artesanales en Lombok Central y se analizaron mediante SEM PLS. Los resultados de este estudio revelan que la cultura Tastura no afecta directamente el desempeño de las pymes. El uso de deuda en las decisiones de financiación media completamente la influencia de la cultura Tastura en el desempeño de las pymes, y las decisiones de financiación median parcialmente la influencia del exceso de confianza gerencial en el desempeño de las pymes. Estos hallazgos indican que los valores culturales locales resultaban insuficientes sin las decisiones de financiación. Los hallazgos brindan información para comprender el papel de los valores culturales en las decisiones de financiamiento que, en última instancia, contribuyen a mejorar el rendimiento empresarial. Además, este estudio ofrece al gobierno información valiosa para elaborar un plan de desarrollo para las pymes artesanales en el centro de Lombok, basado en la cultura local.

Palabras clave: Valores culturales locales; Cultura Tastura (Tatas Tuhu Trasna); Exceso de confianza gerencial; Desempeño de las pymes; Financiamiento mediante deuda

Código JEL: L2, G4, Z1.

INTRODUCTION

Small and medium-sized enterprises (SMEs) contribute significantly to economic development in developing countries. SMEs are crucial in improving income distribution and generating employment (Amoah et al., 2021; Ye & Kulathunga, 2019). The role of SMEs in predominantly rural areas, such as Lombok Island, is crucial due to the absence of large-scale industry. Lombok attracted global media attention when the MotoGP world championship was hosted at the Pertamina Mandalika International Circuit for the first time in 2022. Mandalika, located in Central Lombok Regency, Indonesia, is a Special Economic Zone established to enhance the tourism sector on Lombok Island. More than 50% of small industries in Central Lombok are craft-based SMEs that support regional tourism development. The crafts produced are closely related to the local culture. Although SMEs in Central Lombok make a substantial contribution, they face challenges that affect their performance, including market penetration and financial difficulties.

The current global conditions have created high uncertainty. This requires managers or business owners to remain responsive to changes in the dynamic business environment. Emphasising business performance is essential as it reflects an enterprise's achievements or shortcomings. Business performance assessment generally concerns an organization's ability to effectively utilise its resources to accomplish predetermined objectives (Taouab & Issor, 2019). Managers and stakeholders can better understand a firm's accomplishments by assessing performance through a combination of financial and non-financial measurements. The evaluation process performance in SMEs differs from that of larger corporations.

SME achievement is determined by entrepreneurs' cognitive processes, behaviors, and actions (Singh et al., 2013). These cognitive processes can be shaped by cultural values, which may influence individuals' beliefs about their abilities and their confidence levels (Culpepper & Romero, 2017; Meisel et al., 2016). Culture is an essential aspect of organisations because it affects the personal characteristics of entrepreneurs or managers responsible for making financial decisions. Consequently, cultural values affect both financial decisions and firm performance (Yogantara et al., 2025).

Before entering an organisation, leaders internalise values and conventions derived from their family, community, nation, educational system, tribe, and religion, which subsequently shape their behaviour. Culture influences individuals' cognitive and emotional aspects in decision-making (Statman, 2008). It is an important aspect to consider within an organisation, as it influences the personal characteristics of entrepreneurs or managers. Overconfidence is a trait among entrepreneurs and managers (Reyes et al., 2022). Prior research has shown a

relationship between culture and overconfidence (Bhaskar & Thomas, 2019; Cieślik et al., 2018; Culpepper & Romero, 2017; Moore et al., 2018).

Managerial overconfidence can have both positive and negative effects on firm performance. It often leads entrepreneurs to underestimate risks and disregard competition, potentially increasing the likelihood of business failure when accompanied by weak control mechanisms (Gudmundsson & Lechner, 2013). Conversely, it can positively affect business sustainability, as high self-confidence fosters greater ambition in setting targets and motivates managers or entrepreneurs to work harder to achieve their goals (Vitanova, 2021).

According to Behavioral Decision Theory, cultural values and managerial overconfidence affect financial decisions, which in turn influence business performance. A classic issue faced by SMEs concerns capital or funding constraints. The analysis of mediation in behavioural studies is further supported by the framework developed by Baron and Kenny (1986). Therefore, this research proposes that funding decisions mediate the relationship between culture and managerial overconfidence regarding SME performance. Most studies on culture and managerial overconfidence focus on large corporations. This study addresses that gap by examining small and medium-sized enterprises. It contributes to the evolving literature on behavioural finance by exploring how cultural values and overconfidence influence SMEs' performance through the use of debt in funding decisions.

REVIEW OF LITERATURE AND HYPOTHESES

Conventional finance theories posit that individuals are rational (Baker et al., 2018). Nevertheless, reality differs from these assumptions, as individuals are not entirely logical. Studies in behavioural finance show that decision-making is influenced by cognitive biases and limited rationality, leading to deviations from the optimal model proposed by neoclassical finance (Abdeldayem & Sedeek, 2018).

According to Behavioral Decision Theory, decision-making is related to an individual's cognitive processes (Takemura, 2014). Entrepreneurs' cognitive processes may be influenced by their cultural values. Cultural differences lead to variations in perception, expectations, cognitive elements, and emotions. Hence, culture is an essential aspect of financial decision-making (Statman, 2008; Zhou et al., 2022). The fundamental assumption of Behavioural Decision Theory is bounded rationality. In practice, rationality is constrained by limited information, personal motivations, and cognitive capacity. Limited rationality, along with psychological biases and non-standard preferences, affects financial decisions, including funding decisions. The concept of bounded rationality explains that managerial decision-making is limited by biases, cultural values, abilities, and habitual behaviors (Esghaier,

2017). Cultural values shape human behavior and vary across regions. Cultural values also influence the personal characteristics of business leaders. Moreover, culture plays a critical role in dynamic business decisions, where appropriate choices enhance business achievement.

Tastura Culture

The cultural values of a business owner or leader influence their perspective and decisions (Farooq et al., 2020). These values affect individuals' cognitive and emotional dimensions in decision-making (Statman, 2008). Therefore, culture is a crucial factor to consider within a firm, as it shapes financial decisions, which, in turn, determine its outcomes.

Indonesia is known for its cultural diversity, stemming from various ethnicities, tribes, and religions. The cultures of numerous tribes across Indonesia have evolved into forms of local wisdom supported by the local communities. The Central Lombok development concept focuses on protecting environmental quality and cultural values. The majority of Central Lombok's population are descendants of the Sasak tribe. Tatas Tuhu Trasna (Tastura) represents the indigenous knowledge and cultural heritage of the Sasak tribe in Central Lombok and serves as the slogan of Central Lombok Regency.

The majority of preceding articles are written from a macro perspective, with most studies focusing on country-level or overall economy and banking sector analysis. However, research from the user's perspective, such as that from SMEs, remains relatively scarce. This study makes a substantial contribution and presents novel insights from the user standpoint, specifically SMEs, whose numbers remain relatively small, particularly in terms of leveraging unique local genius values to enhance the interaction between financial inclusion and SMEs' financial performance.

Tatas Tuhu Trasna has distinct meanings (Marijo, 2019). Tatas implies a broad perspective and a progressive outlook. Tuhu implies endurance, an entrepreneur's unwavering spirit, and work dynamism. Trasna implies compassion, respect for others, and a willingness to collaborate. In Hofstede's cultural dimensions, Tatas signifies long-term orientation, Tuhu reflects adaptability in the face of uncertainty, and Trasna embodies collectivism. Adaptability in the face of uncertainty reflects the audacity to embrace opportunities and take risks.

Managerial Overconfidence

Overconfidence is the most common and potent cognitive bias in decision-making (Burkhard et al., 2018; Navis & Ozbek, 2016). Overconfident managers tend to overlook competition, underestimate risks, and implement control functions with diminished rigour due to exaggerated self-evaluation (Gudmundsson & Lechner, 2013). Managerial overconfidence is

a distorted impression among company managers who overestimate their capabilities or knowledge (Moore & Schatz, 2017). Malmendier et al. (2023) reconceptualize overconfidence as an inflated assessment of the value a manager believes can be generated. Thus, managerial overconfidence refers to the tendency of managers to overrate their competencies and experiences, thereby exaggerating the organization's potential. Most SME owners in Central Lombok also serve as managers; therefore, managerial overconfidence is inherent among SME owners. Baker et al. (2018) found that SME owners tend to be overconfident, and such proprietors depend more on trade credit and government-supported programs than those who do not exhibit overconfidence.

Funding decisions

Funding decisions concern the choice between debt and owner's equity. These decisions are vital for enterprises, as they determine how they finance operational activities and investments. Balancing debt and equity remains a key challenge for enterprises, as capital structure influences the cost of capital, risk profile, liquidity, and returns (Bajaj et al., 2020). While optimal funding decisions support an ideal capital structure, suboptimal ones may result in financial difficulties (Zhang & Chen, 2017).

Conventional modal structure theories, such as trade-off theory and pecking order theory, assume that managers act as rational agents. These models typically emphasize comparing the costs and benefits of debt versus equity. The pecking order theory posits that internal financing is less costly than debt and external equity, leading firms to prefer internal financing (Zhang & Chen, 2017). However, empirical evidence (Arrieta et al., 2020; Canto et al., 2019; Ishikawa & Takahashi, 2010) shows that many small and medium-sized enterprises in the European Union rely on trade credit and various debt instruments to survive during the global financial crisis.

Lam et al. (2013) propose the norm theory of capital structure, which highlights the relationship between cultural values and funding decisions. The theory posits that managerial norms, shaped by interactions among managers, subordinates, and the surrounding environment, affect funding decisions. Lam et al. (2013) further find that managerial norms have a stronger association with leverage ratios in small firms than in large corporations.

SME performance

Performance measurement is a key element of the control process, enabling management to clarify the enterprise's capabilities. It helps anticipate both internal and external conditions and supports timely decision-making (Taouab & Issor, 2019). Enterprise performance displays a relationship between outcomes and the resources utilised in operations. Therefore, the enterprise's performance must consider the efficiency of resource utilization in production (Nguyen et al., 2021).

Performance measurement can be undertaken using objective and subjective measures. Objective measures typically employ financial ratios derived from financial statements, while subjective measures require managers or financial analysts to evaluate the firm's performance based on their perceptions (Singh et al., 2016). Collecting financial data from the sample entities, particularly SMEs, is often challenging.

In Indonesia, SMEs are not required to conduct audits or disclose financial statements, making it difficult to obtain objective financial data. Non-financial performance is also necessary to assess the company's overall performance. However, obtaining information on non-financial performance, such as market share and development in human resource capabilities, is challenging to extract from a firm's annual reports. Hence, subjective measures provide a practical solution. Singh et al. (2013) show that managers can precisely evaluate their organisation and compare performance with competitors by cross-examining secondary data. Subjective performance measurement, including financial and non-financial indicators, has been used in prior studies to assess SME performance (Hidayati et al., 2021; Palmer et al., 2019; Singh et al., 2013; Sinha & Dhall, 2020).

Hypotheses

Cultural values play an essential role in shaping an individual's behavior. The local culture values adopted by SME owners influence managerial overconfidence. Prior studies confirm the influence of culture on overconfidence (Cieślik et al., 2018; Culpepper & Romero, 2017; Moore et al., 2018). Management practices aligned with cultural values influence the decision-making processes of business owners or managers (Gaganis et al., 2019). For example, Culpepper and Romero (2017) show that Chinese cultural values shape decision-making within the Chinese community.

Prior research (Farooq et al., 2020; Mogha & Williams, 2021) confirms the role of culture in funding decisions, whereas Antonczyk and Salzmann (2014) show that a firm's choice of external funding is influenced by overconfidence-related behavioural biases stemming from cultural differences. Ultimately, the local cultural values in which managers are raised affect their attitudes and behaviours.

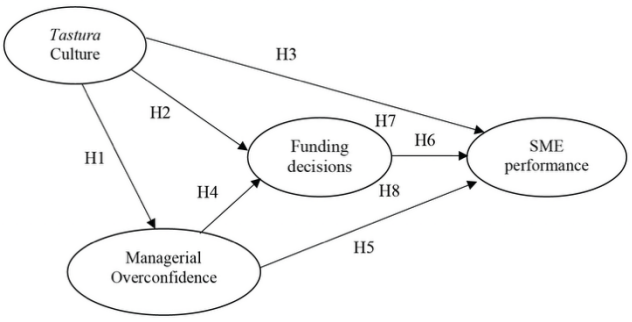
Superior cultural values may enhance firm performance (Farooq et al., 2020). Managers act with the expectation of achieving a greater strategic benefit. The local cultural values adopted by enterprise leaders shape a mental framework that guides reasoning and responses to stimuli from the business environment. Cross-cultural studies demonstrate the effect of culture on firm performance (Boubakri et al., 2017; Farooq et al., 2020; Gaganis et al., 2019). The Tastura culture, a local culture of Central Lombok, may influence the performance of local craft SMEs.

The cognitive style of managers, particularly managerial overconfidence, helps managers gather information and knowledge that guide the organisation toward creative performance, which can determine the company's future growth and success (Kouaib et al., 2022). Excessive self-confidence leads managers to believe they can realise their ambitions, motivating them to work harder to achieve their goals. Their knowledge and experience are beneficial in identifying trends and opportunities to sustain or improve firm performance. Prior studies have confirmed the advantageous effects of managerial overconfidence on firm performance (Kim et al., 2022; Kim & Jang, 2021; Mundi & Kaur, 2019; Reyes et al., 2022; Salehi & Moghadam, 2019; Vitanova, 2021).

Behavioral Decision Theory (Becker & McClintock, 1967; Slovic et al., 1977) clarifies the interplay between cultural values, managerial overconfidence, funding decisions, and business performance. According to this theory, SME owners' values and managerial overconfidence influence funding decisions, which, in turn, affect business performance.

The mediation analysis is supported by the model developed by Baron and Kenny (1986). Behavioral Decision Theory justifies positioning funding decisions as a mediating variable that explains the indirect effect of Tastura culture and managerial overconfidence on SME performance. A persistent challenge for SMEs is access to capital. Overconfident managers often opt for higher debt levels (Esghaier, 2017; Hackbarth, 2008; Jude & Adamou, 2018; Malmendier et al., 2023; Mefteh & Oliver, 2010). Although debt financing entails greater risk than equity financing, overconfident managers are more inclined to take such risks, making debt a preferred funding source. This study highlights funding decisions as the mechanism bridging the influence of organisational culture and managerial overconfidence on SME performance.

Figure 1
Research Model



Source: Own elaboration.

H_1: Tastura culture significantly affects managerial overconfidence.
H_2: Tastura culture significantly affects the use of debt in funding decisions.
H_3: Tastura culture significantly affects SME performance.

H_4: Managerial overconfidence positively affects the use of debt in funding decisions.
H_5: Managerial overconfidence positively affects SME performance.
H_6: The use of debt in funding decisions positively affects SME performance.
H_7: The funding decisions can mediate the effect of the Tastura culture on SME performance.
H_8: The funding decisions can mediate the effect of managerial overconfidence on SME performance.

RESEARCH METHODOLOGY

This study was conducted on 140 SMEs in the handicraft industry of Central Lombok, one of the region's leading sectors. The flagship products include woven fabrics and songket, rattan, ketak, and bamboo weaving, silver crafts, and pottery. The research participants were owners of handicraft SMEs who also acted as managers. Data were collected through questionnaires distributed to the sample group in 2023.

The Tastura culture questionnaire was developed through in-depth interviews and focus group discussions (FGD). In-depth interviews were conducted with two community figures who understand Tastura culture, focusing on its values in relation to business aspects. Tastura culture is treated as a unidimensional variable. Findings from the interviews indicate that Tatas Tuhu Trasna (Tastura) represents an inseparable unity, although each word carries its own meaning.

The FGD was conducted in Praya City on Thursday, August 3, 2023, involving community leaders, government officials, management experts, and SME owners. The FGD aims to confirm the indicators of the Tastura culture. The participants reached an agreement on the Tastura culture construct instrument, which consists of twelve indicators.

Business performance of SMEs includes both financial and non-financial performance. Funding decision refers to the decision made by the SME owner or manager to utilise loan financing. The SME performance questionnaire was developed based on studies of Hidayati et al. (2021) and Palmer et al. (2019). Managerial overconfidence reflects the perception among SME owners or managers who are highly self-assured and believe they possess above-average abilities in the use of debt and in firm performance. Self-assessment surveys were employed, requiring SME owners or managers to rate their confidence levels to capture these subjective perceptions. Funding decisions serve as a mediating variable that bridges Tastura culture and managerial overconfidence with SME performance.

The managerial overconfidence and the funding decisions questionnaire were developed based on prior research by Hidayati et al. (2018). The constructs of the research model were

measured using a 7-point semantic differential scale. A pilot test was conducted by distributing a questionnaire to 35 SME owners outside the sample group. The purpose of the pilot test was to assess the validity and reliability of the Tastura culture construct before distribution to actual respondents, using SPSS for analysis. We applied PLS-SEM to analyse the data from the sample group. The first step was to confirm the measurement scale by testing indicator validity and construct reliability. The second step was to assess the structural model, which explains the relationship among Tastura culture, managerial overconfidence, funding decisions, and SME performance.

RESULTS

In the pilot test, validity was tested using Pearson product-moment correlation, while reliability was tested using Cronbach's alpha. The validity test results indicated that three items of the Tastura culture were invalid, as their correlation values were $r < 0.325$ and their p-values were> 0.05. These invalid items were prudent and disciplined in financial management and maintained good relationships with government agencies. Consequently, 9 items were considered as valid indicators of the Tastura culture construct. The Cronbach's alpha coefficient for the nine items was 0.802, exceeding the threshold of 0.7, indicating that the Tastura culture construct is reliable.

In PLS, validity is assessed through convergent validity. For reflective constructs, convergent validity is evaluated by the outer loadings of their indicators. An indicator is considered valid if its outer loadings exceed 0.708 (Hair et al., 2019). Table 1 shows that all indicators have outer loading values > 0.708, confirming their validity.

Table 1
Experts agree on the validity of the content of the Catur Purusa Artha culture

No	Indicator
1	The importance of adequate knowledge and insight
2	Innovation is driven by trends
3	Prudence in financial management
4	Improving human resource capabilities
5	Working hard to achieve targets
6	Considering customer feedback
7	Discipline in financial management
8	Dare to take risks to increase profits
9	Maintaining good relationships with government agencies
10	Cooperating with suppliers and other industry members
11	Paying attention to employee welfare
12	Maintaining good relationships with customers

Source: Own elaboration

Reliability in PLS is assessed by comparing Cronbach's alpha and composite reliability values, both of which should exceed 0.7 (Hair et al., 2019). As shown in Table 2, all constructs have Cronbach's alpha and composite reliability values above 0.7, with composite

reliability consistently higher than Cronbach's alpha. This confirms the reliability of the Tastura culture, managerial overconfidence, funding decisions, and SME performance constructs. In addition, the average variance extracted (AVE) values for all constructs exceed 0.50, thereby meeting the validity criteria.

Table 2
Indicator Loadings

Construct	Indicator	Outer Loadings
Tastura Culture	The importance of adequate knowledge and insight	0.869
	Innovation is driven by trends	0.754
	Improving human resource capabilities	0.766
	Working hard to achieve targets	0.853
	Considering customer feedback	0.719
	Dare to take risks to increase profits	0.770
	Cooperating with suppliers and other industry members	0.755
	Paying attention to employee welfare	0.863
	Maintaining good relationships with customers	0.835
Managerial Overconfidence	overconfidence in the ability to manage a business	0.774
	overconfidence in the ability to seize opportunities	0.723
	overconfidence in the ability to pay debts and interest expenses	0.850
	overconfidence in the ability to increase sales	0.905
	overconfidence in the ability to increase profits	0.847
Funding decisions	Debt financing support business financial condition	0.762
	The benefits of debt surpass the risks	0.725
	Prudence in financial management	0.734
	Debt enhances productivity and discipline	0.825
SME performance	Sales growth	0.952
	Profit growth	0.862
	Develop new products	0.930
	The increase of market share	0.917
	Human resource development	0.721

Source: Smart PLS results.

The SRMR value of our research model is 0.074 (below 0.08), indicating that the model meets the criteria for goodness of fit. The coefficient of determination (R2) for management overconfidence is 0.625, indicating that 62.5% of its variance is explained by the Tastura culture. The R-square for funding decisions is 0.458, implying that Tastura culture and managerial overconfidence account for 45.8% of the variance in funding decisions. The R-square of SME performance is 0.319, indicating that the Tastura culture, managerial overconfidence, and funding decisions explain 31.9% of SME performance.

Hypothesis testing in SmartPLS uses bootstrapping. In our research, the value of α is set at 0.05. Therefore, the hypothesis is accepted if the p-value is < 0.05 and the t-statistic >1.96. The results in Table 3 show that the t-statistic for hypothesis 1 is 20.831. The significance of H1 is further supported by a substantial effect size (f2) of 1.668. An effect size > 0.35 signifies a strong relationship between the exogenous and endogenous variables (Hair et al., 2019). The Tastura culture exhibits an intense beneficial relationship with managerial overconfidence:

Table 3 shows that the t-statistic for hypothesis 2 is 3.012 with a p-value of 0.003. This confirms that the Tastura culture has a significant positive direct effect on funding decisions, thus H2 is accepted. Conversely, hypothesis 3 is rejected because the t-statistic value is < 1.96, indicating that the relationship between the Tastura culture and SME performance is unsupported.

Table 3
Construct reliability and validity

Variable	Cronbach's Alpha	Composite Reliability	AVE	R-Square
Tastura Culture	0.929	0.941	0.640	
Managerial Overconfidence	0.879	0.912	0.676	0.625
Funding decisions	0.760	0.847	0.582	0.458
SME performance	0.925	0.930	0.775	0.435

Source: Smart PLS results.

Table 4
Hypothesis Testing

Hypothesis	Direct / Indirect Path	Path Coefficient	P-value	T-statistic	Empirical remark
H_1	*Tastura* culture => Managerial overconfidence	0.791	0.000	20.831	Supported
H_2	*Tastura* culture => Funding decisions	0.345	0.003	3.012	Supported
H_3	*Tastura* culture => SME performance	0.022	0.843	0.198	Not Supported
H_4	Managerial overconfidence => Funding decisions	0.370	0.001	3.342	Supported
H_5	Managerial overconfidence => SME performance	0.404	0.000	4.022	Supported
H_6	Funding decision => SME performance	0.303	0.001	3.451	Supported
H_7	*Tastura* culture => Funding decisions => SME performance	0.104	0.042	2.034	Supported
H_8	Managerial overconfidence => Funding decisions => SME performance	0.112	0.010	2.575	Supported

Source: Smart PLS results.

The t-statistics for hypotheses 4 and 5 exceed 1.96, indicating that Managerial overconfidence exhibits a favourable direct effect on funding decisions and SME performance. Hypothesis 6 is supported, as the t-statistic of 3.451 (> 1.96) indicates that funding decisions have a significant, beneficial direct effect on SME performance. Hypothesis 7 is accepted, with a t-statistic > 1.96, suggesting that Tastura culture indirectly affects SME performance through funding decisions. Moreover, the indirect effect of managerial overconfidence on SME performance (H8) is supported by its t-statistic and p-value.

DISCUSSION

The findings show that the Tastura culture significantly affects managerial overconfidence (H_1). This aligns with the research outcomes of Culpepper and Romero (2017), Cieślik et al.

(2018), and Bhaskar and Thomas (2019). The handicrafts produced by SMEs in Central Lombok are closely related to the local culture. For instance, Central Lombok's woven fabrics feature distinctive, meaningful motifs passed down through generations. Craft SMEs owned by the Sasak tribe incorporate local cultural values and the Tastura culture in their business practices. The Tastura culture thus plays a crucial role in developing the overconfidence of craft SME business leaders.

The results of PLS–SEM indicate that the Tastura culture significantly affects funding decisions (H2), positively influencing the use of debt as a funding source. This result supports the findings of Culpepper and Romero (2017), Farooq et al. (2020), and Mogha and Williams (2021). It demonstrates that SME owners are willing to take risks to boost business profits, while also working hard to achieve targets.

The decision to use debt to increase working capital reflects this risk-taking attitude. SME owners perceive debt as facilitating productive activities, where its benefits outweigh the risks. Debts also foster greater caution in managing cash and motivate owners to be more productive and disciplined. The combination of diligence and prudent financial management helps mitigate default risk, thereby enabling debt to facilitate business growth. Hence, the Tastura culture enhances the tendency to rely on debt as a source of finance.

Managerial overconfidence positively affects the use of debt in funding decisions (H4), consistent with prior research (Esghaier, 2017; Hackbarth, 2008; Malmendier et al., 2023; Mefteh & Oliver, 2010). Excessive confidence in managing a business, settling debts, seizing business opportunities, and enhancing sales and profits encourages craft SME owners to utilise debt as a funding source. They act as dependable leaders in managing their business operations and strive to meet capital needs to sustain continuous production. When enterprises expand production capacity, working capital requirements increase. If equity is insufficient, debt becomes a viable alternative. Consequently, overconfident craft SME owners are more likely to choose debt financing.

Managerial overconfidence positively affects SME performance (H5). The personality traits of managers as decision-makers influence organizational outcomes (Kouaib et al., 2022). Small and Medium Industries typically have a simpler organizational structure than corporate entities, with owners frequently assuming managerial roles. Consequently, managerial overconfidence, as an entrepreneurial trait, affects organizational performance.

The findings of our study confirm prior studies (Kim et al., 2022; Kim & Jang, 2021; Mundi & Kaur, 2019; Reyes et al., 2022; Salehi & Moghadam, 2019; Vitanova, 2021). Managerial overconfidence can enhance entrepreneurs' resilience, particularly during crises (Puerta et al., 2023). High self-confidence drives craft SME owners to believe they can achieve their

goals, motivating them to improve business performance. Accordingly, managerial overconfidence encourages persistence in business development and positively influences firm performance.

