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Intellectual Capital and Innovation:
A Systematic Literature Review

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Abstract

Innovation is a cornerstone of firms' performance and survival. Although existing literature suggests a connection between Intellectual Capital and Innovation, this relationship has been analysed through various lenses and methodologies and there is no dominant framework. This raises the question where the study of the relationship between intellectual capital and innovation currently stands, and we address it by performing a systematic literature review of 178 full-text papers published between 1998 and January 2021, indexed in ISI Web of Knowledge – Current Contents. We examine the existing research on the Intellectual Capital – Innovation nexus, identifying the main research areas and setting the stage for future studies. Our findings reveal a growing but unstructured body of work, organized mainly around Intellectual Capital components (human capital, structural capital, and relational capital) and their specific roles in driving innovation. This article provides a theoretical framework for consolidating knowledge on the relationship between Intellectual Capital and Innovation, outlining practical implications and emerging research directions.

Keywords: Human Capital, Innovation, Intellectual Capital, Relational Capital, Structural Capital, Systematic literature review

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1. Introduction

The connection between intellectual capital and innovation is currently underexplored. Some isolated contributions have been made by scholars part of the intellectual capital community or to the innovation community (e.g., Agostini and Nosella, 2017, Chen et al., 2015, Engelman et al., 2017), yet there is no common framework to integrate the knowledge and provide a comprehensive perspective of what is currently known and what are the areas to study so that we may better understand the different dimensions of this connection.

Innovation is considered a cornerstone of firms' performance and survival (Ruiz-Jiménez and Fuentes-Fuentes, 2018). Therefore, there is a need for continuous innovation in order to overcome competition in a challenging and dynamic business environment. Intellectual capital contributes to firms' innovative capacity (Sardo and Serrasqueiro, 2018). Intellectual capital is a new source of competitive advantage, since it is difficult to replicate or to use it efficiently (FitzPatrick et al., 2013), and it is a source of firm value (Bontis, 1999), firm earnings (Liu and Wong, 2011) and firm wealth (Guerrini et al., 2014). Intellectual capital also affects the dynamics of a firm's growth opportunities due to the capacity to produce technological innovations (Liu and Wong, 2011) through investment in research and development activities (Chen et al., 2005).

The majority of previous papers that analysed the Intellectual Capital-Innovation nexus, decomposed Intellectual Capital into three components: *human capital*, which refers to the sum of employees' knowledge, competence, innovativeness, commitment and wisdom (Sardo and Serrasqueiro, 2018); *structural capital*, which can be seen as the basic structure of a firm that supports and empowers human capital (Bontis, 1998) and is considered the support infrastructure for the establishment and maintenance of relationships with key external stakeholders (Molodchik et al., 2014); and *relational capital*, which refers to the knowledge embedded in the identification, development and maintenance of external relationships (Bontis, 1999). Despite previous literature indicating a connection between Intellectual Capital and Innovation (e.g., Agostini and Nosella, 2017, Chen et al., 2015, Engelman et al., 2017), the research examining this relationship remains fragmented.

Our paper aims to tackle that issue and develop a comprehensive framework based on the scholarly contributions that have been published on ISI Web of Knowledge – Current Contents, from 1998 to 2021, on Intellectual Capital and Innovation, identifying research trends and knowledge gaps and capturing the multifaceted role of IC in fostering innovation. We aim to contribute to a structured understanding of the relationship between Intellectual Capital and Innovation, highlighting areas where empirical research is abundant and others where further investigation is needed.

The remainder of the paper is structured as follows. Section 2 describes the methodological approach used to perform this study. The findings of this study are presented in the Section 3. Section 4 draws the conclusion.

2. Methodology

To answer the research question, we perform a systematic literature review, following the Tranfield et al. (2003) and Saur-Amaral et al. (2018) procedure: definition of the search protocol, search execution and results analysis and presentation, using two academic software to support the research: Endnote X9 and NVivo 12. We build upon the approach previously used by Buenechea-Elberdin (2017) to explore the relationship between intellectual capital and innovation, upscaling the analysis performed in her seminal paper.