The use of debt in funding decisions positively affects SME performance (H6). This finding aligns with studies by Zhang and Chen (2017), Cole and Sokolyk (2018), Ramli et al. (2019), Farooq et al. (2020), and Suroso et al. (2021). Our study highlights the significance of the funding decisions in small enterprises, particularly craft SMEs. Adequate cash availability facilitates the enterprise's activities, enabling organisations to generate and increase earnings. When craft SMEs deplete their financial resources, they seek external funding. Appropriate debt utilisation, along with prudent cash management, can enhance SME performance.

Tastura represents a cultural heritage encompassing the values, perspectives, and wisdom of Central Lombok society. However, because Tastura culture is abstract and not specifically designed for business organizations, it does not directly enhance the performance of craft SMEs in the region (H3). The results align with those of Ifada et al. (2019), Utomo and Budiastuti (2019), and Stasa Ouzký and Machek (2024).

Utomo and Budiastuti (2019) found that the influence of culture on firm performance is mediated by firm competitiveness; meanwhile, Stasa Ouzký and Machek (2024) demonstrated that culture has an indirect effect on firm performance through social capital. According to Behavioral Decision Theory, the cultural values adopted by SME owners and managers influence funding decisions, which in turn affect performance. While Tastura values are embedded in organizational practices, their impact on company performance remains limited. Thus, appropriate strategies are required to achieve optimal results. Furthermore, cultural values are not the sole determinants of performance, as external factors such as industry competition and global market dynamics also play a significant role.

The relationship between Tastura culture and business performance is complex and requires the presence of mediating factors. Funding decisions made by SME owners are a crucial aspect of financial management that enhances firm performance. Our findings indicate that funding decisions mediate the impact of the Tastura culture on SME performance (H7). Tastura's values emphasize mentality, diligent work behavior, and dedication to maintaining harmonious stakeholder relationships, which shape funding decisions and, in turn, influence performance. Cultural values are foundational to institutional frameworks and financial decision-making in different countries.

Our research findings confirm that funding decisions can mediate the impact of managerial overconfidence on SME performance in Central Lombok (H8). The considerable direct and indirect effects of managerial overconfidence on performance indicate partial mediation.

Overconfidence influences decision-making regarding the utilisation of debt as a funding source for production and investment activities, thereby affecting business performance. As a result, this study contributes to behavioural finance research in small and medium enterprises by examining how funding decisions mediate the influence of Tastura's cultural values and managerial overconfidence on enterprise performance.

Managerial overconfidence is a behavioral trait observed across cultures but expressed differently depending on societal norms, tolerance for uncertainty, and risk preferences. The behavioral variations can lead to significantly different performance outcomes across national contexts. The international relevance of this study becomes increasingly important in the context of globalization and the strengthening economic integration, where SMEs play a strategic role in economic growth and job creation in many countries.

CONCLUSIONS

This study develops a new research instrument to examine the link between Tastura culture and managerial overconfidence, funding decisions, and SME performance. The result demonstrates a positive relationship between Tastura culture and managerial overconfidence toward the use of debt as the funding source. Funding decisions also positively affect SME performance. Tastura culture does not directly affect SME performance; instead, funding decisions fully mediate its influence, as the direct relationship is insignificant. Additionally, funding decisions partially mediate the impact of managerial overconfidence on SME performance.

This study provides empirical evidence that enriches Behavioral Decision Theory by demonstrating the mediating role of funding decisions in connecting local cultural values and managerial overconfidence to firm performance. However, this study is limited to the local cultural context of the research sample in Central Lombok. This is important because the unique cultural characteristics and economic structure in Lombok may limit the generalizability of these findings to other regions or to different national and international contexts. Therefore, future research is recommended to expand the scope of the study to other areas of Indonesia with different cultural characteristics, such as Java, Sumatra, or Papua, to test the consistency of the relationship between cultural values, funding decisions, and SME performance.

Cross-country research is also essential, particularly in developing and developed countries that exhibit significant differences in cultural values, financial institutional structures, and the maturity levels of SMEs. By comparing results across countries and sectors, future research can make important contributions to the global debate on how cultural factors

influence SME competitiveness amid market pressures, technological integration, and shifts in economic policy. Furthermore, expanding this study to different industrial sectors—such as manufacturing, technology, or services—can reveal how cultural values interact with sectoral characteristics in influencing funding decisions and business performance.

The results of this study provide insights for SME owners or managers on the crucial role of cultural values in shaping managerial overconfidence and influencing financing decisions, ultimately enhancing firm performance. Additionally, this study offers valuable information for policymakers and financial institutions to establish a craft SME development strategy in Central Lombok that leverages local culture (Tastura) and designs more contextual and responsive interventions to meet entrepreneurs' needs.

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From Hyperglobalization to "New Globalization": Transnational Corporations, Geopolitical Shocks, and Resilient Global Value Chains

De la hiperglobalización a la "nueva globalización": corporaciones transnacionales, shocks geopolíticos y cadenas globales de valor resilientes

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ABSTRACT

Transnational corporations (TNCs) are central to international political economy (IPE), yet their role remains contested amid geopolitical rivalry, economic shocks, and sustainability demands. This integrative review of 264 sources from Web of Science identifies five dominant perspectives in the literature: adverse globalization (critical views of TNC power), global development (TNCs as growth engines), glocal strategies (local adaptation approaches), hyperglobalization (borderless integration), and new globalization (post-2008 reconfiguration emphasizing resilience and new regionalization). These perspectives map onto established IPE theoretical frameworks, ranging from neo-Marxist dependency theory to neoliberal institutionalism, with "new globalization" emerging as the dominant paradigm. The analysis reveals a shift from polarized debates toward recognition of a more segmented, crisis-aware global economy. Persistent research gaps concern climate alignment and Global South perspectives. We derive implications for balanced policy approaches, resilient corporate strategies, and multilateral governance reform.
Keywords: Transnational corporations (TNCs); International political economy (IPE); New globalization; Global value chains; Economic resilience.

Jel Code: F23, F21, F59

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RESUMEN

Las corporaciones transnacionales (CTN) son fundamentales para la economía política internacional (EPI); sin embargo, su papel sigue siendo controvertido en un contexto de rivalidad geopolítica, de crisis económicas y de demandas de sostenibilidad. Esta revisión integradora de 264 fuentes de Web of Science identifica cinco perspectivas dominantes en la literatura: globalización adversa (visiones críticas del poder de las CTN), desarrollo global (CTN como motores de crecimiento), estrategias glocales (enfoques de adaptación local), hiperglobalización (integración sin fronteras) y nueva globalización (reconfiguración posterior a 2008 que enfatiza la resiliencia y la nueva regionalización). Estas perspectivas se integran en marcos teóricos consolidados de la EPI, que abarcan desde la teoría neomarxista de la dependencia hasta el institucionalismo neoliberal, con la "nueva globalización" que emerge como el paradigma dominante. El análisis revela un cambio desde debates polarizados hacia el reconocimiento de una economía global más segmentada y consciente de las crisis. Persisten lagunas en la investigación sobre la alineación climática y las perspectivas del Sur Global. Derivamos implicaciones para enfoques de política pública equilibrados, estrategias corporativas resilientes y reformas de la gobernanza multilateral.

Palabras clave: Corporaciones transnacionales (ETN); Economía política internacional; Nueva globalización; Cadenas globales de valor; Resiliencia económica.

Código JEL: F23, F21, F59

INTRODUCTION

Since the 1960s, numerous international political economy (IPE) scholars have examined how transnational corporations (TNCs) shape political power, economic development, and technology transfer in host countries (Dunning, 1981; Gilpin, 1987; Hymer, 1977; Kindleberger, 1969; Moran, 1983; Strange, 1988; Vernon, 1971). Early debates noted that while foreign direct investment (FDI) can bring capital and know-how, it may also undermine host-state autonomy and create dependency (Hymer, 1977; Madeuf & Michalet, 1978; Vernon, 1971). Over the decades, TNCs have become central actors in globalization, evolving from primarily manufacturing and extractive industries into finance, services, and high-tech sectors. Yet despite extensive literature on TNC impacts, it remains difficult to foresee how their role will adapt amid current global uncertainties and restructuring.

Prior studies tend to focus on particular eras or theories, making it challenging to form a cohesive picture of TNCs' future in the IPE. The present review addresses this gap by synthesizing insights across the literature and identifying five principal interpretive trends regarding TNCs and globalization. In brief, these perspectives range from critical ("adverse globalization") to over-optimistic ("hyperglobalization"), with intermediate views emphasizing development benefits, "glocal" strategies, or an emerging "new globalization" paradigm. The goal is to distill the core arguments of each trend and examine recent revisions (e.g. sustainability and geopolitical factors) that respond to contemporary challenges. By outlining these five trends and their evolution, we provide a clearer understanding of how TNCs' roles are interpreted today and what that implies for the future[2].

[2] To ensure clarity throughout this analysis, we define several core concepts:
TNCs: Enterprises that operate across national boundaries through FDI, subsidiaries, joint ventures, or strategic alliances, maintaining coordinated operations in multiple countries while typically being headquartered in one home country.
IPE: The academic field examining the intersection of politics and economics in global affairs, analyzing how political and economic forces interact to shape international relations, trade patterns, and development outcomes.
Globalization: The process of increasing interconnectedness and interdependence among countries through cross-border flows of goods, services, capital, information, and people, facilitated by technological advances and policy liberalization.
Glocalization: The adaptation of global business strategies to local conditions and cultures, involving the simultaneous pursuit of global integration and local responsiveness in corporate operations.
FDI: Cross-border investment where an entity in one country obtains a lasting management interest (typically 10% or more of voting stock) in an enterprise located in another country, often involving technology transfer and managerial control.

THEORETICAL BACKGROUND: EVOLVING VIEWS ON TNCs AND GLOBALIZATION

Early IPE Scholarship (1960s–1980s)

The initial wave of IPE research on TNCs highlighted the strong international reach of the United States (US) and European multinationals and the mixed consequences for host countries. On one hand, TNCs were seen as conduits for modernization—transferring technology, capital, and managerial skills to developing economies. On the other hand, critical theorists argued that these benefits came at a cost: foreign firms could displace local industries, drain resources, and erode national sovereignty, often reproducing structures of dependency.

Pioneering works by Hymer (1977), Kindleberger (1969), and Vernon (1971) examined why firms invest abroad and warned that oligopolistic corporate expansion might lead to "uneven development" and dependency in weaker states. Mainstream economists like Dunning (1981) formulated the OLI paradigm (Ownership-Location-Internalization) to explain FDI, suggesting that firms expand overseas when they have competitive advantages and find supportive host conditions. Meanwhile, voices such as Susan Strange and Robert Gilpin drew attention to the political influence of TNCs, cautioning that as firms globalize, states could lose some control over their economies (Gilpin, 1987; Strange, 1988).

In France, structuralist thinkers (e.g., Charles-Albert Michalet, 1976) similarly noted that FDI triggers bigger changes than trade alone, bringing an ambivalent mix of modernization and sovereignty concerns. By the 1980s, the consensus was that TNCs are transformative forces in the world economy: they spurred industrial growth in some locales but also exacerbated inequalities and challenged the policy autonomy of host governments. This realization set the stage for new questions about how states and other socioeconomic actors might bargain with or regulate TNCs to maximize gains and minimize harm.

Globalization Ascendant (1990s–2000s)

The post-Cold War era saw a surge of enthusiasm for globalization, accompanied by divergent analyses of TNCs' role in it. Influential commentators proclaimed the emergence of a borderless world economy—for example, Thomas Friedman's notion of a "flat" and frictionless world fueled by global business integration (Friedman, 1999), or Francis Fukuy ama's "end of history," which declared liberal democracy the definitive ideological victor (Fukuyama, 1992).

Many scholars in international business argued that competitive pressures now compel firms to internationalize all facets of their operations, from R&D to production, to stay ahead (e.g., Gerybadze & Reger, 1999). At the same time, comparative political economists introduced the idea of "varieties of capitalism," emphasizing that multinationals remain shaped by their home and host institutions. For instance, Hall and Soskice (2001) showed that TNC strategies differ between liberal market economies and coordinated economies, indicating that local institutional frameworks strongly determine how foreign firms behave.

The concept of "glocalization" also gained notable traction: firms learned to think globally but act locally, adapting products and management practices to fit local cultures while leveraging global efficiencies (Robertson, 1992). Critical perspectives persisted as well. French Regulation School theorists like Alain Lipietz argued that the new era of flexible, offshored production (or "post-Fordism") was not a development panacea; instead, it often perpetuated peripheral dependence and social dislocation, calling for updated regulations to manage recurrent crises (Lipietz, 1985).

Another major shift in this period was the rise of emerging-market multinationals. By the 1990s, companies from East Asia, Latin America, and other developing regions began investing abroad, challenging the North-to-South flow of capital that had dominated earlier decades (Rugman, 2010). For example, the late 1990s Asian boom and China's entry into the World Trade Organization in 2001 led to a wave of Chinese, Indian, and Brazilian firms "going global" (Rugman, 2010).

This global corporate diversification meant that TNC-driven globalization was no longer a one-way projection of Western power; it became a more complex, multipolar phenomenon that deeply restructures socioeconomic balances. In sum, at globalization's high tide (circa 2000), the narrative around TNCs was double-edged. Liberal scholars highlighted how TNCs fostered growth, integration, and innovation worldwide. More skeptical voices pointed to social fallout—sweatshop labor, financial volatility, and widening inequalities—which hinted that globalization under TNC dominance was beneficial but far from universally so (Stiglitz, 2002). These unresolved tensions set the context for the emerging "new globalization" debates of the 2010s.

After 2008: Toward a New Globalization?

The past decade and a half have shaken the previous certainty about ever-deepening globalization. A series of disruptive events—the 2008 financial crisis, a resurgence of economic nationalism (e.g., Brexit, US–China trade war), a global pandemic, and even war in Europe—have exposed the fragility of hyper-integrated markets. Scholars note that the liberal international order led by the US entered a crisis of authority and legitimacy. According to John Ikenberry, the American-led system faces a "crisis of authority" as rising

powers (China and others) contest established rules and demand a greater voice (Ikenberry, 2011). Meanwhile, Dani Rodrik's "globalization trilemma" gained renewed relevance: it posits that deep economic integration, national sovereignty, and democratic politics cannot all coexist fully (Rodrik, 2011).

In practice, the pursuit of "hyper-globalization" in the 1990s–2000s often meant sacrificing domestic priorities, a trade-off that many societies have grown unwilling to accept. Thus, recent literature questions the sustainability of the old model of globalization and explores what a rebalanced model might entail. Some emphasize that new technologies (automation, digital platforms, AI) are transforming globalization rather than reversing it—Richard Baldwin describes a "third unbundling" where telepresence and digital services allow globalization to penetrate even white-collar work (Baldwin, 2012).

Others outline scenarios for the future: for example, one set ranges from "Globalization 3.0" (a cooperative reboot of liberalization) to "Islandization," a fragmented world of regional blocs and protectionism. Strohmer et al. (2020) depict these divergent futures: Globalization 3.0 returning to high trade and growth, as in the early 2000s, versus Islandization, marked by surging nationalism, trade barriers, and a collapse of global supply chains. Other scenarios include new polarization (a bifurcated world with rival blocs) and commonization (unprecedented global cooperation and inclusive growth).

In analyzing current trends, frameworks like the Evolutionary Structural Triptych (EST) suggest that the world economy could evolve along multiple paths, from severe fragmentation to renewed inclusive globalism, with the current trajectory falling somewhere in the middle (Vlados & Chatzinikolaou, 2025). Key features of this emerging "new globalization" include greater caution and contingency planning by firms, more regionalization of trade, and stronger demands for sustainability and resilience. The geopolitical rivalry between the US and China appears to be a major driver: as these superpowers jockey for technological and economic primacy, TNCs find themselves navigating two sets of rules and supply chain networks—effectively a partial decoupling of the global economy (Grosse et al., 2021; Luo & Witt, 2022).

Emerging-market TNCs (especially Chinese firms) now figure prominently in this dynamic, often benefitting from state support and home markets as they expand abroad. At the same time, COVID-19 and other international shocks have taught companies and governments the importance of supply chain resilience (not relying on a single country or supplier) and the need to align business models with broader social goals (Guillén et al., 2022). Both the private sector and policy discourse increasingly invoke the UN Sustainable Development Goals (SDGs) and climate commitments, pressing TNCs to contribute to environmental and social objectives, not just profit (Bull & Miklian, 2019).

In short, today's context points toward a more segmented, crisis-aware globalization in which TNCs remain pivotal but must operate under new constraints and expectations. The rest of this review will examine how the literature reflects these shifts through five distinct perspectives on TNCs in IPE.

METHODOLOGY

We conducted an integrative literature review to capture the full range of perspectives on TNCs in the international political economy (Snyder, 2019). The search (performed in Web of Science, up to January 2023) used broad keywords related to "transnational corporations" and "international political economy" in article titles and author keywords. This yielded an initial pool of academic publications without date restrictions (though the vast majority were post-1980, reflecting the field's growth after the acceleration of globalization). We then screened the results, removing non-peer-reviewed items and clearly unrelated studies based on titles and abstracts. After this filtering, approximately 264 relevant sources were retained for in-depth qualitative analysis.[3]

Using an iterative reading and coding process, we identified common themes and arguments across the literature. Each source was evaluated for its central thesis about TNCs and globalization, and we grouped papers with similar outlooks. This clustering revealed five predominant interpretive trends:

- "Adverse globalization" – emphasizing negative impacts of TNC-led globalization (49 papers).
- "Global development" – emphasizing positive development impacts (32 papers).
- "Glocal strategies" – focusing on how TNCs blend global integration with local adaptation (52 papers).
- "Hyperglobalization" – viewing ever-deepening globalization as inevitable and largely beneficial (67 papers).
- "New globalization" – highlighting a post-2008 reconfiguration of globalization (64 papers).

Each paper was categorized under one (primary) trend, though some spanned multiple themes. We also performed a keyword co-occurrence analysis using VOSviewer to validate these groupings. This bibliometric analysis examined the most frequent terms in article titles, abstracts, and keywords, revealing distinct vocabularies for each cluster.

[3] Figures in Appendices 1 and 2 show the selection protocol and the terms investigated, respectively.

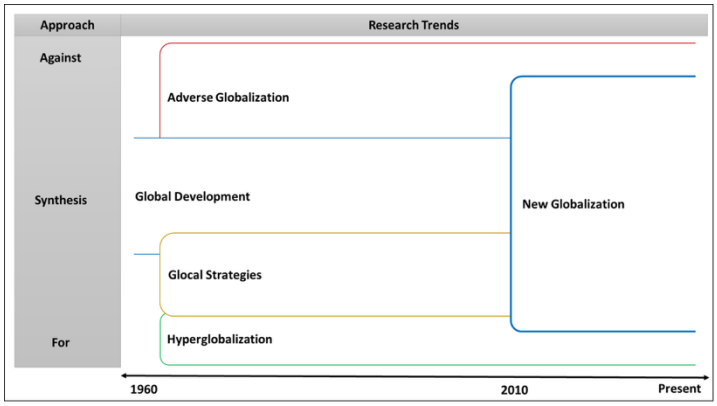
The five clusters corresponded closely with our qualitative classification, lending confidence in the robustness of the identified trends. For instance, papers in the adverse globalization group used terms such as "inequality," "human rights," and "neoliberalism," whereas glocal strategy papers used terms such as "management," "localization," and "capabilities." Across all clusters, certain concepts, such as "crisis," "FDI," and "entrepreneurship," appeared frequently, indicating shared concerns. In contrast, terms related to climate change or regionalization were notably scarce, suggesting gaps in the current literature.[4]

In what follows, Section 4 presents the five trend areas in detail, synthesizing representative studies and arguments for each perspective. Section 5 then discusses how these perspectives relate to one another, to emerging issues (sustainability, geopolitical shifts), and to different practical and policy implications. Finally, the conclusion (Section 6) summarizes key takeaways and directions for future research.

RESULTS: FIVE INTERPRETIVE TRENDS IN THE LITERATURE

Through our analysis, the literature on TNCs and IPE can be understood as five broad interpretive frameworks or "stories." Each presents a different evaluation of globalization's effects and TNCs' behavior, often grounded in particular theoretical traditions. In this section, we outline each trend, highlighting its core arguments and key supporting evidence from the literature (Figure 1).

Figure 1
The Spectrum of IPE Theories on TNCs



Source: Own elaboration.

[4] Figures in Appendices 3–5 provide supplementary bibliometric information: the distribution of reviewed papers by journal (App. 3), the chronological trend of publications (App. 4), and a keyword frequency table (App. 5). The full list of the papers analyzed can be found at: doi.org/10.5281/zenodo.17221237

Adverse Globalization: Critique of Neoliberal TNC Power

This perspective views globalization as driven by TNCs under neoliberal policies, as a fundamentally unequal and destabilizing process (Bartley, 2018; LeBaron, 2015; Lee & Lee, 2015; Sprague, 2009). Scholars in this camp argue that, left to their own devices, TNCs prioritize profit at the expense of workers, communities, and the environment (Bartley, 2018; Dios & Cosenza, 2019; Etzioni-Halevy, 2002; Latham & Beaudry, 2001; LeBaron, 2015; Lee & Lee, 2015; Sprague, 2009). They paint globalization as a juggernaut that exacerbates and reproduces inequalities within and between countries (Steingard & Fitzgibbons, 1995).

Empirical examples often cited include the "race to the bottom" in labor and environmental standards and the recurrence of financial crises provoked by unregulated capital flows. The speculative actions of TNCs often lead to their quick exit from markets at the initial signs of instability—this was clearly evident during the Asian financial crisis (Kwon & Pohlmann, 2018). Many critics argue that multinationals promote and sustain crony capitalism, which destabilizes economic growth in developing countries (Yeganeh, 2019).

The 2008 global financial crisis is seen as a direct result of the excessive speculation and irresponsible actions of these corporations, which prioritize profit over people's welfare and ecological sustainability. In this context, although not directly caused by TNCs, the US subprime mortgage crisis exemplifies the disastrous effects of corporate greed (Baud & Durand, 2012; Boussebaa & Faulconbridge, 2019).

A recurring claim is that TNCs wield structural power over states, pressuring governments (especially in the Global South) to adopt business-friendly policies or face capital flight. The result can be a loss of policy autonomy, where countries compete to offer tax breaks, lax regulations, or cheap labor to attract or retain investment. Several studies document cases of TNCs influencing national policies in their favor—from mining companies shaping environmental laws to pharmaceutical giants impacting public health regulations—often to the detriment of local populations (Bartley, 2018; Etzioni-Halevy, 2002; LeBaron, 2015). Even purported "mitigating" mechanisms, such as Corporate Social Responsibility (CSR), are treated with skepticism here.

The false image of CSR only serves to further this agenda, masking the harmful practices of these corporations (Bartley, 2018; Dios & Cosenza, 2019; Etzioni-Halevy, 2002; LeBaron, 2015). They point to ongoing labor abuses in global supply chains as evidence that voluntary corporate codes often lack teeth. In short, the adverse globalization trend portrays TNCs as agents of a neoliberal globalization project that has entrenched disparities and vulnerabilities. It calls for stronger checks on corporate power—from global governance reforms to local resistance movements—to protect public interests. As a result, authors call for increased

activism and advocacy to challenge the actions of these corporations and work towards creating a more equitable and sustainable world (Latham & Beaudry, 2001).

Global Development: TNCs as Engines of Growth and Integration

In sharp contrast to the above, the global development perspective highlights the positive contributions of TNCs to host economies, especially when appropriate policies are in place. In this analytical perspective, the liberalization of international trade and business is generally considered beneficial for global human welfare (Dogan, 2010).

This largely liberal view sees FDI and global business integration as catalysts for development, helping to raise incomes (improving living standards) and diffuse innovation worldwide. Research indicates that FDI leads to wage increases and does not reduce employment in host countries (Tomohara & Takii, 2011; Yamashita & Fukao, 2010). Additionally, TNCs are thought to positively influence local skills in lower-income countries over the long term (Head & Ries, 2002). Establishing TNCs in a host country involves a complex, multifactorial process influenced by governmental goals to draw their technological capabilities (Dunning, 1994). For instance, studies on the growing role of emerging economies in globalization illustrate how these nations initially attract FDI and gradually develop internal comparative advantages, which lead to the formation of more TNCs (Rugman, 2010).

According to this perspective, TNCs are crucial in transforming production, distribution, and consumption in host countries. They bring with them the latest technologies, innovative production methods, and access to vast international markets, which can contribute to upgrading the host country's production capabilities and competitiveness (Buckley, 2006; Krueger, 2008; Schuh, 2007). Multinationals are vehicles for transferring modern technologies and business practices across borders: they introduce new products, more efficient processes, and managerial know-how that can "spill over" as local companies learn and adapt.

Beyond wages and productivity, global-development scholars argue that TNCs can promote higher standards over time. Many multinational enterprises bring stricter safety or quality controls and can disseminate norms on issues like workplace safety, diversity, or environmental protection. Openness in international trade has been shown to reduce child labor (Neumayer & De Soysa, 2005), while multinationals are increasingly prioritizing ethical and sustainable human development (Lozano & Boni, 2002). Technology transfer through R&D can also foster cross-spatial innovation linkages and improve global innovation systems in the long run (Reddy, 1997).