Our search took place on the 26th of January 2021 on the Current Contents Connect database of ISI Web of Knowledge. We applied the search equation "intellectual capital" AND innov* IN Topic, filtered on Social & Behavioural Sciences Edition and Business Collection, with a timeframe of 1998 to the date of the search.

We then filtered the results by: Document Type = (Article or Review) AND Research Areas = (Business Economics) AND Languages = (English). We obtained an initial sample of 247 results, which we exported to Endnote X9. Further, all abstracts were manually analysed and all the papers that did not have an abstract or were not related to the topic under study were eliminated, leading us to a final sample of 178 papers whose full text papers were collected.

This final sample undertook two levels of analysis. The first one included a bibliometric-like study showing the key journals related to the topic, as well as top authors in the field, using a descriptive statistics approach. The second one included a qualitative analysis performed with NVivo 12 on the results imported from Endnote, which reveals the research questions, the methodologies, and the future research directions, and allowed the development of a theoretical state-of-the art framework which reveals the focus area of intellectual capital in innovation, as well as the way the different components of intellectual capital have been studied along the years when linked to innovation.

3. Findings

3.1. Descriptive Statistics

The data related to the sample, more specifically information on the journal where each paper was published, the publication year and the authors of each paper were used to analyse the publication trends, as well as top journals and top authors.

As it may be seen in Figure 1, there is an increase of interest in the Intellectual Capital-Innovation nexus registered from 1998 onwards, reaching its peak on 2020 with 19 published papers on ISI Web of Knowledge. While there has not been an exponential increase, there is a tendency of growth.

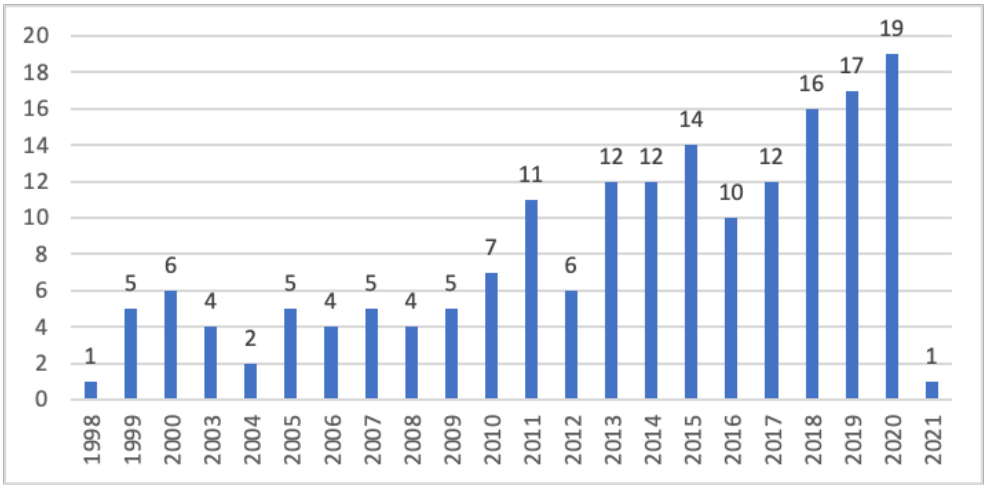

Figure 1 Paper distribution by year.

The most prolific authors (see Figure 2) are Kianto, A. (6 papers), Amores-Salvado, J. and Delgado-Verde, M. (5 papers each one of the authors), and Maylor, H., Navas-Lopez, J.E., Saenz, J., Swart, J. and Turner, N. (4 papers each one of the authors). However, considering the period of our sample (1998 to January 2021), we may note that there is no consolidated author with regular publications in the field.