The global development view does acknowledge caveats: benefits are not automatic and depend on complementary international, national, and local policies. If host governments build effective institutions—investing in education, enforcing reasonable regulations, negotiating fair terms with investors—then TNCs can be harnessed for development. Overall, "global development" shows that while TNCs contribute to economic advancements in host countries, the benefits could be uneven and often accompanied by high social and environmental costs. However, when the host country has favorable institutions and the right policies in place, TNCs can play a crucial role in promoting economic growth and improving the standard of living.

Glocal Strategies: Transnational Corporations "Think Global, Act Local"

The glocal strategies perspective shifts attention from macro-level outcomes to the strategic behavior of TNCs themselves. This trend sheds light on the concept of glocalization and its impact on TNCs. As described in the theoretical background, glocalization involves balancing economic homogeneity at the global level with extensive, reproducible socioeconomic heterogeneity at the local level in the context of globalization. This relationship is deemed both inevitable and dialectical, necessitating that TNCs strike a balance between universalization and localization in their operations—as discussed by scholars such as Applbaum (2000), Chuang et al. (2011), Giulianotti and Robertson (2004), and Shenkar (2004).[5]

The importance of TNCs incorporating glocal strategies into their operations is a recurring theme in this trend. This includes being aware of the implications of glocalization for their CSR, which requires a comprehensive understanding of national institutions and the development of a corporate image aligned with local variations (Gjolberg, 2009; Millar & Choi, 2010; Wrigley et al., 2005). Additionally, the internationalization of TNCs' R&D activities is emphasized, with a need for compliance with national labor laws—as highlighted by Beret et al. (2003).

One key aspect is local talent and management: globally successful firms tend to hire local managers who understand the culture and can navigate host-country institutions, rather than relying solely on expatriates in leadership. The recruitment and active integration of local managers are identified as key glocal strategies for TNCs. This approach is deemed essential because local managers bring both human capital and a thorough understanding of the host country, enabling TNCs to effectively balance the forces of globalization and localization and align their operations with the host country's unique cultural and institutional contexts (Millar & Choi, 2010).

[5] In practice, this approach views global dynamics as a conflictual yet integrative process that perpetuates heterogeneity while constantly reshaping homogenizing forces worldwide (Vlados, 2004).

Furthermore, the glocal perspective notes that TNCs can foster local embedment by forming partnerships with domestic firms and suppliers. Instead of simply importing their entire value chain, many successful entrants build local supply networks, which both ingratiate them with host governments (through job creation) and reduce costs through local sourcing. The literature highlights organizational innovations that support glocal strategies: matrix structures that allow local units some autonomy; cross-border teams that share knowledge across subsidiaries; and regional headquarters that coordinate clusters of country subsidiaries.

A study found that many multinationals have set up regional management centers to manage regional adaptation more effectively, rather than managing each country from a single global HQ (Arregle et al., 2016). Overall, in the realm of "glocal strategies," the focus is on how TNCs dynamically combine and harmonize global operations with local realities. This strategy is vital for TNCs to enhance their international competitiveness while adhering to local cultures and regulatory frameworks.

Hyperglobalization: Triumph of Global Capital and the Borderless World

The hyperglobalization perspective represents the high-water mark of enthusiasm for an integrated world economy led by TNCs. This research trend is characterized by the belief that globalization will continue to deepen, driven by the uninterrupted expansion of TNCs (Vahlne et al., 2018). According to this outlook, nation-states and borders were becoming increasingly irrelevant in the face of global market forces and technological connectivity. TNCs were the protagonists of this story, extending supply chains and capital flows across the globe and knitting countries into a single economic space.

These corporations are believed to promote global visions (Robbins, 2004) and undertake offshoring activities for their survival, leading to an inevitable deepening of globalized R&D (Coucke & Sleuwaegen, 2008). A key finding of this research is that dominant central coordination of smaller global centers is more critical than full decentralization, and multinationals are seen as critical drivers of this trend (Athukorala & Kohpaiboon, 2010; Gerybadze & Reger, 1999; Liu & Uzunidis, 2021). From an academic standpoint, hyperglobalization echoes an extreme form of neoliberal economic thought: it emphasizes the efficiency gains of globalization and assumes that capital, goods, and knowledge will flow to wherever they are most productive, benefiting all in aggregate.

TNCs, in this view, drive innovation and growth by allocating resources globally. Offshoring and outsourcing are portrayed not as evils but as rational responses to cost differences—allowing consumers to enjoy cheaper products and companies to reinvest savings into innovations. Ultimately, this view holds that global dynamics are driven by an irreversible homogenizing force centered on the transnational corporation.

However, the concept of hyperglobalization is not without its criticisms and challenges. A central concern is its heterogenizing effect on national democracies, as the widespread diffusion of information technologies can undermine the authority of governments and institutions, giving rise to diverse forms of "hybrid capitalisms" (Devinney, 2011).

Another issue is the impact of globalization on labor, as TNCs may exploit lower wages and weaker labor laws in developing countries, leading to exploitation and reduced opportunities for workers in developed countries (Devinney, 2011). In addition, the potential for global labor union coordination raises questions about the balance of power between corporations and workers, and the role that governments and international organizations can play in ensuring fair and equitable outcomes (Wills, 1998).[6]

Overall, "hyperglobalization" is marked by a firm commitment to accelerating global integration, primarily driven by TNCs. Research in this field has traditionally highlighted the advantages of expanding global networks but often overlooks how they may sustain various socioeconomic, cultural, and political barriers and conflicts in the expansion and intensification of globalization structures.

New Globalization: Fragmentation, Resilience, and Rebalancing

The final trend, which has gained prominence in the literature of the 2010s and early 2020s, can be termed "new globalization." This trend focuses on the crucial understanding required to grasp the ongoing transformation of globalization. The 2008 financial crisis was undoubtedly a crucial turning point, signaling a shift from the previously established form of globalization to a new form; however, the specific crisis that initially manifested in 2008 should not be perceived as the cause but as an exacerbation of a broader maturation process that ultimately leads to the formation of a new globalization.

Rather than expecting a return to 1990s-style business as usual, advocates of the new globalization thesis argue that we are entering a qualitatively different phase—one characterized by strategic economic integration, greater state intervention, and a realignment of TNC strategies in response to recent crises. TNCs must recognize this change and devise strategies that align with the evolving global socioeconomic landscape, which is characterized by the growth of developing nations and increased regionalization (Toporowski, 2010).

A key observation is the phenomenon of deglobalization or slowbalization: metrics like "world trade/gross domestic product" and cross-border investment flows have plateaued or

[6] This school of thought downplays the enduring diversity of capitalism, frequently miscasting it as the "end of history" (Fukuyama, 1992).

declined relative to global output since around 2010. In recent times, the idea of deglobalization has gained significant attention, with protectionist forces leveraging it to resist further global interconnectivity and accusing TNCs of being both the cause and targets of anti-globalization sentiments (Petricevic & Teece, 2019; Prashantham et al., 2018; Witt, 2019).

A substantial portion of this body of literature explores how TNCs are adapting to the new form of globalization. According to Buckley and Hashai (2020), anti-globalization policies can impede the transfer of complex technological knowledge by limiting the international flow of intellectual property. As a result, TNCs must formulate strategies that consider the increased local control costs imposed by these restrictions. Additionally, Grosse et al. (2021) argue that multinationals should prioritize managing the risks generated by policy shifts linked to the rise of China and other BRICS economies (Brazil, Russia, India, China, South Africa), rather than focusing solely on cost-efficient global supply chains.

Given these developments, TNCs need to recognize that the global environment is increasingly oriented toward sustainability and inclusion, in response to rising volatility and uncertainty—trends reinforced by policies in the Global South that aim to secure a more balanced role in global governance institutions (Aguiar & Micussi, 2022; Bull & Miklian, 2019). To effectively manage their operations and align with local market conditions in the emerging new globalization, TNCs might establish regional headquarters or subsidiaries in various regions (Arregle et al., 2016; Berrill & Hovey, 2018).

This strategy responds to the growing instability in the global economy and the declining effectiveness of traditional international institutions, such as the World Trade Organization and the International Monetary Fund (IMF), in enforcing rules (Kobrin, 2017). It demands a thorough understanding of the developing "new regionalization" (de la Torre et al., 2011).

The literature on emerging economies, particularly China, indicates a growing division in the global economy between a rather "strict-rule bloc" centered around China and a "market-driven democratic bloc." Additionally, the trade war between the US and China exacerbates these difficulties for TNCs, even though both nations benefit from sustaining an open economic environment (Grosse et al., 2021). Luo and Witt (2022) observe that TNCs' expansion strategies are influenced by external pressures, such as increased deglobalization. This trend significantly hinders their ability to secure global resources, especially for those operating within China or in countries considered to be Chinese allies.

The interdependence fostered by TNCs, coupled with rapid technological advancements, the expansion of global production networks, and the critical need for cross-border information sharing, renders complete security and self-sufficiency unattainable in today's globalized

world (Thangavel et al., 2022). A return to pre-globalization times is not possible (Contractor, 2022). Thus, TNCs must be prepared to navigate the challenges posed by a volatile and uncertain new global economy. To do so effectively, a shift in perspective is necessary in how international business is viewed and studied. This new perspective should consider the internal and external organizational environment in a dynamic, interdisciplinary manner (Teece, 2022).

In sum, the "new globalization" trend indicates a movement towards a more fragmented, geopolitically readjusted, and regionally refined global economic system. This new global context is driven and shaped by crises like the 2008 financial meltdown and other disruptive events, which are merely the visible effects of the deeper evolutionary saturation of the previous globalization phase.

DISCUSSION

Integrating the Five Perspectives in Theoretical Context

The five interpretive trends can be mapped onto a spectrum of classic IPE theories, ranging from critical neo-Marxist stances (adverse globalization) to liberal/neoliberal positions (hyperglobalization), with hybrid approaches in between. This spectrum reflects enduring IPE debates over the relationship among capital, the state, markets, and society, and between private and public interests.

At the critical end of the spectrum, adverse globalization draws heavily on dependency theory and world-systems analysis. Scholars such as Stephen Hymer and later neo-Marxist thinkers argued that TNCs foster dependent development, in which host economies expand in distorted ways that ultimately reproduce underdevelopment and subordination to foreign capital (Hymer, 1977; Vlados, 2019).

The emphasis on inequality, loss of sovereignty, and the call for radical change (even deglobalization) harks back to the works of thinkers such as Andre Gunder Frank or Samir Amin, who viewed multinational corporations as agents of neo-imperialism (Amin, 1976; Frank, 1966). Susan Strange's concept of structural power (that markets can dictate terms to states) also resonates strongly here (Strange, 1988). Essentially, the anti-globalization camp situates itself within the Marxian/critical tradition, suspicious of capitalist globalization and highlighting its contradictions.[7]

[7] Notably, other schools of thought and political orientations appear to be moving in a similar direction, with elements of the contemporary far right—even neo-fascist movements—appropriating aspects of this critique, often united by a populist rhetoric (Jay et al., 2019).

On the opposite side, hyperglobalization largely aligns with neoliberal institutionalism and conventional neoclassical economics. It is the ideological descendant—albeit in a significantly modified form—of classical liberal thought, which views free markets and free trade as the primary engines of progress. This perspective recalls the optimism of modernization theory—the idea that global integration lifts all boats—and finds contemporary voice in those who celebrated the "end of history" (Fukuyama, 1992) or the flattening of the world (Friedman, 1999).

Its faith in TNCs to allocate resources efficiently across borders without much state interference channels the spirit of 1990s neoliberalism (the Washington Consensus era). Realists in international relations who focus on state power were skeptical of the notion of a borderless world. Still, hyperglobalization advocates argued that economic interdependence had fundamentally transformed international relations, making old power politics less relevant.

In between these poles, we find more balanced frameworks. The global development perspective, often associated with soft or embedded liberalism, views globalization and TNCs as broadly positive but stresses the importance of domestic and international institutions and governance in ensuring that the benefits are widely shared. This resonates with classical development economics (e.g., Arthur Lewis, 1954, who saw foreign capital as helpful for development, given the right policies) and with liberal internationalist ideas that support globalization coupled with global governance (such as the postwar Bretton Woods era thinking).

It is optimistic but with a dose of pragmatism—somewhat akin to Keynesian liberalism, which is pro-market but also pro-regulation (Vercelli, 2010). In theoretical terms, it does not reject the liberal order. Still, it calls for managing globalization (for instance, via the UN SDGs or labor standards set by the International Labor Organization) to ensure outcomes like poverty reduction and social upgrading.

The glocal strategies perspective is less about grand theory and more about meso- and micro-organizational behavior. It intersects with business theory (particularly the integration-responsiveness framework of Bartlett and Ghoshal, 1990) and with sociological institutionalism (the idea that firms must seek legitimacy within local normative contexts).

This perspective does not fit neatly into an IPE paradigm such as liberalism or Marxism; instead, it draws from management studies and cultural analysis to develop its own interpretive lens on global development. Implicitly, however, glocalization carries a constructivist undertone, suggesting that global and local norms interact to shape corporate behavior while simultaneously creating the conditions for growth within globalization.

TNCs are seen as embedded actors that negotiate between different institutional environments. This is reminiscent of John Ruggie's concept of "embedded liberalism" (the global economy embedded in domestic social contracts), except applied at the firm level: firms embed themselves in local contexts while being part of a liberal global economy (Ruggie, 1982). The glocal perspective also links with institutionalism in IPE. For example, the "varieties of capitalism" approach, which we cited in Section 2.2, aligns with the idea that companies operate differently depending on national institutional frameworks (Hall & Soskice, 2001).

Finally, new globalization represents something of a synthesis or realignment of the old debates. It acknowledges, like the critical view, that unrestrained globalization can undermine social contracts and faces political backlash (Vlados & Chatzinikolaou, 2022). It also acknowledges, as the liberal view does, that globalization has brought tremendous gains and is necessary for tackling global challenges. In a way, new globalization thinking is akin to neo-Keynesian or neo-Polanyian ideas: it calls for re-embedding globalization within social and environmental constraints (Fraser, 2014).

One might see it as the IPE community grappling with Polanyi's "double movement". After a period of market expansion (the hyperglobalization era), there's a protective countermovement (resilience, decoupling, and sustainability efforts) that seeks to reintegrate economic activity with societal needs (Polanyi, 1944).

The new globalization perspective thus often bridges prior schools: it agrees with liberals that global cooperation (on issues like climate or tech standards) is needed, but it also agrees with realists and critical scholars that state power and geopolitics play a decisive role in shaping economic outcomes. The emphasis on new multipolarity and blocs speaks to a realist understanding of IPE (power dynamics between great powers shaping the rules), while the emphasis on corporate responsibility and governance speaks to a constructivist and liberal understanding (ideas, norms, and institutions shaping behavior).

One could argue that "new globalization" is the emerging paradigm in contemporary IPE, absorbing lessons from the other four paradigms. It's more refined than hyperglobalization (no more naive "flat world" assumptions) but more hopeful than outright deglobalization calls. It retains the developmental aims of globalization (growth, integration, innovation) but insists on tempering it with resilience, equity, and sustainability. In theoretical terms, it posits a dialectical outcome: neither a fully globalized world nor a retreat behind national borders, but a complex patchwork in which global, regional, and local forces coexist. This aligns with some current theoretical discussions in IPE about "geo-economics" (the return of geopolitics in economics) and "responsible globalization" (Vlados & Chatzinikolaou, 2025).

In summary, each trend correlates with known IPE frameworks: Adverse (Marxist, dependency, and populist critiques), Development (liberal and modernization approaches with institutional adjustments), Glocal (institutionalist and constructivist perspectives at the firm and industry level), Hyper (neoliberal globalist), and New (a hybrid synthesis of realist, liberal, and critical insights). Recognizing this spectrum helps us see that the seemingly disparate literature on TNCs is in fact part of a long intellectual lineage. It also explains the persistence of debates about their role: they engage with fundamental questions of who benefits from the evolution of global capitalism and whether, and how, it can be governed in the public interest.

Notably, these theoretical perspectives are not mutually exclusive in reality. Elements of each may appear simultaneously in policy formulation. For instance, a single country might experience adverse effects from some TNC activities (e.g., resource extraction causing local harm) even as it reaps developmental benefits from others (e.g., manufacturing FDI creating jobs). At the same time, its policymakers pursue glocal tactics (requiring foreign firms to partner with locals) and global institutions push new globalization agendas (like climate disclosure rules). The value of distinguishing the trends lies in analytic clarity—each provides a lens that foregrounds certain mechanisms and outcomes. Together, they provide a comprehensive palette to interpret the evolving role of TNCs in the world economy.

Cross-Cutting Issues and Implications for Policy and Practice

Two major cross-cutting issues transcend the five trends and hold profound implications for policy and practice: sustainable development (including climate action) and geopolitical fragmentation. These represent frontiers largely overlooked by earlier literature clusters but now fundamental to understanding globalization's current trajectory.

It is striking how little the earlier literature clusters (especially hyperglobalization and global development) addressed environmental sustainability. Climate change remained peripheral to TNC studies. This is changing as recognition grows that TNCs must become part of climate solutions or remain significant contributors to problems.

The anti-globalization camp already frames TNCs as major contributors to environmental degradation, while mainstream voices increasingly call for corporate behavior transformation that aligns with Paris Agreement goals (Bolton & Kacperczyk, 2021). Progress is evident through multinational net-zero targets and participation in the UN Global Compact (Hale et al., 2022; Msiska et al., 2021), though skepticism persists regarding greenwashing. Research on 51 large companies showed most do too little to meaningfully limit global warming (Corporate Climate Responsibility Monitor, 2024). This necessitates deeper integration of

environmental criteria into TNC discussions, introducing concepts like "carbon footprint of globalization" and "stranded assets" (Mishra & Dash, 2022).

The second overarching issue concerns the reassertion of geopolitics in TNC operations. Earlier globalization narratives assumed a stable liberal international order under U.S. hegemony. Yet, this framework is now contested by U.S.–China strategic rivalry and the realignments within the BRICS grouping, which are reshaping investment patterns through export controls and drives for technological self-reliance (Hamdani & Belfencha, 2024).

The Ukraine war and Russian sanctions demonstrated how geopolitical conflicts can force TNCs to withdraw from markets overnight, underscoring that political fault lines override profit motives (Vlados & Chatzinikolaou, 2024). The rise of emerging-market TNCs, particularly from China, India, and Brazil, challenges traditional North-to-South investment flows. These firms may pursue different logics, with Chinese state-owned multinationals often aligning more overtly with Beijing's geopolitical objectives than Western private multinationals. As power shifts, emerging economies demand greater say in international investment norms and trade rules, creating more polycentric governance.

In essence, whereas earlier IPE debates framed globalization primarily as an economic process mediated by relatively stable international regimes, the contemporary context places geopolitics and security at the forefront. What emerges is a partial return to geo-economic strategy, with states deploying economic instruments—such as trade barriers, tariffs, FDI restrictions, and sanctions—as tools of strategic competition.

TNCs are sometimes the pawns, sometimes the players in this great game. Future research needs to address questions such as: Will the bifurcation of technology and finance between US-led and China-led spheres continue, and how will firms adapt? Can global challenges like pandemics or climate force cooperation that overrides rivalries, or will rivalries impede a unified response? And importantly, what does all this mean for countries caught in the middle—many of which are in the Global South? These countries might leverage the competition (playing great powers against each other to get better deals), but they also risk being squeezed or forced to choose sides.

For the study of TNCs, incorporating a Global South lens is crucial. That means not only studying TNC impacts in developing countries (which the literature has long done) but also amplifying the perspectives and experiences from those regions. Southern scholars may interpret the five trends with varying nuance, perhaps with less optimism about "global development" given unfulfilled promises, or with a different kind of adverse globalization narrative focused on the colonial legacy and resource extraction. Also, emerging-market multinationals might inspire new theoretical developments: for instance, some argue that we

need new FDI theories to explain "springboarding," the rapid internationalization of firms from less developed contexts by acquiring strategic assets abroad (a pattern seen in some Chinese and Indian firms).

These cross-cutting challenges demand coordinated responses across three levels. National policymakers must balance openness to TNC investment with public interest protection, leveraging TNCs for development while enforcing labor, environmental, and competition regulations. Host countries need adequate bargaining power and institutional capacity, while home countries should support global standards and curb harmful practices like tax evasion. The goal is what might be termed "smart globalization," which advances national development without excessive protectionism.

At the corporate level, sustainable business requires glocal practices, supply chain resilience, and alignment with climate and human rights norms. Companies must embed local management, adapt to local needs, and embrace frameworks protecting the environment and certain social standards. Success depends on being viewed as valued partners rather than footloose exploiters, with the agility to regionalize operations when facing geopolitical constraints.

Finally, international institutions must update 21st-century rules to establish minimum standards on corporate taxation, labor rights, and environmental impact. Global governance should facilitate inclusive development, prevent complete decoupling from technology, and orchestrate climate partnerships. The goal is reformed globalization that remains fair, accountable, and resilient while preserving economic interdependence.

The era of compartmentalizing "economics" from "politics," or treating the environment as an externality, is over. Contemporary global developments restore a crucial interpretive role to political economy. Both the field of IPE and its key actors—TNCs, states, and civil society—now face the challenge of negotiating a new balance in which globalization is neither embraced uncritically nor dismantled, but instead rewired to become more sustainable and politically acceptable. The path forward requires a creative synthesis, akin to what the "new globalization" perspective seeks to articulate, whereby TNCs are steered toward reinforcing global public goods rather than undermining them.[8]

CONCLUSIONS

[8] In this regard, the integrated study of three interrelated spheres—politics, economics, and technology, conceptualized as the EST—at the global level is of particular significance (Vlados & Chatzinikolaou, 2025).

This integrative review examined how scholarly perceptions of TNCs in IPE have shifted from polarized positions to a nuanced recognition of the complex realities of contemporary globalization. The five analytical trends—adverse globalization, global development, glocal strategies, hyperglobalization, and new globalization—represent different interpretive lenses, with the emerging "new globalization" paradigm increasingly emphasizing resilience, regionalization, and governance over unfettered market expansion.

Key findings underscore the increasing centrality of sustainability imperatives, geopolitical security, and innovation in shaping TNC operations. The rise of emerging-market multinationals, combined with renewed great-power competition, has produced a contested multipolar global economy in which economic, security, and technological logics intersect more closely than ever.

This review focused on English-language academic literature, potentially missing important Global South perspectives. Future research should examine green transformation patterns, the impacts of digital globalization, South-South investment dynamics, and the effectiveness of global governance mechanisms. Critical gaps remain in understanding climate alignment strategies and incorporating diverse regional perspectives into TNC analysis.

Neither an unimpeded, homogenizing, and linear globalization nor outright deglobalization appears viable. Instead, success depends on stakeholder collaboration across international, national, and local levels to build frameworks in which TNCs help address global challenges rather than intensify them. Emerging scholarship offers guidance for navigating this transformation, emphasizing that globalization must be reimagined for 21st-century realities rather than either abandoned or embraced uncritically.

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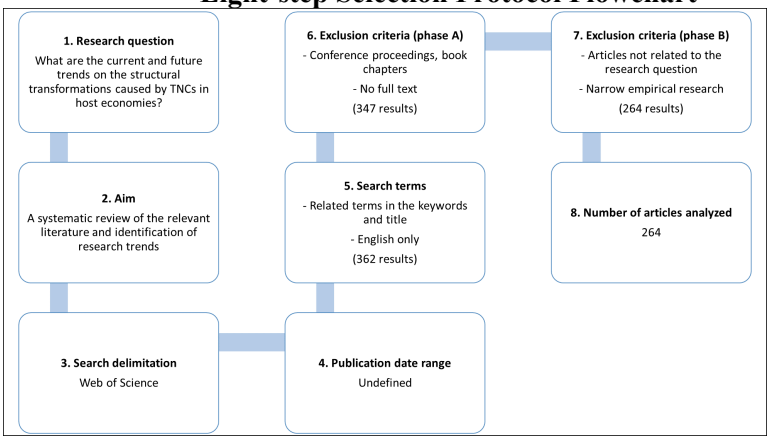
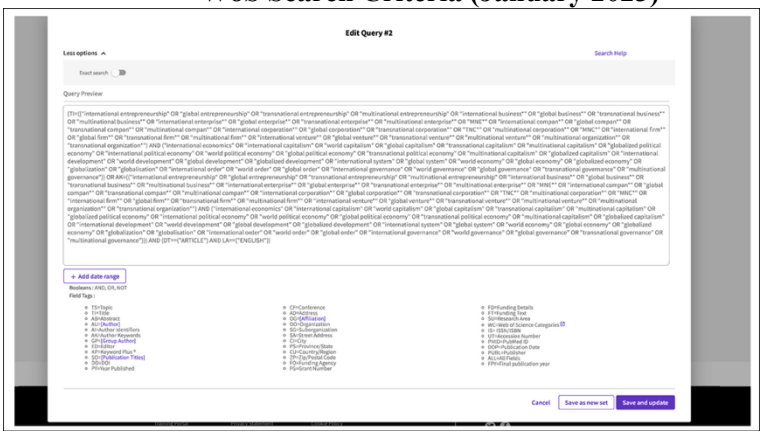
APPENDIX

Appendix 1
Eight-step Selection Protocol Flowchart



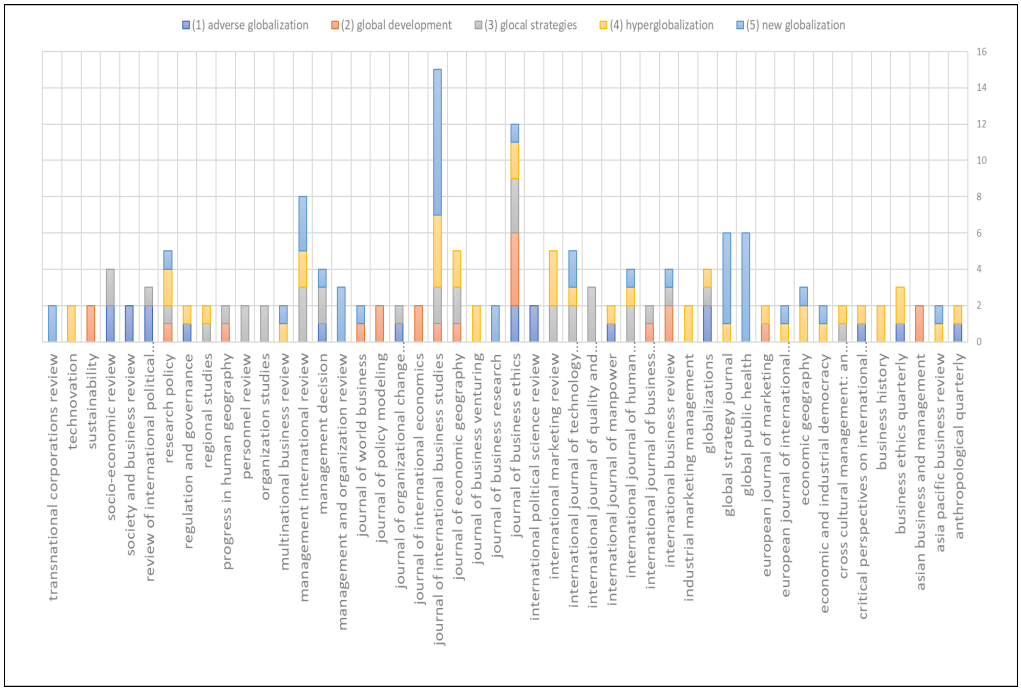
Source: Own elaboration.