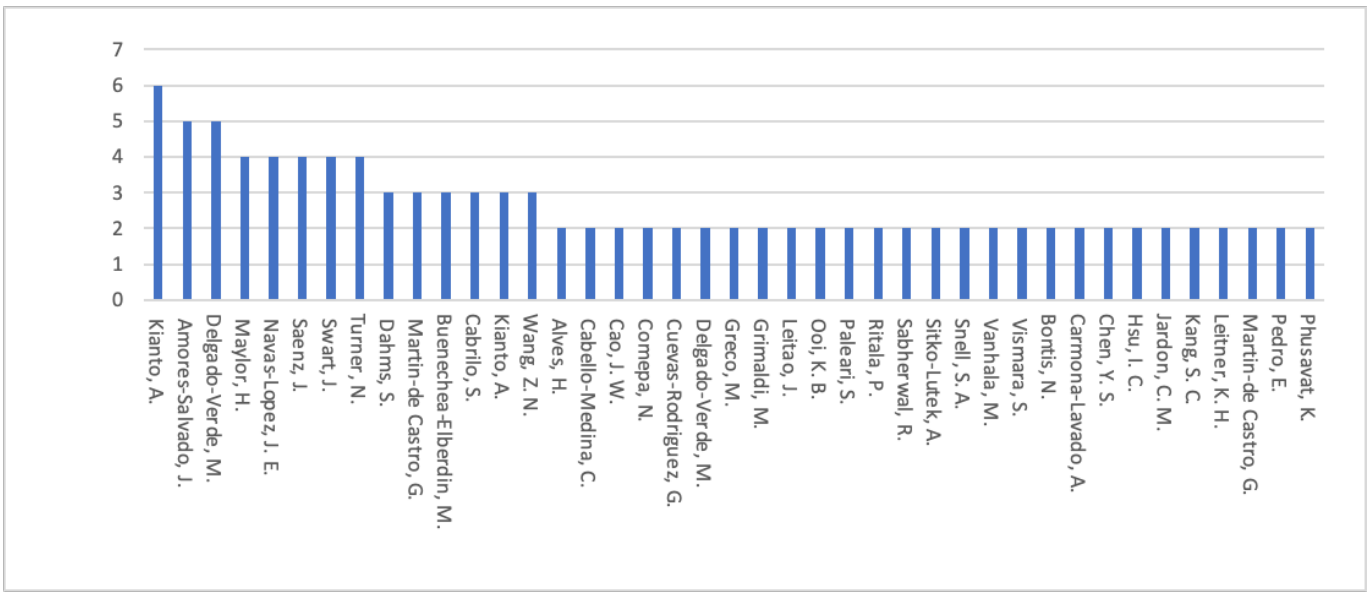

Figure 2 Number of papers per author (authors with at least 2 papers).

Regarding paper distribution per journals and per year during the analyzed period (see Figure 3), the most influent publications are Journal of Intellectual Capital (29 papers) and Knowledge Management Research & Practice (20 papers), which occupy at a certain distance the top positions.

They are followed by International Journal of Technology Management (13 papers), Management Decision (10 papers), Journal of Knowledge Management (9 papers), R & D Management (6 papers), Journal of Business Research (5 papers), and International Journal of Human Resource Management (4 papers).

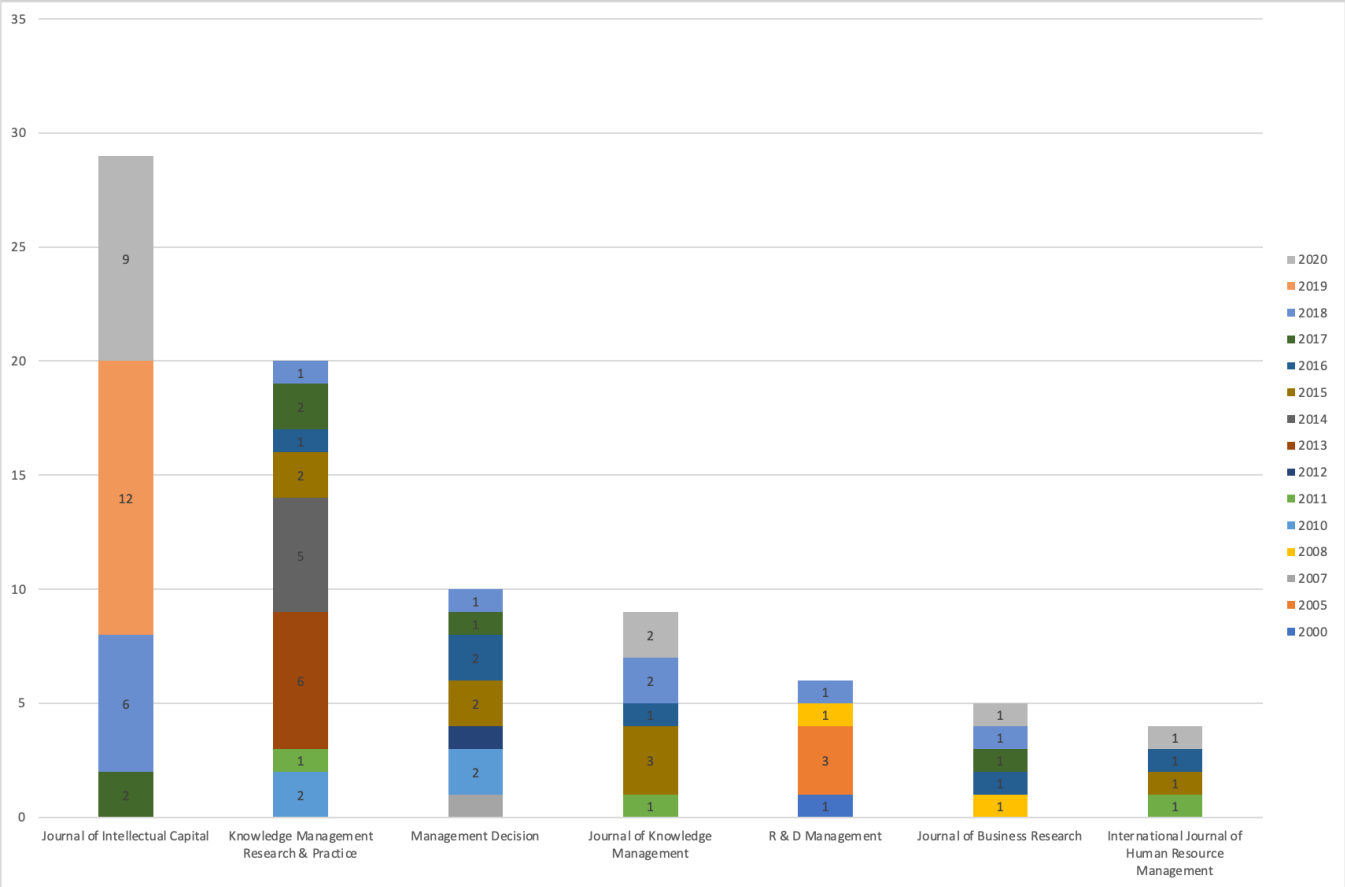

Figure 3 Number of papers per top journals (minimum 4 papers): 1998 - 2020.

However, when we analyse the period 2015-2020 (see Figure 4) for these top journals, we observe that Journal of Intellectual Capital continues to be the journal with most papers published in the field, but in the second position we have Journal of Knowledge Management, with a recent interest in the topic.

Knowledge Management Research & Practice and Management Decision have no papers published in 2019 and 2020, which may indicate a loss of interest from the editorial team in the topic. Also, R&D Management published only one paper.