Appendix 2
WoS Search Criteria (January 2023)



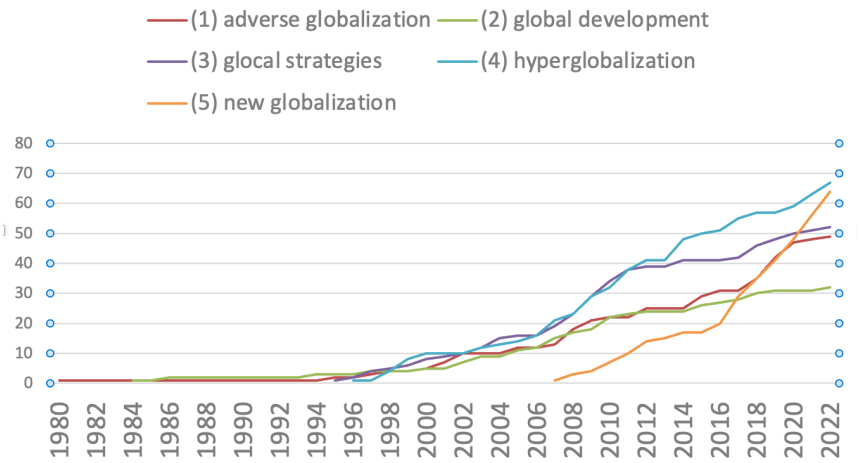
Source: Own elaboration.

Appendix 3
Journal Distribution



Source: Own elaboration.

Appendix 4
Total Number of Pages



Source: Own elaboration.

Appendix 5
Trends of Keywords Appearing More Than 50 Times in the Full Texts

all	(1) adverse globalization	(2) global development	(3) glocal strategies	(4) hyperglobalization	(5) new globalization
human rights	human rights	corruption	strategic management	human rights	crisis
crisis	neoliberal	foreign direct investment	crisis	entrepreneurship	de-globalization
entrepreneurship	corruption	human rights	dynamic capability	global governance	emerging market
foreign direct investment	crisis	emerging market	glocal	trade union	foreign direct investment
global governance	inequality	economic development	trade union	corporate social responsibility	entrepreneurship
corporate social responsibility	corporate social responsibility	crisis	corporate social responsibility	foreign direct investment	global governance
corruption	capitalist class	corporate social responsibility	entrepreneurship	strategic management	strategic management
trade union	privatization	global governance	foreign direct investment	crisis	trade union
strategic management	foreign direct investment	inequality	emerging market	inequality	anti-globalization
neoliberal	global governance	institutional development	human rights	climate change	human rights
emerging market	trade union	entrepreneurship	economic development	economic development	corporate social responsibility
inequality	corporate elite	strategic management	regionalization	sustainable development	economic development
de-globalization	economic development	sustainable development	inequality	resilience	privatization
economic development	deregulation	regionalization	sustainable development	dynamic capability	corruption
privatization	sustainable development	privatization	corruption	corruption	resilience
capitalist class	environmental degradation	trade union	privatization	neoliberal	neoliberal
anti-globalization	climate change	deregulation	neoliberal	emerging market	dynamic capability
sustainable development	anti-globalization	de-globalization	deregulation	deregulation	inequality
dynamic capability	entrepreneurship	environmental degradation	capitalist class	capitalist class	capitalist class
deregulation	de-globalization	anti-globalization	anti-globalization	privatization	corporate elite
corporate elite	emerging market	neoliberal	global governance	de-globalization	sustainable development
resilience	resilience	climate change	resilience	regionalization	regionalization
climate change	strategic management	dynamic capability	climate change	anti-globalization	climate change
glocal	regionalization	capitalist class	de-globalization	corporate elite	deregulation
regionalization	institutional development	corporate elite	environmental degradation	institutional development	institutional development
environmental degradation	glocal	resilience	institutional development	glocal	environmental degradation
institutional development	dynamic capability	glocal	corporate elite	environmental degradation	glocal

Source: Own elaboration

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Do Human-Like Cars Drive Loyalty? The Role of Anthropomorphism

¿Los coches con apariencia humana fomentan la lealtad? El papel del antropomorfismo

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ABSTRACT

In contemporary markets, the value of a product extends beyond its price and functional utility, encompassing design, packaging, attractiveness, and positioning in the customer's mind. These characteristics play a vital role in shaping customer purchase intentions in various industries. An emerging phenomenon contributing to this path is brand anthropomorphism. It is a way of attributing human-like characteristics, emotions, and personalities to a non-human entity. By infusing these human traits into products, brands establish a deeper emotional connection with their customers, influencing their trust and loyalty. This trend has been prevalent in the marketplace for more than a decade. Using a car's physical attributes, 221 participants from the NCR region of India served as the sampling units. A smart PLS-SEM technique was used to obtain the results. This study examined the increasing importance of anthropomorphism in marketing, its psychological effects on consumers, and its role in promoting brand trust, attachment, and loyalty. By understanding the influence of anthropomorphic branding, businesses can create more compelling brand narratives and enhance their market position.

Keywords: Anthropomorphism, Automobile, Cars, Customers, Loyalty

Jel Code: M37, M31, D12,

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RESUMEN

En los mercados contemporáneos, el valor de un producto va más allá de su precio y utilidad funcional, abarcando diversos componentes, como el diseño, el empaque, el atractivo y el posicionamiento en la mente del cliente. Estas características desempeñan un papel vital en la configuración de las intenciones de compra de los clientes en diversas industrias. Un fenómeno emergente que contribuye a esta tendencia es el antropomorfismo de marca. Se trata de una forma de atribuir características, emociones y personalidad humanas a una entidad no humana. Al incorporar estos rasgos humanos en sus productos, las marcas establecen una conexión emocional más profunda con sus clientes, lo que influye en su confianza y lealtad hacia la marca. Esta tendencia ha prevalecido en el mercado durante más de una década. Utilizando los atributos físicos de un automóvil, se emplearon 221 participantes como unidad de muestreo en la región NCR de la India. Se utilizó una técnica inteligente, PLS-SEM, para obtener los resultados. Este estudio examinó la creciente importancia del antropomorfismo en el marketing, sus efectos psicológicos en los consumidores y su papel en el fomento de la confianza, el apego y la lealtad a la marca. Al comprender la influencia de la marca antropomórfica, las empresas pueden crear narrativas de marca más atractivas y mejorar su posición en el mercado.

Palabras clave: antropomorfismo, automóvil, coches, clientes y lealtad.

Código JEL: M37, M31, D12,

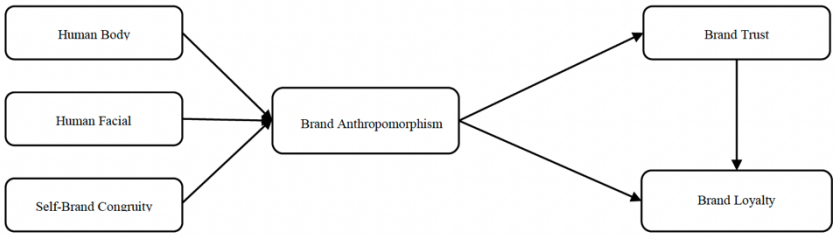
INTRODUCTION

Today, the value of a product extends beyond its price or consumption; it encompasses elements such as appearance, packaging, attractiveness, and positioning, which collectively influence a customer's purchase intention across all fields. These features lead to anthropomorphism. It is about imbuing non-human entities with human-like attributes, where we view products or things through the lens of anthropomorphism. It has been prevalent in the marketplace for decades. Marketers use this as a detrimental strategy to drive sales and improve customer experience with their brand. Different products, whether necessity goods or luxury goods, include toothbrushes, perfumes, cosmetics, and vehicles. This study focuses on the specificity of this field by determining anthropomorphism in automobiles (cars). Likewise, other products, such as cars, bear subtle resemblance to human facial expressions, eyes, headlights, the mouth, the grille, etc. (Aggarwal & McGill, 2007). Even customers whom marketers do not nudge to act anthropomorphise the product indirectly, frequently engage in this behaviour. Examples of anthropomorphic engagements include naming vehicles and implementing their technical systems. All these marketing strategies have a substantial and significant impact on customers.

The automobile industry's car segment accounted for a 17.69% share in FY 2023-24 (India: Automobile Market Share by Segment, 2024), comprising hatchbacks, Sedans, SUVs, and occasionally, MUVs. The ownership of cars in urban areas is approximately 13% compared to 4% in rural areas of India. As per the data available from TOI, it indicated that Delhi, being the National Capital, had a total of 20.7 lakh cars, which has been surpassed by Bangalore this year ("Bengaluru, World's Second-Most Congested City, Now Has the Highest Number of Cars in India, Overtakes Delhi, 2024"). However, the study focuses on NCR's population for analysis, as it includes people from diverse professions and areas, such as urban and semi-urban areas, creating a more varied consumer base for studying preferences, buying behaviours, and car usage patterns.

The study is organised into distinct sections, comprising an introduction, an extensive literature review, methodology, analysis, findings, conclusions, and implications. In a digital setting, according to Rauschnabel and Ahuvia (2014), there are four primary effective ways that brands employ anthropomorphism in their branding and other marketing initiatives. These strategies include interacting with potential customers on social media as the brand's created persona, employing first-person communication, utilizing stimuli that mimic human characteristics, and building a strong brand personality through testimonials that align with the target market. These branding strategies cultivate a sense of familiarity, enhancing consumer trust and laying the groundwork for a lasting relationship with the brand (Heinonen, 2025).

Figure 1
The Conceptual Framework



Source: Own elaboration.

THEORETICAL BACKGROUND

The Elaboration Likelihood Model

ELM is a two-fold model or theory of persuasion (i.e., the peripheral and central routes) that describes how people make decisions based on the information presented. In the 1980s, Richard E. Petty and Cacioppo developed this model. This model is used in various types of businesses, as well as in marketing research, to predict customers' behaviour and attitudes. Advertising antecedents such as the type of media, message repetition, and its impact on customers who pursue the peripheral route versus the central route of persuasion.

Teeny et al. (2017) also examined the influence of ELM on changes in consumer attitude. In a similar study, Reyes et al. (2019) found that ELM is applicable in many domains. Moreover, Fukada and Masashi (2024) introduced this model as a medium to study how customers process anthropomorphism in brands, focusing on these “routes” (central or peripheral). This customer processes information and focuses on high- or low-involvement concepts; therefore, brand anthropomorphism is treated as a vital peripheral cue in shaping customers' decisions, trust, and attachment.

Attachment Theory

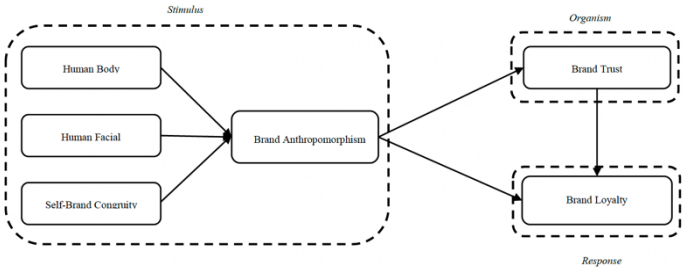
The core idea of attachment theory is that a baby’s personality and interactions with other people are shaped by their early contact with a carer (Ainsworth, 1969). Although it was first developed, it is used to describe an infant's attachment to a dominant carer; the term "attachment" has since been used in a variety of fields to explain a wide range of problems. According to Wei et al. (2005), it has been used for a long time to gain an understanding of an adult’s loneliness, attachment, and depression. This concept has also been applied in different fields of study. For example, in discussions of marketing literature, researchers have conceptualised brand attachment as a strong, crucial emotional factor that connects customers to brands and prevents them from changing brands (Loureiro et al., 2012; Thomson et al., 2005).

S-O-R Model

The SOR model, also known as the Mehrabian Russell model and based on the stimulus-response theory in environmental psychology, was initially proposed by Mehrabian in 1974. This pattern illustrates how environmental cues affect an individual's thoughts, feelings, and actions (Liu et al., 2023). The central concept of the SOR paradigm, which posits that an individual's emotions and cognitive processes are influenced by both internal and external stimuli, thereby shaping their reactions, is the relationship between components.

For instance, the SOR model was used to confirm that three anthropomorphic communication dimensions—coolness, warmth, and cuteness—have an impact on tourists' emotional attachment to the brand and willingness to overpay (Liu et al., 2023) showed how VR video (virtual tour stimulation) affects viewers' varied levels of enjoyment using the SOR trend. On this ground, we incorporate the theoretical background of our study, with the constructs: brand anthropomorphism (Stimulus), brand trust (Organism), and brand loyalty (Response). (Figure 2)

Figure 2
Theoretical background



Source: Own elaboration.

Brand Anthropomorphism

Aggarwal and McGill (2007) initiated the study of anthropomorphism in the consumer arena by presenting a preliminary framework for understanding when customers perceive items as human-like. They illustrated that advertisements that activate human schemas (such as promoting a “product family”) or market those products with humanlike features elicit anthropomorphism and more positive assessments. Therefore, a congruency effect, resulting in a favourable assessment of the anthropomorphised product, was caused by a match between the activated schema (family) and the schema attributes (two parents and two children).

Epley et al. (2007) underpinned some crucial dimensions of anthropomorphism, such as sociality and effectance. A theory developed by Guido and Peluso (2015) provides three primary aspects of brand anthropomorphism. The three dimensions are self-brand congruity, which refers to the alignment between the consumer's self-image and the brand's personality; facial physiognomy, which encompasses all visual features that mimic human facial traits; and human body lineaments, which include any physical brand features that resemble human

body parts. According to earlier research, brand anthropomorphism can significantly impact how consumers perceive a company by strengthening emotional ties, fostering a sense of familiarity, and enhancing brand trust (Rauschnabel & Ahuvia, 2014).

According to Golossenko et al. (2020), incorporating anthropomorphic features into branding, communication, imagery, and customer interactions can enhance consumer trust by making the business more relatable and approachable. Consumer-brand connections revolve around trust, which is considered the primary factor in forging a solid, enduring connection between them. Additionally, numerous studies have found that brand loyalty and consumer trust are positively correlated. According to Munawar et al. (2023), anthropomorphism positively impacts consumer trust and can be a primary factor in establishing it.

In contrast, Puzakova et al. (2013) suggested that incorporating anthropomorphism into branding can increase consumer trust. Furthermore, utilising anthropomorphic traits in branding can help build consumer trust, according to Aggarwal and McGill (2012), who claim that anthropomorphic characters' social responsibility can lead to human-like communication. According to Rauschnabel and Ahuvia (2014), anthropomorphism can significantly impact how consumers perceive a company by strengthening emotional ties, fostering a sense of familiarity, and enhancing trust. Furthermore, Golossenko et al. (2020) argued that incorporating anthropomorphic components—such as images or an anthropomorphic communication style—enhances brand relatability, thereby increasing customer trust.

This study contributes to the body of knowledge by demonstrating how anthropomorphic branding influences customer trust and brand loyalty. Additionally, it strengthens the role of its outcomes, such as brand trust and brand loyalty, in brand positioning and in enhancing its marketing efforts. As brand trust helps, when consumers have too many options, they simplify their choices by asking themselves, "Who do I trust?" If they have strong faith in a brand, they won't switch for a little discount. It states that “novelty is defeated by familiarity.

Referrals increase and multiply when trust is established. Customers who are happy with a brand become brand ambassadors (Conant, 2025). Anthropomorphic chatbots enhance emotional connections by replicating human-like interactions, thereby strengthening loyalty (Albarq et al., 2025). Additionally, anthropomorphism and customisation promote better brand-consumer interactions, according to research in conversational advertising (Adam et al., 2021). As a result, anthropomorphic chatbots can be used as a strategic point of contact to enhance client loyalty.

H1: Brand Anthropomorphism positively impacts Brand Trust.
H2: Brand Anthropomorphism positively contributes to Brand Loyalty.

Brand Trust

Brand trust refers to customers' willingness to trust a brand under all circumstances, when the brand's promise can deliver positive benefits to its customers. The concept of trust has been explored in multiple disciplines, including psychology, economics, and marketing (Hosmer, 1995). According to Fournier (2001), marketers define brand trust as the bond between customers and their brand that affects customers' purchasing decisions. Additionally, customers engage in relationships with various brands throughout their daily routines.

Customers prefer a trusted brand over other products because trust reduces dissonance or eliminates risk (Power et al., 2008). The dual-process theory states that the human brain processes brand communication in two distinct ways: System 1 and System 2. In digital markets, where affective and cognitive processes are prevalent, brand managers employ these two strategies to build consumer trust (Punyatoya, 2019).

According to the literature review, affective trust is acquired by appealing to consumers' emotions and fostering a sense of warmth and connection, which appeals to system 1, whereas cognitive trust is based on presenting the brand as capable, trustworthy, and credible, which is processed in system 2 (Lee et al., 2015; Dowell et al., 2015).

Anthropomorphism in branding increases cognitive trust by making the brand seem deliberate, predictable, intentional, and goal-oriented—all crucial components in a consumer's decision-making process, according to an earlier study on the subject (Kim and McGill, 2011). Many customers like anthropomorphic branding, which is particularly effective at fostering affective trust. This is because it is easy to appeal to consumers' social reactions, emotions, and empathy by endowing the brand with anthropomorphic characteristics, making it feel more human (Dowell et al., 2015). Additionally, Grigaliunaite and Pileliene (2016) found that more consumers prefer affective branding over cognitive branding.

Research on brand trust and its development is crucial since it can be a significant factor in both purchase intention and brand loyalty (Delgado & Munuera, 2001). Consumers' faith in a brand is reflected in brand loyalty. Loyal consumers consistently choose a brand over its rivals because they trust it, not just because it is more affordable or more readily available. Positive prior experiences, steady value delivery, and the emotional bond they have built over time are the sources of this belief.

H3: Brand trust has a positive impact on brand loyalty.

H4: Brand trust positively mediates the relationship between Brand Anthropomorphism and Brand Loyalty.

Brand Loyalty

Brands are treated as interfaces between consumers and companies. During the brand relationship journey, customers develop loyalty to the brand, depending on the company's characteristics. Trust in a brand is built through trust in the customer. Using the framework developed by Chaudhuri and Holbrook (2001), we also acknowledge that brand trust and its impact on brand loyalty are significant (Wünderlich et al., 2024).

Nam (Reyes et al., 2019) investigates the mediating effects of customer-based brand equity and brand loyalty in the hotel industry. Using structural equation modelling, he identified five important dimensions of brand equity that positively impact customer satisfaction: physical quality, ideal self-congruence, staff behaviour, lifestyle congruence, and brand identification. The results of the study revealed the partial mediated effect of customer satisfaction, ideal self-congruence, and staff behaviour on brand identification and brand loyalty.

RESEARCH METHODOLOGY

Sampling procedure

To determine the hypothesised research model, the authors collected primary data through structured, formatted research surveys. This research aimed to investigate the role of brand anthropomorphism in building brand trust and loyalty within the automotive industry, specifically for cars. Respondents who owned a car were targeted for the study. We assured the respondents regarding the confidentiality of the information they were required to provide during the research survey. As we know, car ownership is rising considerably and shows great potential in Tier 1 and Tier 2 cities in India. We selected the Tier 1 region, which has a multitude of services and opportunities. Tier I cities in India are a pinnacle of urban development.

These cities are important centres of commerce, culture, and the economy that attract both domestic and foreign interests. Their varied sectors, top-notch educational institutions, and outstanding infrastructure were impressive. In addition to providing a wealth of job opportunities, these Tier I cities attract a diverse population that fosters innovation and cultural diversity (Decoding Indian Cities Classifications in Tier I, II, III, IV, 2023). The study's sampling frame is drawn from the NCR region of India (as classified by the Classification of Indian Cities). For validation purposes, we conducted a pilot survey of 53 car owners to proceed further with our study. Afterwards, we distributed survey forms

through both online and offline media and obtained 221 meaningful responses to assess the model.

Informed Consent

Informed consent was obtained before including participants in the study; all individuals were informed of the study's objectives, the confidentiality of their answers, and their freedom to discontinue participation at any time. Before participation, consent was obtained orally, as the study involved both in-person and online surveys.

Questionnaire development

Initially, research questionnaires were used to ensure that the content validity was sufficient. In this regard, the questionnaire's measurement items closely followed the existing literature. According to Bharati and Chaudhury (2004), content validity explains the comprehensiveness of study constructs. Generalised scales for measuring brand anthropomorphism were adapted from Guido and Peluso (2015), and items related to brand trust and brand loyalty were adapted from Chaudhuri and Holbrook (2001) and Adhikari and Panda (2019), respectively.

Assessment of Common Method Bias

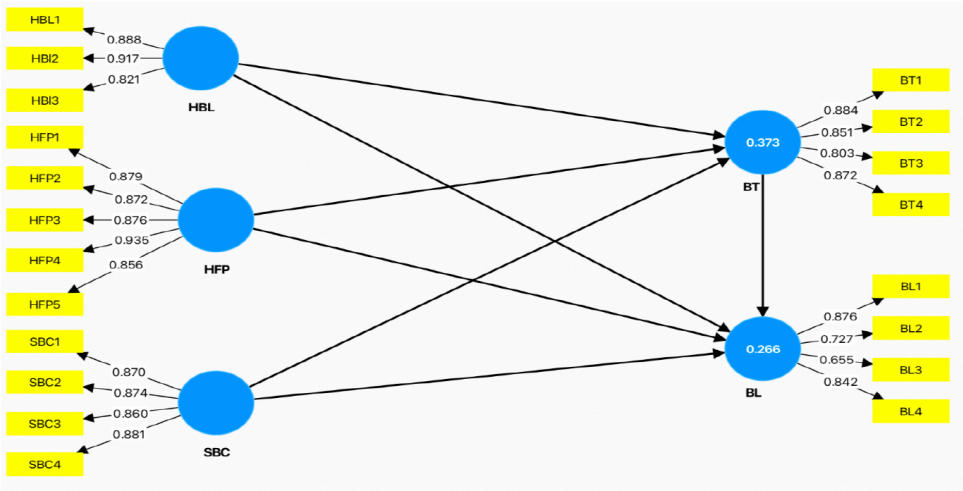
Our study incorporated a standardised survey instrument for data collection. Nevertheless, the survey scales may exhibit measurement error and variance due to the common method. In most cases, such measurement errors may introduce bias that hampers the construct's linkage. We assessed the common method bias through the VIF values of the inner model. All VIF values were less than 3.33 in our study; therefore, the model is free from common method bias (Kock, 2015).

RESULTS

Model assessment using PLS-SEM

The measurement model has two stages. First, the five reflective exogenous variables, including human body lineaments (HBL), human facial physiognomy (HFP), self-brand congruity (SBC), brand trust (BT), and brand loyalty (BL), were assessed in line with reliability and validity criteria. In the next step, the model was examined based on customer data collected to assess convergent validity (Kock, 2014). (Figure 3)

Figure 3
Result of Assessment of Lower Order Constructs



Source: Own elaboration.

Table 1
Result of assessment of measurement model (First Order)

Constructs	Outer Loadings	SD	CR rho-a	CR rho-c	Cronbach Alpha	AVE
Human Body Lineaments (HBL)			0.925	0.908	0.858	0.768
HBL1	0.888	0.021				
HBL2	0.917	0.016				
HBL3	0.822	0.050				
Human Facial Physiognomy (HFP)			0.936	0.947	0.930	0.781
HFP1	0.878	0.020				
HFP2	0.871	0.017				
HFP3	0.876	0.016				
HFP4	0.935	0.008				
HFP5	0.856	0.020				
Self-Brand Congruity (SBC)			0.894	0.927	0.894	0.759
SBC1	0.871	0.016				
SBC2	0.874	0.016				
SBC3	0.860	0.020				
SBC4	0.881	0.017				
Brand Trust (BT)			0.883	0.915	0.876	0.729
BT1	0.887	0.020				
BT2	0.865	0.030				
BT3	0.808	0.039				
BT4	0.854	0.020				
Brand Loyalty (BL)			0.818	0.862	0.791	0.612
BL1	0.859	0.022				
BL2	0.755	0.039				
BL3	0.680	0.067				
BL4	0.822	0.036				

Source: Own elaboration

According to Kock (2014), convergent validity is a crucial aspect of the measurement model's quality. If the associated measures of each construct and latent variable are easily understood by the respondents in the exact way they were designed, it confirms that the measurement instrument has good convergent validity (Kock, 2014). Cronbach's alpha, composite

reliability (CR), average variance extracted (AVE), and the outer loadings of all items for each of the five reflective constructs listed above were assessed and reported to check the reliability and convergent validity of the constructs (Hair et al., 2017). To establish the reliability of the construct, the values of outer loadings, along with Cronbach's alpha and CR, should be more than 0.7, and the average variance extracted should be greater than 0.5 to confirm convergent validity. However, item loadings ranging between 0.5 and 0.7 are also acceptable if the CR and AVE of the constructs exceed the recommended threshold (Hair et al., 2017). (Table 1).

Table 2
Discriminant Validity Using HTMT

	BL	BT	HBL	HFP	SBC
BL					
BT	0.478				
HBL	0.298	0.396			
HFP	0.407	0.519	0.679		
SBC	0.535	0.678	0.651	0.762	

Source: Own elaboration.

To assess discriminant validity between two groups, we employed the most recent and conservative strategy, the heterotrait-monotrait (HTMT) ratio (Henseler et al., 2015). According to the literature, the HTMT ratio should be lower than 0.85 or 0.9 to achieve discriminant validity (Henseler et al., 2015).

The results from (a) HTMT and (b) Fornell and Larcker's criteria, tests are displayed in Tables 2 and 3, which verify the discriminant validity in which the value of the original diameter must be higher than their respective row's and column's left and bottom values. The criterion is also mostly acceptable, according to the statistical analysis (Bahrami & Omidi, 2023).

Table 3 illustrates the standard output for this criterion; all diagonal values exceed those in their respective rows and columns, confirming the establishment of divergent validity. Furthermore, in the second stage, the two-stage approach of assessing higher-order constructs, including Human Body Lineaments (HBL), Human Facial Physiognomy (HFP), and Self-brand Congruity (SBC), establishes Brand Anthropomorphism (BA) in a formative manner.

Table 3
FL Criteria

	BL	BT	HB	HFP	SBC
BL	**0.780**				
BT	0.448	**0.853**			
HB	0.287	0.369	**0.876**		
HFP	0.363	0.482	0.658	**0.884**	
SBC	0.472	0.603	0.604	0.697	**0.871**

Source: Own elaboration.

This study comprises a single second-order formative construct due to the characteristics of its dimensions, which have distinct aspects that are not interchangeable. To test the second-order formative construct in the next step, the issue of multicollinearity was addressed using the variance inflation factor (VIF). This value should be less than 3, with significant outer weight (Hair et al., 2017). It is often used to measure the variance of regression coefficients, but this measurement can be inflated if the independent variables are correlated. It is calculated as follows: If the VIF values are within the threshold or collinearity is not a major issue, the R2 value of the endogenous construct(s) should be examined. According to Shmueli and Koppius (2011), the model's explanatory power stems from its ability to measure the variance explained in each of the dependent constructs. This is also referred to as the 'in-sample predictive power' of the model (Rigdon, 2012). Its range is from 0 to 1, where higher values indicate greater explanatory power.

The values of 0.75, 0.50, and 0.25 (R^2) can be considered substantial, moderate, and weak, respectively (Hair et al., 2011). However, the acceptable value of R^2 depends on the specific context of the study. In some fields, it may be as low as 0.10, which can still be considered satisfactory (Raithel et al., 2012). Table 1 shows the results of the reliability and convergent validity for all five reflective or lower-order constructs. Additionally, we evaluated the discriminant validity of our formative construct by analyzing the VIF values of all latent variables in the study. All VIF values were less than 3, with the highest being 2.606 (Table 5) for the BT1 item, which was also below 3, indicating no issues with full collinearity.

Table 4
Cross Loadings

	BL	BT	HBL	HFP	SBC
BL1	**0.876**	0.460	0.222	0.331	0.427
BL2	**0.727**	0.252	0.291	0.284	0.386
BL3	**0.655**	0.106	0.105	0.186	0.211
BL4	**0.842**	0.439	0.241	0.295	0.389
BT1	0.366	**0.884**	0.278	0.456	0.559
BT2	0.237	**0.851**	0.320	0.358	0.513
BT3	0.300	**0.803**	0.244	0.342	0.449
BT4	0.564	**0.872**	0.396	0.463	0.529
HBL1	0.307	0.358	**0.888**	0.690	0.645
HBL2	0.290	0.345	**0.917**	0.570	0.497
HBL3	0.046	0.212	**0.821**	0.363	0.366
HFP1	0.334	0.454	**0.600**	0.879	0.618
HFP2	0.385	0.372	0.680	**0.872**	0.537
HFP3	0.268	0.455	0.520	**0.876**	0.630
HFP4	0.315	0.496	0.648	**0.935**	0.698
HFP5	0.299	0.329	0.432	**0.856**	0.587
SBC1	0.405	0.533	0.592	0.642	**0.870**
SBC2	0.408	0.518	0.466	0.611	**0.874**
SBC3	0.392	0.549	0.416	0.598	**0.860**
SBC4	0.441	0.503	0.632	0.578	**0.881**

Source: Own elaboration.

Table 4 presents the loadings of the individual indicators along with their associated latent constructs. It should be higher than its loadings with all the remaining constructs. This criterion of discriminant validity is often referred to as cross-loadings. As depicted below, the highlighted loadings of the latent variable in itself are greater than those of the rest of the constructs.

Table 5 presents the assessment of the second-order measurement construct for car owners. The result shows a desirable VIF and significant loadings with additional outer weights for all the items of the BA formative construct, and an admissible full collinearity, which is lower than 3.3 for our constructs in the second stage (Kock and Lynn, 2012). All the values of outer loadings and weight are statistically significant, with VIFs < 3 and p-values < 0.05, except for a single measurement item of the formative construct, i.e., human body lineaments, in our study.

Based on the results of our data's outer weight, we obtained a surprising result: the item's magnitude is negative (i.e., -0.069; Table 5), which is small, indicating a weak relationship. However, the p-value and path coefficient are significant. A formative index can lose its meaning if an indicator fails to fulfil its intended support role. The significance of the formative indicator coefficients is tested using a bootstrapping procedure (Hair et al., 2011) as the measure is supported by the theoretical concepts of Guido & Peluso (2015). In our study, the HBL revealed a negative weight towards anthropomorphism; however, its loadings, cross-loadings, and validity, with p-values < 0.05, support the inclusion of the indicator.

Table 5
Result of Assessment of Second-Order Construct

Construct/Associated Item	Outer Loadings	Outer Weights	P-Value	VIF
Brand Anthropomorphism (Formative)				
HBL	0.604	-0.069	< 0.05	1.903
HFP	0.780	0.205	< 0.05	2.348
SBC	0.991	0.890	< 0.05	2.097
Brand Trust (Reflective)				
BT1	0.884	0.312	< 0.05	2.606
BT2	0.851	0.253	< 0.05	2.427
BT3	0.803	0.250	< 0.05	1.931
BT4	0.872	0.354	< 0.05	2.184
Brand Loyalty (Reflective)				
BL1	0.876	0.411	< 0.05	2.048
BL2	0.726	0.300	< 0.05	1.529
BL3	0.655	0.156	< 0.05	1.545
BL4	0.842	0.380	< 0.05	2.031

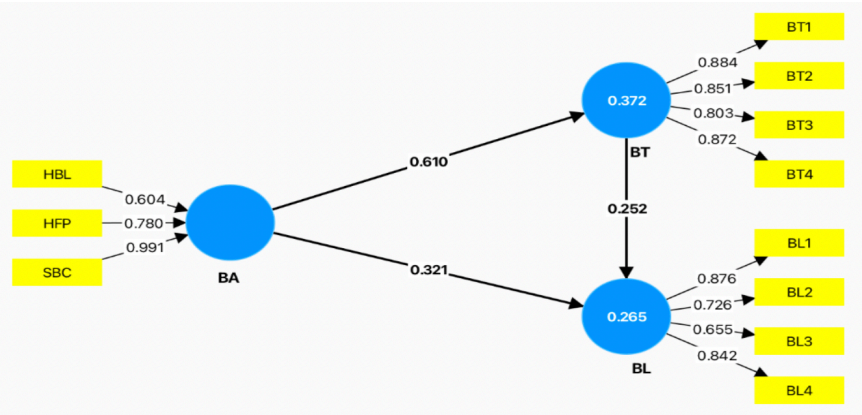
Source: Own elaboration.

Assessment of the structural model

Table 6 and Figure 6 present the results of the structural model and the hypotheses tested for individuals who use cars. The R2 values for brand trust and brand loyalty are 0.37 and 0.26, respectively. Hair et al. (2017) explained that the revealed values for the variables brand trust and brand loyalty are widely accepted in the behavioural sciences.

The outcomes showed a higher R^2 value for brand trust among individuals who used cars from their respective brands. To test the hypotheses, the significance of path coefficients and their signs, along with 95% confidence intervals, were used (Aguirre and Röönköö, 2018). Moreover, we established the convergent validity of the higher-order construct through a redundancy analysis, assessing how the formative construct's measurement correlates with an alternative measure of that construct. We used a single-item measure that captured the essence of the construct, as described by Cheah et al. (2018).

Figure 4
Result of Assessment of The Structural Model

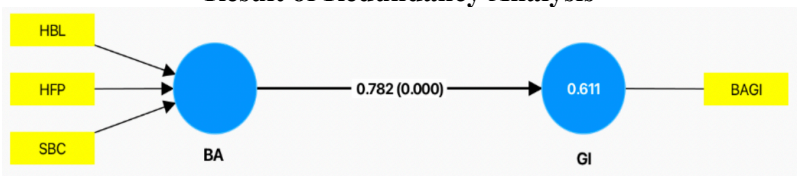


Source: Own elaboration.

Redundancy Analysis

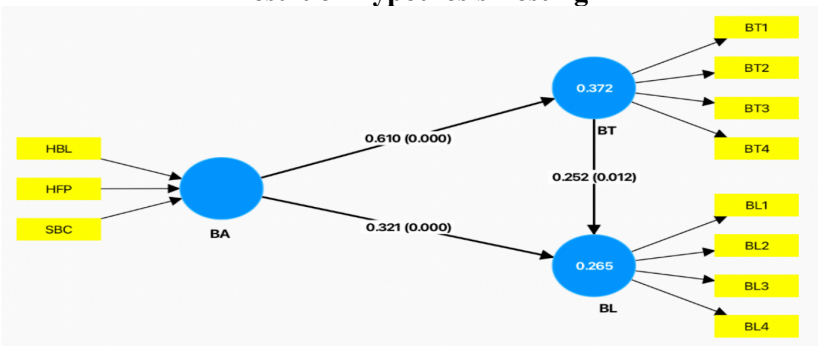
According to the recommendation of Hair et al. (2017a), one should use a global single item "which summarises the essence of a construct having the formative indicators" as a solution. In a single study on measuring brand anthropomorphism in cars, we included a global question asking, "Overall, how do you perceive your car as an anthropomorphic entity?" Furthermore, a single global item reduces the intellectual demands on respondents (Drolet and Morrison, 2001), which in turn increases the rate of effective responses and reduces distrustful response patterns. The global single-item construct correlation should be ≥ 0.70, and our global single item has a path coefficient of 0.782 with p-value < 0.05, confirming convergent validity through redundancy analysis, as depicted below.

Figure 5
Result of Redundancy Analysis



Source: Own elaboration.

Figure 6
Result of Hypothesis Testing



Source: Own elaboration.

For hypothesis testing, we assessed the structural model using beta values (path coefficients). The confidence intervals and p-values were obtained through bootstrapping (5,000 resamples). All the proposed hypotheses of the study were supported (Table 6), indicating that construct H1, Brand Anthropomorphism, significantly influences Brand Trust (β = 0.610, p-value = 0.000), and H2, Brand Anthropomorphism, positively impacts Brand Loyalty (β = 0.321, p-value = 0.000). Moreover, Brand Trust positively influenced Brand Loyalty with (β = 0.252, p-value = 0.012). VAF was calculated to assess the mediation of the constructs, with VAFs of 0.439 for BT and 0.358 for BL, reinforcing the partial mediating role in fostering customers' loyalty towards the car brand and thereby supporting the hypotheses. While the SRMR value is 0.7 and the NFI is 0.821 for the model fit, this indicates room for improvement that can be explored in subsequent studies.

Table 6
Result of Hypothesis Testing

	Hypothesis	Path Coefficient	Confidence Interval 95%	P value	Support
H1	BA > BT	0.610	[0.497, 0.698]	0.000	Yes
H2	BA > BL	0.321	[0.161, 0.466]	0.000	Yes
H3	BT > BL	0.252	[0.048, 0.430]	0.012	Yes
R2	BT	0.372	**Q2**	BL	0.206
	BL	0.265		BT	0.353

Source: Own elaboration.

The higher-order model analysis revealed statistical significance for the specific indirect effect via the associated pathways (BA • BT • BL), reinforcing the moderate role of BA

quality in shaping loyalty and trust outcomes towards the brand. These findings provide guidance and further scope for identifying more aligned and meditative variables that may better explain loyalty. Furthermore, this study lays the groundwork for future investigations to assess indirect effects and impacts via other variables, such as brand attachment and brand credibility, across diverse demographic settings.

Table 7

Specific Indirect Effect

	Original sample	Sample mean	SD	T statistics	P values	2.5%	97.5%
BA -> BT -> BL	0.154	0.147	0.060	2.561	0.010	0.032	0.265

Source: Own elaboration

Variance Accounted For (VAF)

Indirect effect of BA → BT → BL = Path coefficient for BA → BT * Path coefficient for BT → BL = 0.610 × 0.252 = 0.154. The indirect effect from BA → BL = Path coefficient for BA → BL = 0.321. Hence, the total indirect effect is 0.475.

VAF for BT: 0.372 / (0.372 + 0.475) = 0.372 / 0.847 = 0.439

VAF for BL: 0.265 / (0.265 + 0.475) = 0.265 / 0.740 = 0.358

In the PLS-SEM software, "f^2" refers to Cohen's f-squared, which is a measure of effect size. This indicates the proportion of variance in the model that is explained by the predictor variable. The results for f^2 in the table above suggest that the exogenous variable brand anthropomorphism → brand loyalty has a small effect ($f^2 = 0.089$), which explains why brand anthropomorphism has only a minor direct impact on brand loyalty. Although a minor effect is present, further studies should be conducted to strengthen this relationship by accounting for additional interactions or factors. On the other hand, brand anthropomorphism → brand trust showed a large effect size ($f^2 = 0.591$) (above 0.35). Brand anthropomorphism strongly influences brand trust, indicating a substantial contribution to explaining its variance. The effect size suggests that brand anthropomorphism is a crucial driver of the relationship, while brand trust contributes less, indicating that other factors may influence brand trust.

DISCUSSION & FINDINGS

There are several studies on enhancing customers' relationships with brands, including attachment theory and the theory of planned behaviour. One of these is the Elaboration Likelihood Model (ELM), which provides a dual-path framework for understanding how consumers shape their attitudes and make decisions. The result aligns with the literature, which views cars as humans, headlights as eyes, grilles as mouths, and even side mirrors as ears (Aggarwal & McGill, 2007). Studies align with several others, such as Avramov's (2024) study.

The interviewed sample in this study confirmed that they could see faces when looking at the front of cars. The present study revealed positive results for the proposed hypotheses, supporting all p-values < 0.05. It was concluded that brand anthropomorphism has a significant and positive impact on brand trust and brand loyalty; however, the effect size is smaller, suggesting the need to employ other constructs as mediators of brand trust across different fields of study. To establish affective trust, the brand seeks to elicit strong emotional reactions in System 1 through anthropomorphism. Samson and Voyer (2012) state that the goal of incorporating anthropomorphic features into branding is to foster affective trust, which is most commonly utilised in low-risk or low-involvement purchases, where buyers rely more on feelings than on thorough logical assessments.

Collectivism culture vs. Individualistic culture:

In the collectivist civilisation, Individual demands are subordinated to the interests of society, the family, and the workplace. At the same time, individualistic cultures place greater emphasis on the importance of the individual and less on sharing societal obligations. It has been discovered that these traits are crucial to how technologies are perceived and their level of success. Anthropomorphic car design from a cross-cultural perspective reveals that although the general inclination to perceive "faces" in automobiles may be a universal, biologically based human characteristic, the particular interpretations and design preferences for these "faces" and the vehicle as a whole differ significantly across cultures. This indicates that a "one-size-fits-all" design strategy is ineffective for the global market.

A study by Windhager et al. (2012) reported discrepancies between Ethiopian and Austrian assessments on items about (emotional) valence (openness excluded). In Ethiopia, all cars were rated as "happy," "friendly," "open," and "arrogant" (perhaps in a positive sense). In contrast, Austrian mean evaluations showed significant variation amongst cars. One explanation could be that Ethiopians are incredibly courteous and reluctant to express their personal opinions, particularly when they are unfavourable. The fact that interactions with actual cars in Ethiopia are typically beneficial (transporting water, animals, goods, etc.) could be a second factor. These differences reveal cultural variations in geography and economy that can be leveraged to market the brand and foster trust strategically.

These characteristics may not be easily noticed in automobiles, but marketing tactics must prioritise them. Moreover, toaccording on the research survey, anthropomorphism is a beneficial strategy for managers in the automotive market. For the transition to automated vehicles, manufacturers must therefore focus on accounting for cultural differences at various levels, including contextual, individualistic, and collectivist, while using anthropomorphic systems to maximise safety and trust, and reduce error and accident rates.

Theoretical implications

The model suggests that consumers can be convinced through two routes: the central route, which involves thoughtful, cognitive processing of information, and the peripheral route, which relies on emotional or superficial cues. Our study incorporates the construct of Brand Anthropomorphism, aligned with this model, which states that when car brands are cautiously anthropomorphised, they acquire human-like traits that evoke emotional responses from customers, triggering the peripheral route to persuasion.

Customers, through this emotional connection, perceive a human-like appearance and may initially trust a car brand based on its perceived warmth, reliability, and relatability. Given the substantial correlation between brand attachment (BA) and brand trust (BT), customers who develop a strong emotional bond with a particular car brand are likely to engage in deep central-route processing, a fundamental concept in ELM.

This implies that messages from brands, conveyed through cues and physical appearance, are more likely to be processed deeply by highly engaged consumers, thereby improving their trust and loyalty. Trust influences customers' purchase decisions at both high and low levels of engagement. If engagement is high, there is a strong chance of purchasing the vehicle, and vice versa. In the context of specific direct effects with ELM's dual-processing model, BA has a substantial impact on BL ($r = 0.321$, $p = 0.000$), indicating that brand loyalty may increase through both emotional (peripheral) and logical (central) processes.

Some customers may also rely on recommendations and prior experiences to examine product quality and brand consistency as part of the central route. Samson and Voyer (2012) list several cognitive biases that consumers may encounter when interacting with anthropomorphised brands; as a result, marketers may leverage these biases in their marketing actions. In the context of anthropomorphism, these cognitive biases—which are deeply rooted in the dual-process theory—include the affect heuristic (positive emotional reactions), the representativeness heuristic, and perceptual fluency (the tendency to favour anthropomorphically familiar things). They particularly demonstrate how anthropomorphic aspects are attributed to companies by emotionally motivated customers driven by heuristics and emotions, as emotional bias and perceptual fluence can lend a brand image a sense of relatability and reliability.

Practical implications

Over time, as people become more deeply engaged with their vehicle brand, brand trust is further reinforced through the central route, as they evaluate the brand's performance, consistency, and reliability. Such dual processing results in both strengthened brand trust and loyal consumer relationships because people tend to stay committed to trust-based brands they feel emotionally positive about and logically believe in.

The findings also showed that incorporating anthropomorphism into branding directly increases consumers' inclination to make purchases. Therefore, brand managers should consider employing anthropomorphic branding to boost purchase intention. A/B testing of various components, such as graphic design, interactive elements, or tone of voice, is an excellent technique for assessing the efficacy of the branding approach and maximising its impact.

This makes it simpler to identify the precise characteristics and components that appeal to the target market for a particular brand. (Kohavi et al., 2020). More precisely, brand managers should consider the brand's positioning, target market, and context when deciding whether to use competence-based or warmth-based anthropomorphism (Zhang & Qiu, 2025; Chung & Han, 2022). For instance, to establish an emotional connection, firms operating in more emotive categories and those seeking to appeal to System 1 should emphasise warmth in their branding. For example, companies in the IT or finance industries that want to appeal more to System 2 could stress competence-based anthropomorphism to highlight knowledge, dependability, and intellect. (Zhang & Qiu, 2025).

When technology is human-like, consumers are more likely to trust it. Features such as human-like voices, names, or even visual cues (such as animated eyes on an interface) increase confidence in the competence and safety of cars by making the system's behaviour more predictable and understandable. Customers can develop an emotional bond with a product by attributing human characteristics to it, thereby increasing brand love and loyalty. Beyond the product's practical use, this relationship lends it social value. It fosters a sense of intimacy with the brand, thereby enhancing the brand’s long-term relationship and customer retention.

Marketers can build brand trust and loyalty by applying the elements of the Elaboration Likelihood Model and dual processing theory to incorporate both emotional and rational marketing strategies. On the other hand, attachment theory supports the relationship between brand trust and loyalty: brand trust increases with attachment to a brand, which in turn leads to enhanced loyalty. Loyalty in brands may also be improved by leveraging brand reputation and content created by car users.

Path for future research

Despite the significant and positive impacts of the variables in marketing studies, this study has been limited to a small number of respondents and variables, which is one of its stated limitations. Only the NCR region was chosen for testing the proposed model, which can be applied across geographical boundaries, as culture is an essential factor in people’s lives; it may also be considered for inclusion. Additionally, the study measured trust and loyalty at a

single time point, rather than over time. This approach does not capture the evolution of brand loyalty over time.

For a deeper perspective on how anthropomorphism affects brand development, for example, stabilisation or declination, a longitudinal study should be conducted further. This could also help in demonstrating the benefits of building long-term trust. Furthermore, while discussing constructs, this study has a limited set of constructs defining the relationship, which can be further tested using additional mediating variables, such as brand attachment, brand love, and personification. The cues, such as storytelling and word-of-mouth, can be studied in further studies to obtain more generalised results for the variables. Additionally, the study has not included data from different cultures for quantitative analysis, which can be considered further and could serve as a catalyst for automotive anthropomorphic research.

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APPENDIX

Measurement Scales	(1= Strongly Disagree, 4= neither agree nor disagree, 5= Strongly Agree)	Adapted From
Brand Anthropomorphism	*Human Body Lineaments*	Guido & Peluso (2015)
	This branded product looks like a person.	
	This branded product seems to have a human neck.	
	This branded product seems to have a human trunk.	
	Human Facial Physiognomy	
	This branded product seems to have a human face.	
	This branded product seems to have a nose.	
	This branded product seems to have eyes.	
	This branded product seems to have a mouth.	
	This branded product seems to have ears.	
	Self-Brand Congruity	
	This branded product is congruent with the image I hold of myself.	
	This branded product is congruent with the image I would like to hold of myself.	
	This branded product is congruent with the image others hold of myself.	
	This branded product is congruent with the image I would like others to hold of myself.	
Brand Trust	I trust this branded product.	Chaudhuri & Holbrook (2001)
	I rely on this branded product.	
	This is an honest branded product.	
	This branded product is safe.	
Brand Loyalty	I would definitely recommend branded products to family and peers.	Adhikari & Panda (2019)
	I am willing to continue using branded products in future.	
	I will stick to branded products even if I get better deals on other brands.	
	I would spread good things about branded products while talking to my friends.	

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SORCIS Model: Social Media Marketing Dimensions, Consumer Decision-Making Styles, and Purchase Intention

Modelo SORCIS: dimensiones del marketing en redes sociales, estilos de decisión del consumidor e intención de compra

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ABSTRACT

This study examines purchase intention in digital marketplaces by integrating social media marketing (SMM) dimensions with Consumer Style Inventory (CSI) decision-making styles through the SORCIS framework. The results obtained from marketplace buyers in Türkiye were analyzed using structural equation modeling. Interaction, informativeness, personalization, trendiness, and electronic word-of-mouth (eWOM) each show positive and significant effects on purchase intention. Among CSI styles, brand consciousness, fashion or novelty consciousness, and website content consciousness are substantial predictors, whereas other styles are not. Theoretically, the study positions CSI styles as enduring organismic factors within the S–O–R structure, explaining why similar SMM cues yield heterogeneous intentions and clarifying the role of content quality and transparency in interface-parity environments. Managerially, the results highlight the importance of informative content, responsible personalization, and community-based interaction.

Keywords: Social Media Marketing, Purchase Intention, Consumer Decision Making Styles, S-O-R Model, SORCIS model.

Jel Code: M30, M31

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RESUMEN

Este estudio analiza la intención de compra en los mercados digitales al integrar las dimensiones del marketing en redes sociales (SMM) con los estilos de decisión del Consumer Style Inventory (CSI) mediante el modelo SORCIS. Mediante ecuaciones estructurales se analizaron los resultados de los compradores de marketplaces en Turquía. La interacción, la informatividad, la personalización, la tendencia y el boca a boca electrónico (eWOM) tienen efectos positivos y significativos sobre la intención de compra. Entre los estilos de decisión, la conciencia de marca, la conciencia de moda o de novedad y la sensibilidad al contenido del sitio web son predictores relevantes, mientras que otros no lo son. Teóricamente, el estudio sitúa los estilos del CSI como factores orgánicos duraderos dentro de la estructura S–O–R, explicando por qué estímulos similares de SMM generan intenciones heterogéneas y aclarando el papel de la calidad y transparencia del contenido en entornos con paridad de interfaz. Desde una perspectiva gerencial, los resultados destacan la importancia de un contenido informativo, de la personalización responsable y de la interacción basada en la comunidad.

Código JEL: M30, M31

Palabras clave: marketing en redes sociales, intención de compra, estilos de toma de decisiones del consumidor, modelo S-O-R, modelo SORCIS.

INTRODUCTION

Digital transformation has reshaped consumer behavior and shifted purchasing to online environments, with social media now central to product discovery, brand interaction, and intention formation (Schiavone & Omrani, 2025; Shao et al., 2024; Wang et al., 2025). Prior research shows that social media marketing (SMM) dimensions, interaction, informativeness, personalization, trendiness, and (WOM) shape consumer behavior (De Alwis, 2023; Sohaib et al., 2022; Utami & Astuti, 2024; Rais, 2025). Within this stream of research, the Stimulus–Organism–Response (S-O-R) framework has become a dominant lens for explaining how digital marketing stimuli translate into consumer reactions.

Existing S-O-R studies typically define the organism in terms of transient states such as trust, attitude, or satisfaction, overlooking enduring decision-making styles (CSI). This omission limits explanatory power because stable processing tendencies strongly influence how consumers interpret identical stimuli (Abbott et al., 2023; Erensoy et al., 2024; Ho et al., 2022; Pereira et al., 2023; Pham et al., 2024). Recognizing this model's potential to deepen understanding can inspire researchers and practitioners to explore new insights in digital marketing.

The Consumer Style Inventory (CSI) addresses this gap by classifying enduring tendencies such as brand consciousness, fashion–novelty orientation, and sensitivity to content quality. However, CSI has rarely been integrated with S-O-R in social media contexts, restricting understanding of how SMM stimuli interact with stable cognitive styles to shape purchase intention in digital settings. To address this gap, we propose an integrated SORCIS model linking SMM dimensions (stimuli) with CSI decision-making styles (organism) to explain purchase intention (response). Extending S-O-R beyond transient evaluations offers a more complete explanation of heterogeneity. It provides a basis for style-sensitive social media strategies, empowering marketers to tailor their approaches effectively.

Viewed globally, SORCIS is most applicable in mobile-first, youthful, and socially driven markets. In such contexts, Latin America, Southeast Asia, and MENA foreground accelerators such as interaction, eWOM, and trend speed (Alibrahim, 2024; Medina & Lodeiros, 2025; Wanigapura et al., 2025; Xu et al., 2023). Sub-Saharan Africa highlights mobile reach and lightweight customer paths (Ogedengbe et al., 2022). Central/Eastern and Western Europe point to interface standardization that shifts advantage to content leadership (Liapis et al., 2025). North America emphasizes privacy and performance disciplines governing personalization (Florea et al., 2025). These contexts collectively offer natural environments to examine how content leadership, interaction, and calibrated personalization influence intention across markets, inviting researchers to explore these dynamics further.

Beyond addressing an empirical gap, SORCIS sharpens theoretical understanding within the S-O-R tradition. Prior studies often position stable differences as peripheral controls or segmentation variables (Hati et al., 2025; Li et al., 2021; Palamidovska et al., 2024; Sultan et al., 2021). By contrast, SORCIS conceptualizes the organism as a layered structure combining transient evaluations with enduring CSI styles. This specification clarifies why identical digital stimuli generate systematically different intentions across profiles and identifies boundary conditions in interface-parity environments.

Our model was tested using survey data from online shoppers in Türkiye (N = 395) and analyzed using structural equation modeling (SEM) with standard validity, reliability, and group-difference assessments. The results provide empirical support for SORCIS and yield theoretical and managerial implications. The remainder of the paper reviews the literature, outlines the research design, presents empirical results, and concludes with a discussion and future research avenues.

LITERATURE REVIEW

Social Media and the Consumer Decision-Making Process

Social media now influences every stage of the consumer decision journey, from problem recognition to post-purchase feedback (Chu, 2024). User-generated content, live streams, and reviews enrich information search, while social proof and algorithmic personalization narrow options and reduce cognitive effort. In-app commerce lowers friction and accelerates conversion. Engagement acts as a key mediator; both firm-created and user-created content shape decisions, particularly in FMCG markets (Sharma & Menka, 2023). Influencers, social proof, and personalized content strengthen intention through trust and perceived benefit (Iqbal, 2024). On visual platforms, content quality, influencer characteristics, and reviews sequentially activate awareness, interest, and intention (Anggara et al., 2024), with effects most pronounced during information search and post-purchase evaluation (Ntobaki et al., 2022).

Advertising and eWOM are central drivers of purchase intention. Source credibility outweighs mere exposure, especially in influencer campaigns (Ahsan et al., 2024). Targeted ads and user content enhance awareness, though ad fatigue and privacy concerns can weaken effectiveness (Sengupta et al., 2024). For high-involvement products, social media provides multi-layered information exchange, reducing perceived risk (Chattopadhyay, 2024). Effects vary by demographics and engagement intensity (Nasiketha et al., 2024). Effective outcomes require managing content quality, transparency, and privacy (Kajaria, 2024; Singh, 2023). Overall, social media forms a multi-layered environment where attitudes, norms, and

behaviors evolve dynamically, prompting firms to adopt holistic strategies beyond product promotion.

THEORETICAL FRAMEWORK

This study introduces the integrated SORCIS model, merging the S-O-R framework with the Consumer Style Inventory (CSI) to explain differential responses to digital stimuli. S-O-R posits that environmental stimuli influence internal states, leading to behavioral outcomes (Mehrabian & Russell, 1974). CSI identifies enduring decision-making tendencies such as brand consciousness, novelty-fashion orientation, and content sensitivity (Sproles & Kendall, 1986). Despite their relevance, CSI styles are rarely incorporated into S-O-R in social media contexts, limiting understanding of how stable cognitive orientations shape responses to SMM stimuli.

Within SORCIS, SMM elements interaction, informativeness, personalization, trendiness, and WOM function as stimuli. Visual and audiovisual content drive engagement, while emotional arousal and novel product information accelerate evaluation (Zhang & Lee, 2022). Trend-based brand strategies can trigger impulse decisions in fashion and retail (Safeer, 2024), and SMM activities can raise purchase intention through trust, brand experience, and brand love (Koay et al., 2023).

The organism comprises both transient states (e.g., trust, perceived value, engagement) and enduring CSI styles. Temporary states mediate the effect of SMM on intention (Safeer, 2024; Zhang & Lee, 2022), while stable styles shape how individuals encode and evaluate content (Sproles & Kendall, 1986). Treating CSI as a core organismic layer rather than a background variable clarifies why identical stimuli elicit different intentions across consumer types.

The response is purchase intention, which is strengthened by mediators such as trust and brand love (Koay et al., 2023). The SMM–intention link varies by demographics and market context, with studies confirming its robustness in emerging economies (Zeqiri et al., 2025). The integrated SORCIS framework extends S-O-R in three ways:

1. Reconceptualizing the organism as a dual-layered structure combining transient and enduring elements, addressing the “black box” limitation of traditional S-O-R.
2. Explaining heterogeneity by linking specific SMM cues with distinct CSI profiles.
3. Clarifying boundary conditions in interface-parity environments where content leadership, transparency, and privacy outweigh usability differences.

This framework supports theoretical implications across direct, indirect, and conditional effects. Direct effects anticipate positive impacts from SMM stimuli (Safeer, 2024; Zhang &

Lee, 2022). Indirect effects involve trust and brand experience (Koay et al., 2023). Conditional effects highlight CSI as a structuring mechanism for heterogeneity. Contextually, the strength of these relationships varies across industries and markets (Aljuhmani et al., 2022; Zeqiri et al., 2025).

In sum, SORCIS reframes core questions toward identifying which stimuli work for which decision-making styles and through which psychological pathways. This integrated perspective broadens the S-O-R framework, strengthens its explanatory power, and equips firms to design style-sensitive digital strategies that enhance purchase intention and loyalty.

Hypothesis Development

Interaction enables two-way, real-time brand user exchanges that heighten engagement and shorten the path to purchase; evidence shows interaction-intensive SMM boosts brand engagement and, in turn, purchase intention (Zeqiri et al., 2025), amplifies arousal and immediacy in retail/fashion with effects on (impulse) purchasing (Safeer, 2024), fosters cognitive customer brand engagement that translates into loyalty and buying (Aljuhmani et al., 2022), and works via trust and experience (Koay et al., 2023). Considering these arguments, the following hypothesis is proposed:

H1a. Interaction in social media marketing activities significantly and positively affects purchase intention.

Informativeness reduces uncertainty in digital exchanges by providing clear, relevant, and diagnostic details that prompt action; in social Q&A settings, higher information quality and usefulness increase information adoption and, ultimately, purchase intention (Ngo et al., 2024), while in WOM contexts informative cues (e.g., repeat-purchase information) raise perceived diagnosticity and value especially for utilitarian products thereby strengthening purchase intention (Li et al., 2023); converging evidence across social-media contexts shows that information-rich mechanisms reliably move consumers from attention to intention (Majeed et al., 2021). Accordingly, the following hypothesis is proposed:

H1b. Informativeness significantly and positively affects purchase intention

Personalization aligns content and recommendations with individual needs, enhancing perceived relevance, trust, and engagement and thereby increasing purchase intention; personalized advertising strengthens brand attitudes and intentions (An & Ngo, 2025; De Keyzer et al., 2022), AI-driven personalization is especially powerful in online retail (Dai & Liu, 2024), in cosmetics 66.8% of consumers cite personalization as the most influential factor (Jeong et al., 2023), and in live-streaming commerce personalization raises intention

indirectly via perceived ad value (Tan, 2024). However, excessive personalization can feel intrusive (Morimoto, 2017). Based on these findings, the following hypothesis is proposed:

H1c. Personalization significantly and positively affects purchase intention.

Trendiness captures consumers' engagement with up-to-date information and fashionable products on digital platforms; consumers follow trends to act as early adopters (Çifci & Sözen, 2017), and trend-seeking behavior significantly shapes purchase intention (Efendioğlu, 2019). In the fashion and textile context, socially responsible and image-consistent branding strategies strengthen consumer attitudes and enhance purchase intention (Huo et al., 2022), and Gen Z often buys trendy items for social recognition (El-Shihy & Awaad, 2025; Mohamed Sadom et al., 2025). Effects vary with cultural/psychological moderators (Kaur et al., 2024), but the overall pattern supports trendiness as a strong driver of purchase intention. In light of the above evidence, the following hypothesis is advanced:

H1d. Trendiness significantly and positively affects purchase intention.

In digital contexts, eWOM via reviews and ratings strongly affects intention across sectors (hospitality, fashion, real estate) due to perceived information quality and credibility (Maharani et al., 2023). Brand image often mediates the link between WOM intention and behavior, translating evaluations into behavioral intentions (Iswara et al., 2024). Social platforms amplify these effects, and moderators such as age can shape WOM's impact (Ghosh et al., 2022). Taken together, these considerations lead to the following hypothesis:

H1e. Word-of-mouth significantly and positively affects purchase intention.

Quality-conscious consumers seek reliable cues and high standards before purchasing (Sproles & Kendall, 1986); higher perceived quality boosts trust and thereby purchase intention in retail, moderated by price sensitivity (Religia et al., 2024), raises perceived value and directly increases intention in video games and streaming services (Pratama & Handoyo, 2024), and in fashion strengthens brand love, which, via emotional value, lifts intention (Wahyadyatmika & Mahyuni, 2025). Similar positive links appear in FMCG and smartphones, with brand reputation and pricing also relevant (Mamuaya, 2024); belief systems and brand awareness can mediate or moderate this pathway (Du et al., 2022), and social media quality signals enhance credibility and value perceptions, increasing intention (Yeniçeri & Şenel, 2021). Building on this rationale, we propose the following hypothesis:

H2a. Quality consciousness positively affects purchase intention.

Brand-conscious consumers value image consistency, distinctiveness, and social prestige; brand consciousness strengthens satisfaction and loyalty (He et al., 2012), and strong brand identity elevates satisfaction (Papista & Dimitriadis, 2012). Across markets, higher brand awareness/brand consciousness increases purchase intention directly and via attitudes or brand image (Chen et al., 2024; Dewi et al., 2024; Efendioğlu & Durmaz, 2022), amplifies the impact of marketing activities in services/retail (Haron et al., 2023), and mediates social-media advertising effects (Hosain & Mamun, 2023); national-brand contexts likewise show brand awareness as a key driver (Azizan et al., 2023). Consistent with this reasoning, the following hypothesis is articulated:

H2b. Brand consciousness positively affects purchase intention.

Fashion- and novelty-conscious consumers track emerging styles, value being first, and often act as early adopters; exposure to innovative social content boosts purchase intention in digital contexts (Yeniçeri & Şenel, 2021). Empirical work shows a direct positive effect of fashion consciousness on fashion purchase intention, amplified by social-media influencers, with similar patterns in e-commerce (Ardana & Artanti, 2022). Attitude frequently mediates the effect, and product involvement strengthens it (Gera & Agarwal, 2023). Related drivers of Gen Z's self-expression and brand image, symbolic consumption motives, and individual innovativeness alongside fashion involvement also align with higher purchase likelihood (Kaur, 2024; Singh, 2023; Wang et al., 2025). On this basis, we put forward the following hypothesis:

H2c. Fashion/novelty consciousness significantly and positively influences purchase intention.

Price-sensitive consumers prioritize value, compare alternatives, and respond to perceived price advantages. In digital commerce, price advantage drives online shopping (Punj, 2011), and social media promotions can shift price perceptions, increasing interest in buying (Gümüş, 2020; Punj, 2011; Rai & Bhattarai, 2023). Empirically, higher price sensitivity is associated with stronger purchase intention in deal-rich, low-switching-cost settings (e.g., Nepal's footwear; labeled bottled mineral water) (Rai & Bhattarai, 2023; Hasanah et al., 2023). Although some categories (FMCG, green durables) show dampening effects (Mamuaya, 2024; Riyaz et al., 2024), evidence in promotion-driven contexts supports the expected direction. Accordingly, the following hypothesis is proposed:

H2d. Price sensitivity positively affects purchase intention.

Portability signals convenience and shapes decisions: compact, lightweight, easy-to-carry/use products raise perceived functionality and purchase intention, especially in

electronics and furniture (Ali & Yateno, 2022; Aprilia & Darmawan, 2025; Sabbir, 2025); grab-and-go packaging increases perceived usefulness/ease of storage and can elevate premium perceptions that translate into buying intent. Portability cues also boost psychological value (Liang et al., 2022; Zhang et al., 2018). In light of these established findings, the following novel hypothesis is proposed:

H2e. Product portability sensitivity positively affects purchase intention.

Content-sensitive consumers respond to rich, credible, and privacy-respecting information; richer content improves experience and shapes perceptions on social platforms (Keng & Ting, 2009). High-quality content marketing (informative, emotional, and interactive) and a strong brand image increase engagement and purchase intention (Chen et al., 2024; Fan et al., 2024; Rizkia et al., 2024). Similarly, well-structured, trustworthy user-generated content lowers judgment costs, boosts perceived value/interest, and increases intention in social e-commerce (Chung, 2025; Zhang & Hu, 2024). Although privacy sensitivity can depress intention, the implementation of robust privacy protections plays a significant role in rebuilding trust and mitigating perceived risk (Wang et al., 2022). This understanding of the impact of privacy protections on rebuilding trust leads us to the following hypothesis:

H2f. Content sensitivity positively affects purchase intention.

According to Souza et al. (2023), consumers' loyalty and purchase behavior in e-commerce are significantly influenced by the quality of online information, trust, and satisfaction, suggesting that content clarity and relevance play a crucial role in shaping purchase intentions. Additionally, interactivity in interface design is a key factor influencing the facilitation of purchasing (Gupta et al., 2023). Recent evidence underscores the predictive power of website design and usability in online purchase intention, particularly when coupled with speed and security (Adedoja et al., 2022).

The perceived ease of use and design quality have been found to heighten intention on platforms like Lazada (Budi et al., 2023), while UI quality, information quality, privacy, security, and trust collectively bolster intention (Vo et al., 2023). On travel sites, the design, information, and usefulness positively impact intention (Chidananda et al., 2024), and higher interactivity increases intention for high-value items (Summerlin & Powell, 2022). The effects of interface design often operate through e-satisfaction/flow to (re)purchase (Pangestika et al., 2024). In light of these findings, the following hypothesis is proposed:

H2g. Sensitivity to the website interface positively influences purchase intention.

Gender moderates the SMM-to-purchase intention pathway, with significant effects in service settings (İbrahim, 2023). Meta-analytic evidence on online purchase intention indicates gender-based heterogeneity in SMM responses (Ghosh, 2024). Therefore, we propose the following hypothesis:

H3a. Gender differences are expected in one or more SMM dimensions, CSI decision-making styles, or purchase intention.

Meta-analytic evidence identifies demographic/contextual moderators of online purchase intention, implying that household structure (marital status) segments how consumers process SMM and eWOM (Ghosh, 2024). Differences in privacy expectations and relational considerations also shape the link between consumer brand interactions on social media and purchase intention (Gutiérrez et al., 2023). Accordingly, the following hypothesis is proposed:

H3b. Marital-status differences are expected in one or more SMM dimensions, CSI decision-making styles, or purchase intention.

Cohort research shows distinct SMM-to-PI dynamics across generations, with Gen Z and Millennials responding differently to digital stimuli and campaign elements (Gurunathan & Lakshmi, 2025; Sulistyowati et al., 2025). In line with cohort differences in digital literacy, platform use, and value orientations, age is expected to shape perceptions of SMM, decision styles, and purchase intention. Considering these arguments, the following hypothesis is proposed:

H3c. Age-cohort differences are expected in one or more SMM dimensions, CSI decision-making styles, or purchase intention.

Education influences engagement with visual eWOM because information adoption beyond perceived usefulness drives purchase intentions, which depend on users' capacity for active engagement and information processing (Bui et al., 2025). Likewise, sensitivity to information quality and interface design affect e-commerce satisfaction and loyalty, indicating systematic heterogeneity by education (Yoo et al., 2023). Based on these findings, the following hypothesis is proposed:

H3d. Education-level differences are expected in one or more SMM dimensions, CSI decision-making styles, or purchase intention.

Occupational cohorts vary in digital immersion and platform routines, yielding distinct responses to website experience and brand-related affect along the S-O-R pathway (Banerjee

et al., 2024); moreover, social media advertising and platform affordances can shift trust, loyalty, and purchasing, supporting heterogeneity by job status (Duan et al., 2024). Accordingly, the following hypothesis is proposed:

H3e. Occupational-status differences are expected in one or more SMM dimensions, CSI decision-making styles, or purchase intention.

Income stratification shapes perceived value and adoption in online commerce, for example, base-of-the-pyramid consumers exhibit distinct benefit sacrifice trade offs that drive purchase intention (Srivastava et al., 2023), and meta-analytic findings identify demographic moderators in online purchase intention, supporting expectations of income-level differences (Ghosh, 2024). Consistent with this reasoning, the following hypothesis is proposed:

H3f. Income differences are expected in one or more SMM dimensions, CSI decision-making styles, or purchase intention.

METHODOLOGY

Research Design

This study examines how attitudes toward social media marketing activities and online consumer decision-making styles influence purchase intention. A quantitative research approach with a correlational survey design was chosen for its appropriateness in examining relationships among variables and enabling the derivation of potential causal inferences. The study's theoretical foundation is grounded in the S-O-R model.

Sample and Data Collection

The target population comprises Turkish consumers with experience in online shopping via marketplaces. Data were collected using a structured online questionnaire distributed through social media platforms. Due to access limitations, a non-probability convenience sampling method was adopted. A total of 401 responses were gathered, and after data cleaning (e.g., removal of incomplete responses), 395 valid entries were retained for analysis. Screening questions ensured participants were active users of both social media and online shopping platforms.

Measurement Instrument

All constructs were operationalized with validated multi-item scales and rated on a 5-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree"). Social media marketing (SMM) was measured with 15 items spanning interaction (INT), informativeness (INF), personalization (PER), trendiness (TRE), and word-of-mouth (WOM), adapted from Yadav

and Rahman (2017). Online consumer decision-making styles were captured with 20 items based on the CSI Sproles and Kendall (1986) using the Turkish adaptation by Bayrakdaroğlu et al. (2017), covering quality consciousness (QC), brand consciousness (BC), fashion/novelty consciousness (FNC), price consciousness (PC), product portability sensitivity (PPS), website content consciousness (WCC), and website interface consciousness (WIC). Purchase intention (PI) was assessed with five items from McKnight and Chervany (2001). To ensure linguistic and cultural equivalence, all items underwent translation and back-translation by two independent bilingual researchers, followed by a pilot test (30 respondents) to refine wording and localize brand/channel examples. Construct validity was examined via confirmatory factor analysis; we targeted standardized loadings ≥ .60, composite reliability (CR) ≥ .70, and average variance extracted (AVE) ≥ .50 for convergent validity.

Data Analysis and Assumptions

Data analyses were performed using SPSS 25.0 and AMOS 24.0. The analytical procedure consisted of several steps to ensure methodological rigor and validity. First, descriptive statistics were computed for demographic variables and construct indicators. Second, Exploratory Factor Analysis (EFA) was conducted to explore the underlying factor structure of the measurement scales. Third, CFA was used to validate the measurement model, with construct validity assessed via CR and AVE. Fourth, AMOS implemented SEM to test the hypothesized relationships among constructs and evaluate the overall model fit using widely accepted indices such as CFI, RMSEA, and χ^2/df. Finally, independent samples t-tests were conducted to examine potential group differences between genders and marital statuses. At the same time, one-way ANOVA with post hoc analyses was used to assess differences across age, education, occupation, and income level. This multi-method analytical approach, combining measurement validation and structural testing, strengthens the internal validity and generalizability of the findings.

To verify SEM assumptions, univariate normality was assessed via skewness and kurtosis. All constructs fell within the ±2.00 threshold (George & Mallery, 2024). Skewness ranged from −1.541 to −0.643 and kurtosis from −0.698 to 1.607, confirming acceptable univariate normality. Specifically, skewness and kurtosis values were as follows: INT (sk = −1.082; ku = 1.054), INF (sk = −0.737; ku = 0.129), PER (sk = −1.155; ku = 0.840), TRE (sk = −1.019; ku = 1.140), WOM (sk = −0.656; ku = −0.183), QC (sk = −1.204; ku = 1.263), BC (sk = −0.673; ku = −0.359), FNC (sk = −0.643; ku = −0.698), PC (sk = −1.052; ku = 1.084), PPS (sk = −0.784; ku = 0.230), WCC (sk = −1.541; ku = 1.607), WIC (sk = −1.423; ku = 1.307), and PI (sk = −1.262; ku = 1.142). The observed skewness values ranged from −1.541 to −0.643, and kurtosis values ranged from −0.698 to 1.607, all of which fall within the recommended thresholds. These results confirm that the dataset satisfies the univariate normality assumption required for SEM analyses.

RESULTS

Participant Profile

The data were meticulously collected from 395 respondents with a history of online shopping in Türkiye. Among the participants, 60.5% identified as female and 39.5% as male. A majority (66.6%) reported being single. The most represented age group was 18–24 (38.5%), followed by 25–31 (32.7%). Educationally, 57.2% held an undergraduate degree, while the remaining respondents had graduate-level education or lower. Regarding occupation, the two dominant groups were students (36.2%) and private sector employees (35.9%) (see Table 1).

Table 1
Demographic Statistics

Demographic Variable	Category	N	%
Gender	Female	239	60.5
	Male	156	39.5
Marital Status	Single	263	66.6
	Married	132	33.4
Age	18–24	152	38.5
	25–31	129	32.7
	32–42	76	19.2
	43–52	31	7.8
	53 and above	7	1.8
Occupation	Student	143	36.2
	Public Sector Employee	60	15.2
	Private Sector Employee	142	35.9
	Retired	8	2
	Unemployed	42	10.6
Education	High School or below	53	13.4
	Associate Degree	80	20.3
	Bachelor's Degree	226	57.2
	Graduate Degree	36	9.1
Income	≤500$	124	31.4
	501$–1250$	35	8.9
	1251$–2000$	28	7.1
	2001$–2550$	53	13.4
	2551$–3500$	68	17.2
	≥3501$	87	22

Source: Own elaboration.

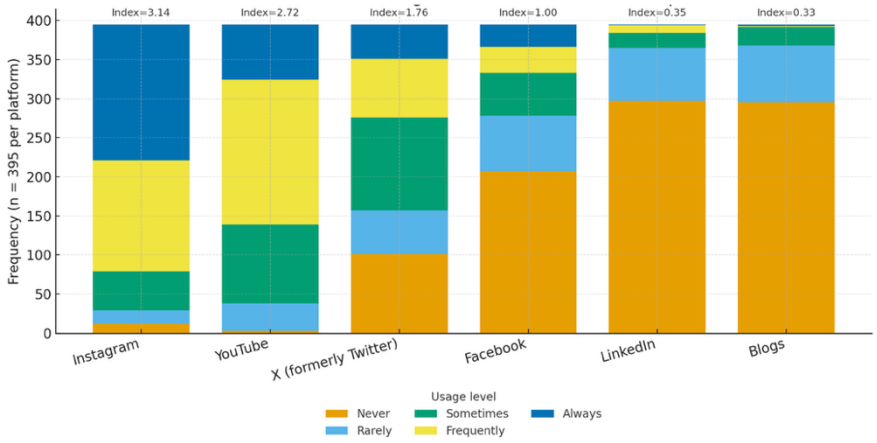
Social Media Usage Frequency

In the sample, social media use concentrates on visual–video platforms: Instagram and YouTube lead with "frequently/always" totals of 80.0% and 64.8%, respectively; for X (formerly Twitter), the distribution is polarized ("sometimes" 30.1%; "never" 25.6%). Facebook (52.4%), LinkedIn (75.2%), and blogs (74.7%) show high "never" usage shares, indicating a clear shift away from low-interaction networks. The weighted usage index (0 = never, 4 = always) is: Instagram = 3.14; YouTube = 2.72; X (formerly Twitter) = 1.76; Facebook = 1.00; LinkedIn = 0.35; Blogs = 0.33. Daily use is moderate, with 54.9% spending

1–3 hours/day and 29.4% spending 3–5 hours. Heavy users (≥5 hours) account for 8.9%, and light users (<1 hour) for 6.8%. Using midpoint coding, the mean is approximately 2.9 hours/day. "First association with social media" clusters around entertainment (38.5%) and sharing (31.6%), with instant access (15.2%) and communication (14.7%) as secondary themes (see Figure 1). This pattern suggests that SMM strategies should prioritize highly interactive, visually rich platforms such as Instagram and YouTube. In contrast, for X (formerly Twitter), more selective positioning by content type is advisable.

Figure 1

Social Media Platform Usage Distribution and Weighted Usage Index (n=395 each)



Source: Own elaboration.

Validity and Reliability Analysis

An EFA was conducted to examine the underlying factor structure. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.899, and Bartlett's Test of Sphericity was significant ($p < .001$), confirming the data's high suitability for factor analysis and instilling confidence in the research process. The final factor solution yielded 13 constructs, collectively explaining 88.65% of the total variance. The overall Cronbach's Alpha (CA) was .940, suggesting high internal consistency. Reliability indicators, including CA, AVE, and CR for each construct, are reported in Table 2. Overall, the findings provide strong evidence of the measurement model's validity and reliability.

Confirmatory Factor Analysis

The Confirmatory Factor Analysis (CFA) was performed to validate the measurement model. The SMM activities scale demonstrated an excellent fit, with model fit indices within acceptable ranges: $\chi^2/df = 2.065$, CFI = 0.984, NFI = 0.970, TLI = 0.979, GFI = 0.968, and RMSEA = 0.052. Similarly, the decision-making styles scale showed a satisfactory model fit: $\chi^2/df = 2.777$, CFI = 0.965, NFI = 0.946, TLI = 0.950, GFI = 0.947, and RMSEA = 0.067. The findings provide strong evidence of the validity and reliability of the measurement model, further confirming that the constructs are not only statistically robust but also

theoretically sound, making them suitable for advancing to the SEM stage to test the hypothesized relationships.

Table 2
Validity and Reliability Analysis

Factor	Item	Loading	CA	AVE	CR
INT	INT1	0.881	0.930	0.742	0.896
	INT2	0.864			
	INT3	0.839			
INF	INF1	0.804	0.942	0.612	0.825
	INF2	0.751			
	INF3	0.793			
PER	PER1	0.757	0.904	0.553	0.787
	PER2	0.749			
	PER3	0.725			
TRE	TRE1	0.837	0.935	0.712	0.881
	TRE2	0.824			
	TRE3	0.871			
WOM	WOM1	0.860	0.914	0.718	0.884
	WOM2	0.856			
	WOM3	0.826			
QC	QC1	0.866	0.802	0.714	0.833
	QC2	0.824			
BC	BC1	0.902	0.915	0.798	0.922
	BC2	0.877			
	BC3	0.903			
FNC	FNC1	0.873	0.935	0.752	0.858
	FNC2	0.862			
PC	PC1	0.965	0.956	0.909	0.968
	PC2	0.940			
	PC3	0.957			
PPS	PPS1	0.922	0.856	0.840	0.913
	PPS2	0.912			
WCC	WCC1	0.833	0.968	0.750	0.947
	WCC2	0.882			
	WCC3	0.893			
	WCC4	0.899			
	WCC5	0.901			
	WCC6	0.784			
WIC	WIC1	0.916	0.877	0.833	0.909
	WIC2	0.910			
PI	PI1	0.780	0.969	0.585	0.876
	PI2	0.764			
	PI3	0.779			
	PI4	0.723			
	PI5	0.779			

Source: Own elaboration.

Structural Equation Modeling

The SEM was constructed to test the research hypotheses. The model fit indices are presented in Table 3. All indices fell within the acceptable or good fit thresholds, indicating a model structure.

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Table 3
Model Fit Indices

Fit Index	Observed Value	Interpretation	Threshold (Good Fit)	Threshold (Acceptable Fit)
CMIN/DF	2.204	Good fit	≤ 3	≤ 5
CFI	0.952	Good fit	≥ 0.95	≥ 0.90
NFI	0.916	Acceptable fit	≥ 0.95	≥ 0.90
TLI	0.941	Acceptable fit	≥ 0.95	≥ 0.90
GFI	0.935	Acceptable fit	≥ 0.95	≥ 0.90
RMSEA	0.057	Good fit	≤ 0.06	≤ 0.08

Source: Own elaboration

Note: Hu and Bentler (1999) suggest CFI/TLI ≥ .95 and RMSEA ≤ .06 for good fit; Kline (2016) and Hair et al. (2019) accept ≥ .90 as adequate for CFI/TLI/NFI/GFI and RMSEA ≤ .08 as acceptable.

Hypothesis Testing

The comprehensive SEM path analysis results, detailed in Table 4, provide a thorough understanding of the relationship between SMM activities and purchase intention. All dimensions of SMM activities (INT, INF, PER, TRE, and WOM) significantly and positively affected PI. There were also significant impacts on consumer decision-making styles (BC, FNC, WCC). However, QC, PC, PPS, and WIC were not significant predictors, reinforcing the study's comprehensive approach.

Table 4
SEM Path Analysis Results

Hypothesis	Path	Standardized Coefficient	p-value	Result
H1a	INT → PI	0.246	**.001**	**Accepted**
H1b	INF → PI	0.215	**.001**	**Accepted**
H1c	PER → PI	0.127	**.022**	**Accepted**
H1d	TRE → PI	0.134	**.002**	**Accepted**
H1e	WOM → PI	0.189	**.001**	**Accepted**
H2a	QC → PI	0.06	.260	Rejected
H2b	BC → PI	0.108	**.002**	**Accepted**
H2c	FNC → PI	0.175	**.001**	**Accepted**
H2d	PC → PI	0.016	.465	Rejected
H2e	PPS → PI	0.02	.594	Rejected
H2f	WCC → PI	0.417	**.001**	**Accepted**
H2g	WIC → PI	0.007	.841	Rejected

Source: Own elaboration.

These results underscore the direct role of digital interaction and user-centric content in shaping purchase intentions on social platforms. They also indicate that not all consumer styles equally influence purchase behavior in online contexts.

Differences by Demographic Variables

Significant variations in key variables were observed based on demographic characteristics: Gender Differences: Independent-samples t tests show higher scores for women than men on INT, INF, PER, QC, WCC, and PI. INT: t(306.39)=2.42, p=.01; INF: t(393)=2.18, p=.03; PER: t(393)=2.32, p=.02; QC: t(287.81)=2.05, p=.04; WCC: t(393)=2.00, p=.04; PI:

t(393)=2.10, p=.03 (female means > male means in all cases). Effects are small (Cohen's d≈0.20–0.26). No gender differences are observed for TRE, WOM, BC, FNC, PC, PPS, or WIC (p≥.05). Notably, female participants outperformed males in interaction, informativeness, and personalization; this pattern underscores the value of tailoring social media strategies to women's preferences, who appear more receptive to relational and content-centric marketing elements (Table 5)

Table 5
T-Test Results for Gender

Variable	Female n	Mean	SD	Male n	Mean	SD	t(df)	p
INT	239	3.93	0.89	156	3.69	0.99	t(306) = 2.42	**.01**
INF	239	3.85	0.98	156	3.62	1.03	t(393) = 2.18	**.03**
PER	239	3.85	0.96	156	3.61	1.04	t(393) = 2.32	**.02**
TRE	239	3.95	0.87	156	3.84	0.95	t(393) = 1.17	.24
WOM	239	3.53	1.07	156	3.44	1.10	t(393) = 0.81	.41
QC	239	4.1	0.89	156	3.89	1.07	t(287) = 2.05	**.04**
BC	239	3.43	1.17	156	3.51	1.07	t(393) = −0.76	.44
FNC	239	3.7	1.24	156	3.58	1.21	t(393) = 1.02	.30
PC	239	3.7	1.38	156	3.82	1.29	t(393) = −0.92	.36
PPS	239	3.81	0.97	156	3.81	1.08	t(393) = 0.07	.94
WCC	239	4.29	0.99	156	4.07	1.13	t(393) = 2.00	**.04**
WIC	239	4.13	1.05	156	4.04	1.19	t(393) = 0.75	.45
PI	239	4.13	0.97	156	3.92	1.08	t(393) = 2.10	**.03**

Source: Own elaboration.

Marital Status: Independent-samples t-tests show that marital status differentiates among several SMM stimuli and content sensitivities. Single participants reported significantly higher means than married participants on INT, INF, PER, TRE, and WCC (t = 2.25–3.26, p ≤ .03). At the same time, no differences emerged for WOM, QC, BC, FNC, PC, PPS, WIC, or PI (p ≥ .07). Notably, single consumers scored higher on interaction, informativeness, and personalization, indicating greater receptivity to relational and content-based features of brand communications on social media (Table 6).

Table 6
T-Test Results for Marital Status

Variable	Marital status	N	Mean	SD	t(df)	p
INT	Single	263	3.92	0.86	t(219) = 2.35	**.02**
	Married	132	3.67	1.06		
INF	Single	263	3.89	0.90	t(213) = 3.26	**.01**
	Married	132	3.52	1.15		
PER	Single	263	3.86	0.92	t(223) = 2.79	**.01**
	Married	132	3.55	1.11		
TRE	Single	263	3.98	0.80	t(207) = 2.25	**.03**
	Married	132	3.75	1.07		
WOM	Single	263	3.56	1.05	t(393) = 1.79	.07
	Married	132	3.36	1.13		
QC	Single	263	4.07	0.91	t(393) = 1.61	.10
	Married	132	3.91	1.06		
BC	Single	263	3.52	1.11	t(393) = 1.37	.17
	Married	132	3.36	1.17		

Variable	Marital status	N	Mean	SD	t(df)	p
FNC	Single	263	3.72	1.21	t(393) = 1.47	.14
	Married	132	3.53	1.26		
PC	Single	263	3.77	1.34	t(393) = 0.48	.63
	Married	132	3.70	1.36		
PPS	Single	263	3.83	1.01	t(393) = 0.38	.70
	Married	132	3.79	1.03		
WCC	Single	263	4.32	0.93	t(393) = 2.93	**.01**
	Married	132	3.99	1.23		
WIC	Single	263	4.10	1.09	t(393) = 0.12	.90
	Married	132	4.09	1.15		
PI	Single	263	4.12	0.92	t(213) = 1.76	.08
	Married	132	3.92	1.18		

Source: Own elaboration.

Age: Participants aged 25–31 scored significantly higher than those 18–24 on INT, INF, TRE, FNC, PPS, WCC, and PI, WOM was also higher for 25–31 than 43+ (all $p \leq .03$). This pattern indicates that the 25–31 cohort is more responsive to digital marketing stimuli and more actively engages in online consumer behaviors (Table 7).

Table 7
ANOVA Results for Age, Education, Occupation and Income

Demographic factor	Variable	F	p	Group difference
Age	INT	4.52	**.01**	1 → 2
	INF	4.82	**.01**	1 → 2
	TRE	4.56	**.01**	1 → 2
	WOM	3.06	**.03**	2 → 4
	FNC	3.66	**.01**	1 → 2
	PPS	4.40	**.01**	1 → 2
	WCC	3.84	**.01**	1 → 2
	PI	3.97	**.01**	1 → 2
Education	WOM	3.09	**.02**	1 → 4
	WIC	2.83	**.03**	1 → 4
Occupation	INT	3.30	**.02**	1 → 3
	INF	3.88	**.01**	1 → 3
	PER	4.36	**.01**	1 → 3
	TRE	3.12	**.03**	1 → 3
	WOM	3.24	**.02**	2 → 3
	BC	3.23	**.02**	3 → 4
	PPS	4.12	**.01**	1 → 4
Income	INT	2.16	**.05**	1 → 4
	INF	3.02	**.01**	1 → 4
	WOM	5.90	**.01**	1 → 4
	PER	2.62	**.05**	1 → 4

Source: Own elaboration.

Education level: Only two constructs varied by education: postgraduates outperformed the high-school-or-below group on WOM and WIC (p = .02–.03). This suggests that highly educated consumers apply more critical evaluations to communicative cues and interface quality (Table 7).

Occupation: Compared with students, private-sector employees reported higher means on INT, INF, PER (personalization), and TRE; WOM was higher for private sector than public sector, BC (brand consciousness) was higher for private sector than retired/unemployed, and PPS was higher for retired/unemployed than students (all p ≤ .03), underscoring systematic role-based differences in digital engagement (Table 7). Income level: Respondents earning $ 2001–$2550 exceeded the ≤ $500 group on INT, INF, and WOM (p ≤ .01), with a marginal difference on PER (≈ .05), indicating a mid-income segment that is primarily engaged with digital marketing content (Table 7)

Table 8
Results on Demographic Differences in SMM and PI

Hypothesis	Factor	Test	Significant constructs	p (range)	Key pairwise difference(s)	Result
H3a	Gender	T-test	INT, INF, PER, QC, WCC, PI	**.01–.04**	Female > Male (all six)	Accepted
H3b	Marital status	T-test	INT, INF, PER, TRE, WCC	**.01–.03**	Single > Married (all five)	Accepted
H3c	Age	ANOVA	INT, INF, TRE, WOM, FNC, PPS, WCC, PI	**.01–.03**	25–31 > 18–24 for INT, INF, TRE, FNC, PPS, WCC, PI; 25–31 > 43+ for WOM	Accepted
H3d	Education level	ANOVA	WOM, WIC	**.02–.03**	Postgraduate > High-school-or-below	Accepted
H3e	Occupation	ANOVA	INT, INF, PER, TRE, WOM, BC, PPS	**.01–.03**	Private sector > Students for INT, INF, PER, TRE; Private sector > Public sector for WOM; Private sector > Retired/Unemployed for BC; Retired/Unemployed > Students for PPS	Accepted
H3f	Income	ANOVA	INT, INF, WOM, PER	**.01–.05**	2001–2550 $ > ≤500$ (all four)	Accepted

Source: Own elaboration.

Women scored higher than men on INT, INF, PER, QC, WCC, and PI (minor effects), whereas singles exceeded married respondents on INT, INF, PER, TRE, and WCC. ANOVAs showed that the 25–31 cohort outperformed the 18–24 cohort on INT, INF, TRE, FNC, PPS, WCC, and PI, and surpassed the 43+ cohort on WOM. Postgraduates scored

higher than the high school or below group on WOM and WIC. Private-sector employees reported higher means than INT, INF, PER, and TRE students. WOM was higher among private-sector employees than among public-sector employees. At the same time, BC was higher among private-sector employees than among retired/unemployed individuals, and PPS was higher among retired/unemployed individuals than among students. Finally, the $2001–$2550 income group exceeded the ≤ $500 income group on INT, INF, WOM, and PER.

These patterns reveal a systematic demographic variation in responsiveness to SMM stimuli and decision-style sensitivities, supporting the H3 suite and underscoring the value of demographic tailoring in digital campaigns (See Table 8). In summary, these findings underscore the importance of tailoring SMM strategies to the demographic characteristics of target audiences. This approach is crucial to maximizing the effectiveness of marketing efforts and ensuring more informed consumer engagement. It is not just a strategy but a necessity in the digital age.

DISCUSSION

The SORCIS model refines the S-O-R framework by conceptualizing consumer decision-making styles as an internal part of the organism rather than as external moderators. This respecification produces three key insights. First, enduring CSI styles add explanatory value to purchase intention beyond social media stimuli. Second, the same SMM cues interaction, informativeness, personalization, trendiness, and eWOM produce different intention levels depending on whether consumers are brand, fashion/novelty, or content-conscious. Third, digital environments characterized by standardized interfaces shift the locus of influence toward content transparency, credibility, and privacy, all of which are filtered through CSI.

These findings align with existing work showing that interaction and informativeness reduce decision costs and enhance trust (Li et al., 2023; Ngo et al., 2024), personalization strengthens evaluative outcomes (Dai & Liu, 2024), and content quality and credibility drive engagement (Chen et al., 2024; Keng & Ting, 2009; Zhang & Hu, 2024). Under UI parity, competitive advantage shifts toward credible, transparent, and privacy-oriented content. Non-significant effects suggest that platform standards dampen quality variance, discounting weakens price, and interface standardization limits the explanatory power of usability, directing resources toward scalable content, review loops, and community interaction.

Globally, the SORCIS framework builds on a universal trust spine grounded in transparent, informative content (Lăzăroiu et al., 2020), complemented by accelerators' interaction, eWOM, personalization, and trend speed tailored to local style mixes (Semwal et al., 2024). Market-specific dynamics from Latin America's mobile-first communities to Southeast

Asia's live-commerce ecosystems, MENA's identity-based trust cues, Sub-Saharan Africa's lightweight content paths, and Europe's regulatory-driven content leadership illustrate the model's adaptability and help determine which levers dominate in each context (Mendoza et al., 2025; Paguay et al., 2025; Eze et al., 2024; Srivastava et al., 2024; Florea et al., 2025).

The evidence shows that SORCIS mechanisms are not Türkiye-specific but characterize mobile-first, platform-based settings across emerging markets (Souza et al., 2023; Zeqiri et al., 2025). Demographic and value risk structures shift the strength but not the direction of these relationships, confirming their context sensitivity (Ghosh, 2024; Srivastava et al., 2023). Latin American markets, with their social-discovery culture and dependence on eWOM, align closely with the trust-spine logic, though privacy expectations limit personalization (Chaparro et al., 2025; Medina & Lodeiros, 2025; Mendoza et al., 2025; Souza et al., 2023). Future multi-group SEM can further validate cross-market performance and identify boundary conditions.

Theoretical Contributions

This study offers four main theoretical contributions. First, it advances the S-O-R tradition by embedding decision-making styles directly into the organism, demonstrating that stable cognitive orientations meaningfully shape how stimuli translate into intention. Second, the model provides a style-sensitive explanation of heterogeneity, showing that SMM cues vary in effectiveness across brand-, fashion/novelty-, and content-conscious consumers. Third, SORCIS clarifies boundary conditions in digital contexts characterized by interface convergence, where content credibility, transparency, and privacy become the primary interpretive filters. Fourth, it articulates a portable decision logic for emerging and global markets by linking trust-spine mechanisms with context-specific accelerators, offering a unifying explanation for variability across regions.

Practical Contributions

Managerially, the results indicate three actionable implications. First, firms should prioritize content quality and credibility by investing in transparent, diagnostic information, clear policies, and curated UGC to strengthen trust and engagement. Second, engineering interaction and personalization remain essential. Tools such as live Q&A, community features, and responsible recommendation systems are especially effective for brand- and fashion-conscious segments. Personalization should follow a "usefulness over intrusiveness" rule with user-controlled settings. Third, demographic segmentation enhances competitiveness: women and younger adults respond strongly to interaction and informativeness, while postgraduate groups value evaluative depth. For internationalization, firms should standardize the trust spine across markets while localizing accelerators to regional CSI profiles. In Latin America's mobile-social environments, rapid trust-building

content, eWOM scaling, and community mechanisms precede trend-based tactics, supporting market share and competitive differentiation.

CONCLUSIONS

This study aimed to fill a significant gap in the literature by introducing the novel SORCIS model, which integrates consumer decision-making styles into the S-O-R framework. Drawing on survey data from 395 online consumers in Türkiye, the findings reveal that the five dimensions of SMM interaction, informativeness, personalization, trendiness, and WOM exert significant and positive effects on purchase intention. In addition, consumer decision-making styles such as brand, fashion/novelty, and website content consciousness emerge as important predictors. In contrast, quality consciousness, price sensitivity, product portability sensitivity, and website interface sensitivity are not significant. These results provide novel insights into how enduring consumer orientations interact with marketing stimuli in digital environments.

Theoretically, this study advances the S-O-R model by positioning consumer decision-making styles as enduring organismic constructs, rather than peripheral control variables, and by showing that these styles explain systematic variation in purchase intention that cannot be accounted for by social media stimuli alone. In practice, it provides clear guidance for firms to design social media strategies that emphasize personalization, content quality, and interaction, particularly when targeting consumer groups such as fashion- or novelty-conscious individuals and brand-oriented individuals. The study equips marketers with actionable insights to maximize engagement and conversion in increasingly competitive online marketplaces by identifying which decision-making styles are most responsive to specific digital stimuli.

This research underscores the importance of adopting an integrated perspective when examining consumer responses in digital marketing contexts. Testing the SORCIS model not only contributes to academic theory but also delivers relevant implications for businesses operating in dynamic social media ecosystems. This integrated perspective provides a comprehensive understanding of consumer behavior in digital environments, enlightening academics and practitioners in the field.

Limitations and Future Research

Despite its contributions, this study has several limitations that should be acknowledged. First, the data were collected via convenience sampling from consumers in Türkiye, limiting the generalizability of the findings to other cultural or regional contexts. The voluntary, online nature of the sampling approach may also introduce self-selection bias, as individuals

with higher digital engagement are more likely to participate. Replicating the study across different countries and product categories could validate and extend the robustness of the SORCIS framework. Second, the cross-sectional design captures consumer perceptions at a single point in time; longitudinal or experimental studies would provide deeper insights into the dynamic nature of consumer decision-making in digital environments. Third, reliance on self-reported measures may introduce common-method bias, suggesting that future studies could incorporate behavioral or observational data to triangulate results. In addition, platform-specific usage patterns and socioeconomic differences may influence how SMM stimuli and decision styles interact, indicating that contextual biases should also be considered when interpreting the findings.

To strengthen portability, we recommend multi-country, multi-group SEM that compares regions with different regulatory stringency, platform maturity, interface convergence, privacy salience, and style compositions. Such comparative designs would directly address the cultural sensitivity of decision-style distributions and clarify which contextual factors shift the strength of SORCIS pathways across markets. Modeling country-level style distributions alongside interface and privacy indicators can disentangle when content leadership versus interaction/eWOM and trend accelerators dominate intention formation, and how the usefulness threshold for personalization shifts across privacy regimes.

Future research could also explore additional psychological or contextual variables that moderate the SORCIS relationships, such as digital literacy, privacy concerns, or platform-specific affordances. Moreover, integrating advanced analytical techniques, such as multi-group SEM or machine learning, may yield greater precision in identifying heterogeneous consumer responses. Cross-market SEM comparing Türkiye and key Latin American economies represents an auspicious direction, offering a systematic test of generalisability while addressing the editorial suggestion for a broader international research agenda. By addressing these directions, future studies can refine and extend the applicability of the SORCIS framework, enhancing both theoretical understanding and managerial relevance in digital marketing research.

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FINANCIAL AND ECONOMIC INDICATORS

The Value and Life of Products and Services based on Culture, Knowledge, and Technology

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Success in business management, particularly in a globalized environment, depends to a large extent on a comprehensive understanding of the relationship between the philosophy of life, the business idea, strategic planning, and the business plan, in close connection with culture, knowledge, and technology. This interrelationship constitutes an essential framework of reference for business decision-making aimed at creating sustainable value.

The value of businesses is closely linked to their ability to generate wealth in a sustained way throughout the useful life of the products and services they offer. This useful life does not respond only to technical or economic criteria. Still, it is determined by the degree of social acceptance, cultural adoption, and symbolic and functional permanence that products and services achieve in the markets. In this sense, the life cycle of goods and services across different regions or countries in the world is fundamentally driven by the dynamic interaction among culture, knowledge, and technology, factors that influence both demand and organizations' capacity to innovate and adapt.

These three elements act in a systemic and interdependent way, configuring consumption patterns, organizational learning processes, and technological trajectories that explain why certain products manage to consolidate and maintain themselves over time, while others disappear prematurely. Each of these pillars is discussed below.

Culture

Culture constitutes the symbolic, normative, and cognitive framework within which individuals interpret, value, and adopt products and services. From an ethnographic perspective, culture or civilization is defined as "that complex whole that includes beliefs, art, morals, law, customs, and any other habits and capacities acquired by man as a member of society" (Kahn, 1975). This definition highlights the integral, historical, and cumulative character of culture as the foundation of social and economic behavior.

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From a contemporary sociological approach, Giddens (1998) conceives culture as the set of values (abstract ideals), norms (concrete rules of behavior), and material goods produced and shared by a social group. It also stresses that culture is not static. Still, an engine of social change, influencing how people live, relate to each other, and make decisions, continuously redefining norms and values in the context of modernity.

In the business environment, culture directly impacts the perception of value, consumption habits, acceptance or resistance to innovation, and the social legitimacy of products and services. Therefore, organizations that understand, respect, and properly manage cultural differences not only facilitate the entry into new markets but also manage to prolong the life of their offerings and strengthen their competitive positioning in diverse contexts.

Knowledge

Knowledge is a fundamental intangible strategic resource for value creation, innovation, and organizational learning. Nonaka and Takeuchi (1995) analyze this concept from two complementary approaches. The first, aligned with traditional Western epistemology, conceives knowledge as something formal, explicit, and static, oriented to the search for objective truth and expressed through propositions, models, and formal logic. This approach privileges the codification, systematization, and transfer of knowledge.

The second approach conceives of knowledge as a dynamic human process, through which individuals justify their personal beliefs in the search for truth. From this perspective, knowledge is contextual, subjective, and active, underpinned by experience, commitment, and individual values, making it a key element of continuous innovation and the generation of sustainable competitive advantages. Various authors have proposed classifications that show the complexity of organizational knowledge. Spender (1996) proposes a matrix based on two dimensions: tacit–explicit and individual–social, from which four types of expertise emerge:

1. Conscious,
2. Automatic,
3. Objective, and
4. Collective.

For his part, Zack (1999) classifies explicit and shared knowledge into three categories:

1. Declarative knowledge, which describes what something is;
2. Procedural knowledge, which explains how an activity is carried out; and
3. Causal knowledge, which analyzes why phenomena occur.

The diversity of approaches and typologies highlights the lack of absolute consensus in the literature. Still, it underscores the relevance of knowledge as a strategic asset that directly

influences companies' ability to design products, optimize processes, adapt to the environment, and extend the economic life of their goods and services.

Technology

Technology represents the practical application of knowledge for problem-solving and the satisfaction of human needs. According to UNESCO, technology is defined as the "know-how and creative process that uses resources, tools, and systems to solve problems and increase control over the natural and artificial environment, with the purpose of improving the human condition" (Ferreyra, 1994).

Levinson (1997) conceives of technology as the reorganization or redistribution of physical material according to human specifications, theories, and ideas, emphasizing its instrumental character and its dependence on previous conceptual frameworks. In a complementary way, Gay (1995) defines technology as an ordered set of knowledge and processes oriented to the production of goods and services, integrating technical, scientific, economic, social and cultural dimensions. From this perspective, technology not only responds to social needs, but also aspires to improve the quality of life.

In the business context, technology acts as an accelerating and, in many cases, disruptive factor in the life cycle of products and services. It allows both accelerated obsolescence and continuous renewal, so its strategic management, aligned with organizational culture and knowledge, is decisive to sustain competitiveness, innovation, and economic value in the long term.

Economic and financial indicators are valuable tools that help organizations make timely, appropriate decisions about their corporate and financial strategies. Next, the evolution of some economic and financial indicators in the Mexican environment is described to facilitate decision-making related to personal and business strategy in an integrated manner.

1. National Consumer Price Index (INPC, Spanish)
2. The Price and Quotation Index of the Mexican Stock Exchange (IPC, Spanish)
3. Exchange rate
4. Equilibrium interbank interest rate (TIIE, Spanish)
5. CETES rate of return
6. Investment units (UDIS, Spanish)

1. NATIONAL CONSUMER PRICE INDEX (INPC)

Born in 1995 and reflecting changes in consumer prices, it measures the country's overall price increase. It is calculated fortnightly by the Bank of Mexico and INEGI (2021). INPC is

published in the Official Gazette of the Federation on the 10th and 25th of each month. The reference period is the second half of July 2018.

Table 1

Accumulated inflation in the year (Base: 2nd. half of July 2018=100 with data provided by *Banco de México*)

Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	0.90	-0.09	0.38	1.70	0.53	0.09	0.48	0.86	0.59	0.76	0.89	0.29
February	1.15	0.09	0.82	2.29	0.91	0.06	0.90	1.50	1.43	1.24	0.99	0.56
March	1.43	0.51	0.97	2.92	1.24	0.44	0.85	2.34	2.43	1.51	1.28	0.88
April	1.24	0.25	0.65	3.04	0.90	0.50	-0.17	2.67	2.98	1.49	1.48	1.21
May	0.91	-0.26	0.20	2.92	0.73	0.21	0.22	2.88	3.17	1.27	1.29	1.50
June	1.09	-0.09	0.31	3.18	1.12	0.27	0.76	3.43	4.04	1.37	1.68	1.78
July	1.42	0.06	0.57	3.57	1.66	0.65	1.43	4.04	4.81	1.86	2.74	2.05
August	1.73	0.27	0.86	4.08	2.26	0.63	1.82	4.24	5.54	2.42	2.75	2.12
September	2.18	0.27	1.47	4.41	2.69	0.89	2.06	4.88	6.19	2.88	2.80	2.35
October	2.74	1.16	2.09	5.06	3.22	1.44	2.68	5.76	6.79	3.27	3.37	2.72
November	3.57	1.71	2.89	6.15	4.10	2.26	2.76	6.97	7.41	3.93	3.06	3.40
December	4.08	2.13	3.36	6.77	4.83	2.83	3.15	7.35	7.82	4.66	4.21	

Source: Own elaboration (INEGI, 2025). Route: Indicadores económicos de coyuntura > Índices de precios > Índice nacional de precios al consumidor. Base segunda quincena de julio de 2018=100 > Mensual > Índice > Índice general

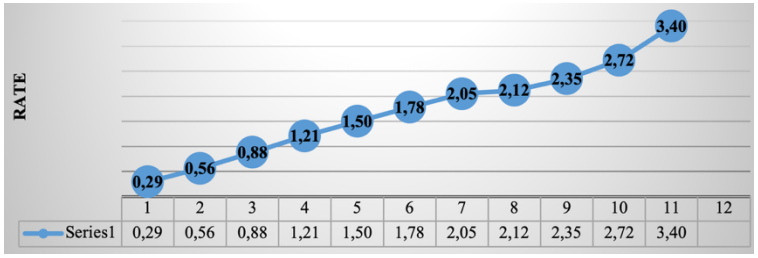
Graph 1

Inflation in Mexico (2014-2024 accumulated at the end of the year)

Source: Own elaboration (INEGI, 2025). Route: Indicadores económicos de coyuntura > Índices de precios > Índice nacional de precios al consumidor. Base segunda quincena de julio de 2018=100 > Mensual > Índice > Índice general

Graph 2

Inflation in Mexico (accumulated January-November 2025)



Source: Own elaboration (INEGI, 2025). Route: Indicadores económicos de coyuntura > Índices de precios > Índice nacional de precios al consumidor. Base segunda quincena de julio de 2018=100 > Mensual > Índice > Índice general

2. THE PRICE AND QUOTATION INDEX OF THE MEXICAN STOCK EXCHANGE (IPC)

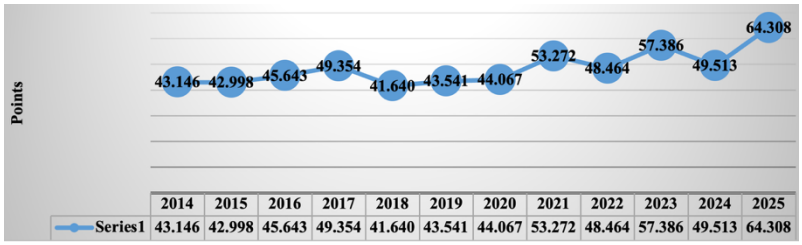
Represents the change in the values traded on the Mexican Stock Exchange concerning the previous day to determine the percentage of rise or fall of the most representative shares of the companies listed therein.

Table 2
The Price and Quotation Index of the Mexican Stock Exchange
(Base: October 1978, 0.78=100)

Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	40,879	40,951	43,631	47,001	50,456	43,988	44,862	42,986	51,331	54,564	57,373	51,210
February	38,783	44,190	43,715	46,857	47,438	42,824	41,324	44,593	53,401	52,758	55,414	52,326
March	40,462	43,725	45,881	48,542	46,125	43,281	34,554	47,246	56,537	53,904	57,369	52,484
April	40,712	44,582	45,785	49,261	48,354	44,597	36,470	48,010	51,418	55,121	56,728	56,259
May	41,363	44,704	45,459	48,788	44,663	42,749	36,122	50,886	51,753	52,736	55,179	57,842
June	42,737	45,054	45,966	49,857	47,663	43,161	37,716	50,290	47,524	53,526	52,440	57,451
July	43,818	44,753	46,661	51,012	49,698	40,863	37,020	50,868	48,144	54,819	53,094	57,398
August	45,628	43,722	47,541	51,210	49,548	42,623	36,841	53,305	44,919	53,021	51,986	58,709
September	44,986	42,633	47,246	50,346	49,504	43,011	37,459	51,386	44,627	50,875	52,477	62,916
October	45,028	44,543	48,009	48,626	43,943	43,337	36,988	51,310	49,922	49,062	50,661	62,769
November	44,190	43,419	45,286	47,092	41,733	42,820	41,779	49,699	51,685	54,060	49,813	63,597
December	43,146	42,998	45,643	49,354	41,640	43,541	44,067	53,272	48,464	57,386	49513	64,308

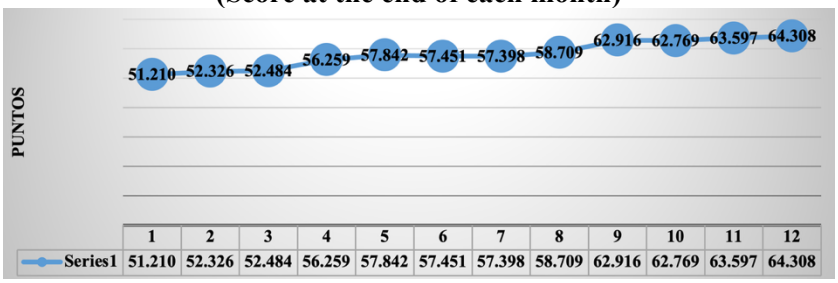
Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=7&accion=consultarCuadro&idCuadro=CF57&locale=es

Graph 3
The Price and Quotation Index of the Mexican Stock Exchange, 2014 - 2025
(Score at the end of each year)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=7&accion=consultarCuadro&idCuadro=CF57&locale=es

Graph 4
The Price and Quotation Index of the Mexican Stock Exchange, January-December 2025
(Score at the end of each month)



Source: Own elaboration (BANXICO, 2025).
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3. EXCHANGE RATE

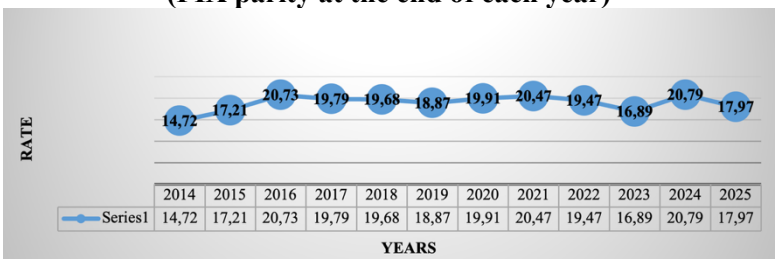
It is the value of the Mexican peso relative to the dollar, calculated from the daily average of the five most important banks in the country, which reflects the spot price (cash) negotiated between banks. It is closely related to Inflation, interest rates, and the Mexican Stock Exchange.

Table 3
Exchange rate (National currency per US dollar, parity at the end of each period)

Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	13.37	14.69	18.45	21.02	18.62	19.04	18.91	20.22	20.74	18.79	17.16	20.61
February	13.30	14.92	18.17	19.83	18.65	19.26	19.78	20.94	20.65	18.40	17.06	20.51
March	13.08	15.15	17.40	18.81	18.33	19.38	23.48	20.44	19.99	18.11	16.53	20.44
April	13.14	15.22	19.40	19.11	18.86	19.01	23.93	20.18	20.57	18.07	17.09	19.61
May	12.87	15.36	18.45	18.51	19.75	19.64	22.18	19.92	19.69	17.56	17.01	19.33
June	13.03	15.57	18.91	17.90	20.06	19.21	23.09	19.91	20.13	17.07	18.24	18.89
July	13.06	16.21	18.86	17.69	18.55	19.99	22.20	19.85	20.34	16.73	18.59	18.76
August	13.08	16.89	18.58	17.88	19.07	20.07	21.89	20.06	20.09	16.84	19.60	18.65
September	13.45	17.01	19.50	18.13	18.90	19.68	22.14	20.56	20.09	17.62	19.64	18.33
October	13.42	16.45	18.84	19.15	19.80	19.16	21.25	20.53	19.82	18.08	20.04	18.57
November	13.72	16.55	20.55	18.58	20.41	19.61	20.14	21.45	19.40	17.14	20.32	18.31
December	14.72	17.21	20.73	19.79	19.68	18.87	19.91	20.47	19.47	16.89	20.79	17.97

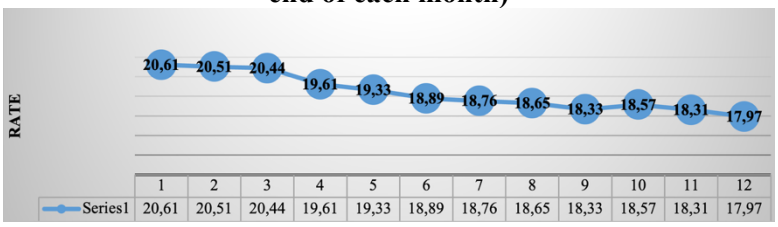
NOTE: Exchange rate FIX by The Banco de México, used for settling obligations denominated in foreign currency. Quote at the end Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

Graph 5
Exchange rate (National currency per US dollar, 2014-2025, (FIX parity at the end of each year)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

Graph 6
Exchange rate (National currency per US dollar, January-December 2025, FIX parity at the end of each month)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

4. EQUILIBRIUM INTERBANK INTEREST RATE (TIIE)

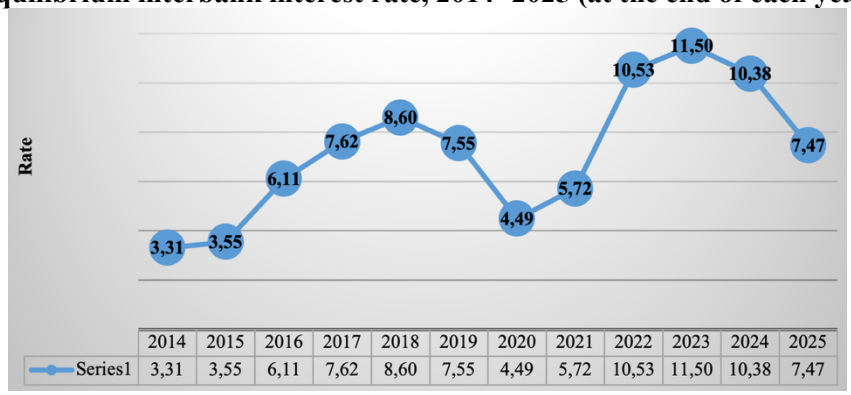
On March 23, 1995, the Bank of Mexico, to establish an interbank interest rate that better reflects market conditions, released the Interbank Equilibrium Interest Rate through the Official Gazette of the Federation.

Table 4
Equilibrium interbank interest rate (28-day quote)

Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	3.78	3.29	3.56	6.15	7.66	8.59	7.50	4.47	5.72	10.82	11.50	10.28
February	3.79	3.29	4.05	6.61	7.83	8.54	7.29	4.36	6.02	11.27	11.50	9.88
March	3.81	3.30	4.07	6.68	7.85	8.51	6.74	4.28	6.33	11.43	11.44	9.74
April	3.80	3.30	4.07	6.89	7.85	8.50	6.25	4.28	6.73	11.54	11.25	9.28
May	3.79	3.30	4.10	7.15	7.86	8.51	5.74	4.29	7.01	11.51	11.24	9.05
June	3.31	3.30	4.11	7.36	8.10	8.49	5.28	4.32	7.42	11.49	11.24	8.74
July	3.31	3.31	4.59	7.38	8.11	8.47	5.19	4.52	8.04	11.51	11.25	8.26
August	3.30	3.33	4.60	7.38	8.10	8.26	4.76	4.65	8.50	11.51	11.08	8.09
September	3.29	3.33	4.67	7.38	8.12	8.04	4.55	4.75	8.89	11.50	11.08	8.02
October	3.28	3.30	5.11	7.38	8.15	7.97	4.51	4.98	9.56	11.50	10.95	7.81
November	3.31	3.32	5.57	7.39	8.34	7.78	4.48	5.13	10.00	11.50	10.74	7.61
December	3.31	3.55	6.11	7.62	8.60	7.55	4.49	5.72	10.53	11.50	10.38	7.47

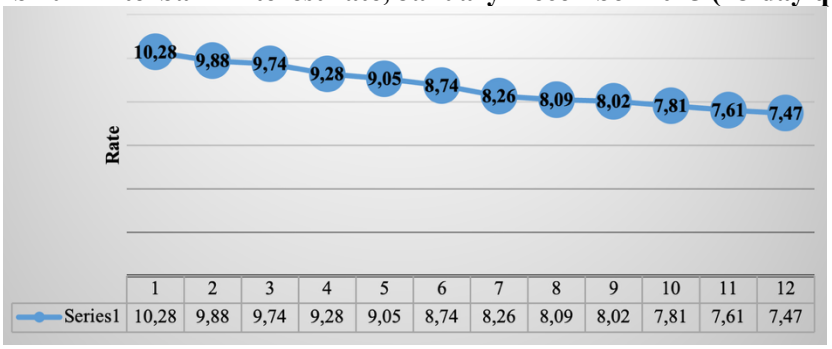
Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=18&accion=consultarCuadro&idCuadro=CF101&locale=es

Graph 7
Equilibrium interbank interest rate, 2014- 2025 (at the end of each year)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=18&accion=consultarCuadro&idCuadro=CF101&locale=es

Graph 8
Equilibrium interbank interest rate, January-December 2025 (28-day quote)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=18&accion=consultarCuadro&idCuadro=CF101&locale=es

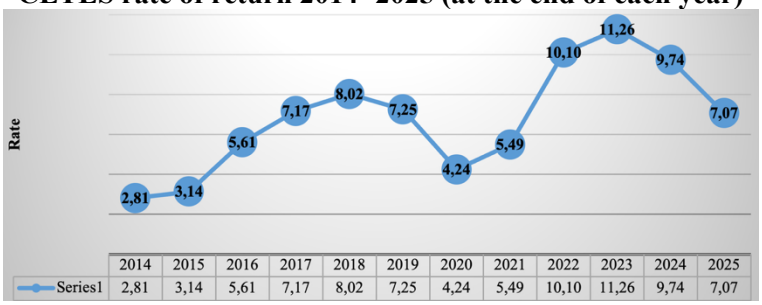
5. CETES RATE OF RETURN

Table 5
CETES rate of return (28-day)

Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2024
January	3.14	2.67	3.08	5.83	7.25	7.95	7.04	4.22	5.50	10.80	11.28	9.87
February	3.16	2.81	3.36	6.06	7.40	7.93	6.91	4.02	5.94	11.04	11.00	9.44
March	3.17	3.04	3.80	6.32	7.47	8.02	6.59	4.08	6.52	11.34	10.90	9.02
April	3.23	2.97	3.74	6.50	7.46	7.78	5.84	4.06	6.68	11.27	11.04	8.65
May	3.28	2.98	3.81	6.56	7.51	8.07	5.38	4.07	6.90	11.25	11.03	8.12
June	3.02	2.96	3.81	6.82	7.64	8.18	4.85	4.03	7.56	11.02	10.88	8.00
July	2.83	2.99	4.21	6.99	7.73	8.15	4.63	4.35	8.05	11.09	10.87	7.48
August	2.77	3.04	4.24	6.94	7.73	7.87	4.50	4.49	8.35	11.07	10.65	7.27
September	2.83	3.10	4.28	6.99	7.69	7.61	4.25	4.69	9.25	11.05	10.35	7.20
October	2.90	3.02	4.69	7.03	7.69	7.62	4.22	4.93	9.00	11.26	10.20	7.10
November	2.85	3.02	5.15	7.02	7.83	7.46	4.28	5.05	9.70	11.78	9.95	7.15
December	2.81	3.14	5.61	7.17	8.02	7.25	4.24	5.49	10.10	11.26	9.74	7.07

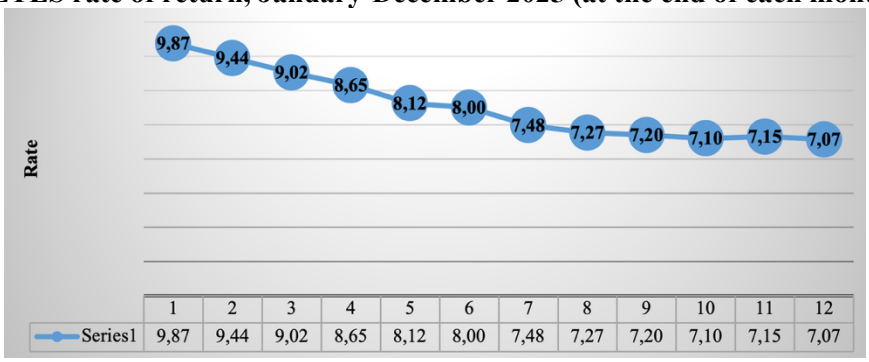
Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=22&accion=consultarCuadro&idCuadro=CF107&locale=es

Graph 9
CETES rate of return 2014- 2025 (at the end of each year)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=22&accion=consultarCuadro&idCuadro=CF107&locale=es

Graph 10
CETES rate of return, January-December 2025 (at the end of each month)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=22&accion=consultarCuadro&idCuadro=CF107&locale=es

6. INVESTMENT UNITS (UDIS)

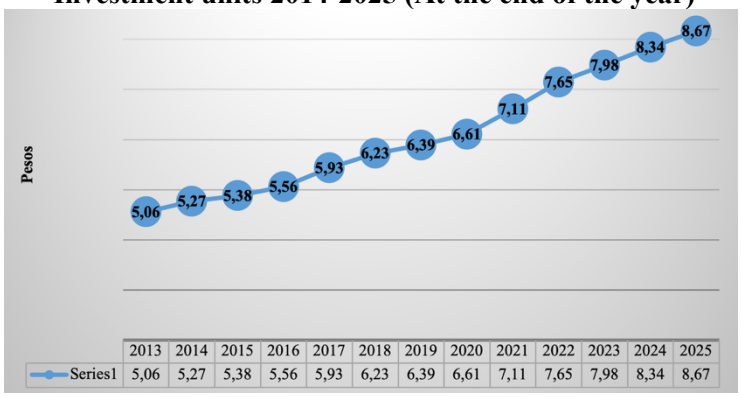
The UDI is a unit of account of constant real value to denominate credit titles. It does not apply to checks, commercial contracts, or other acts of commerce.

Table 6
Investment units (value concerning pesos)

Period	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	5.10	5.29	5.41	5.62	5.97	6.25	6.44	6.64	7.12	7.69	8.06	8.37
February	5.13	5.29	5.43	5.69	6.00	6.25	6.46	6.70	7.18	7.74	8.11	8.40
March	5.15	5.30	5.44	5.71	6.02	6.26	6.49	6.75	7.24	7.77	8.11	8.42
April	5.15	5.32	5.45	5.75	6.03	6.28	6.43	6.79	7.31	7.78	8.13	8.45
May	5.13	5.29	5.42	5.75	6.01	6.27	6.42	6.81	7.33	7.78	8.15	8.48
June	5.13	5.28	5.42	5.75	6.01	6.26	6.44	6.83	7.36	7.77	8.13	8.50
July	5.14	5.28	5.42	5.76	6.04	6.27	6.49	6.87	7.43	7.79	8.20	8.53
August	5.16	5.29	5.44	5.79	6.07	6.29	6.52	6.90	7.47	7.83	8.25	8.54
Sep.	5.18	5.31	5.45	5.82	6.11	6.29	6.55	6.92	7.53	7.87	8.25	8.55
Oct.	5.20	5.33	5.49	5.84	6.13	6.31	6.57	6.97	7.57	7.90	8.26	8.57
Nov.	5.23	5.36	5.53	5.89	6.17	6.35	6.60	7.04	7.62	7.94	8.32	8.61
Dec.	5.27	5.38	5.56	5.93	6.23	6.39	6.61	7.11	7.65	7.98	8.34	8.67

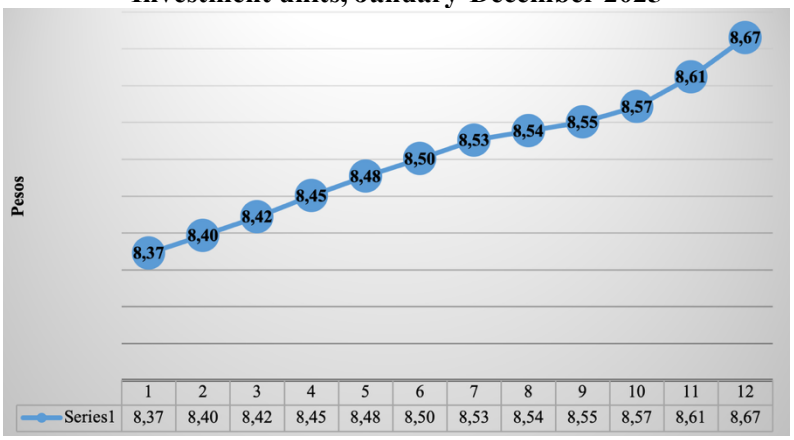
Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CP150&locale=es

Graph 11
Investment units 2014-2025 (At the end of the year)



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CP150&locale=es

Graph 12
Investment units, January-December 2025



Source: Own elaboration (BANXICO, 2025).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CP150&locale=es

Conclusions

The life of products and services based mainly on culture tends to be longer, since culture evolves slowly and gradually, resisting changes imposed by decree or by the simple appearance of new products in areas such as food, clothing, or recreation. In fact, there are goods and services whose permanence transcends even the lives of those who conceived them, becoming cultural symbols or socially rooted practices.

In contrast, the life of products and services based on knowledge and technology is usually shorter due to the dizzying pace of evolution in both factors. The constant appearance of innovations accelerates substitution processes that displace existing products, forcing organizations and individuals to plan their strategic incorporation and disincorporation from the market.

Together, culture, knowledge, and technology make up a strategic triangle that explains the creation, adoption, and permanence of products and services in society. The ability of organizations to coherently articulate these three elements determines not only the generation of economic value, but also the sustainability, legitimacy and social relevance of their business models in an increasingly dynamic and complex global environment.

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