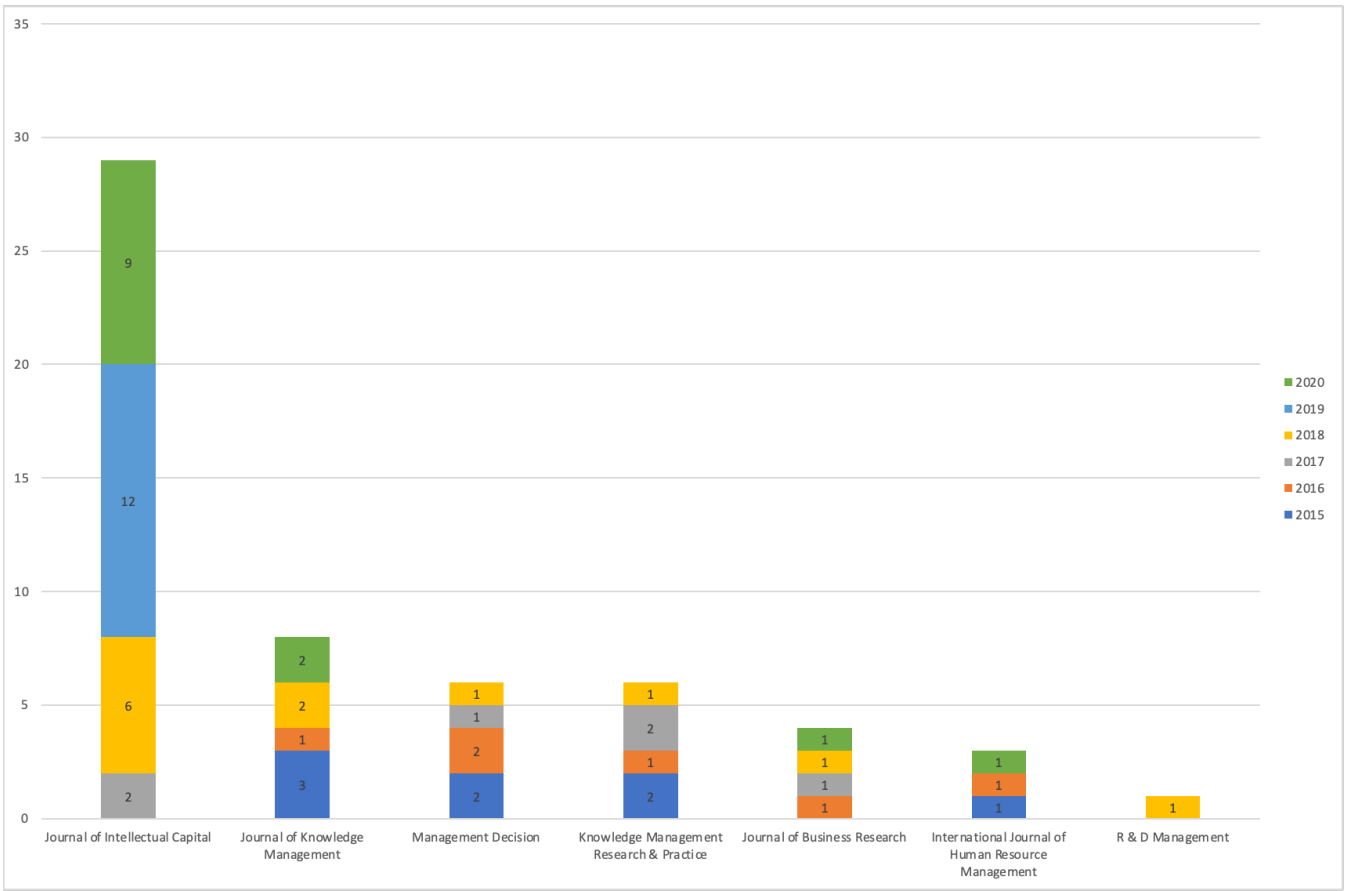

Figure 4 Number of papers per top journals: 2015 - 2020.

3.2. Qualitative Analysis

After the descriptive statistical analysis was performed, all full text papers and corresponding information were imported in NVivo 12, where a thorough content analysis was performed. Based on the specific literature on Intellectual Capital and experience from previous systematic literature reviews, the authors developed a preliminary framework that was used as a starting point for coding (See Figure 5).

The preliminary structure was enriched during the coding, which was performed by two researchers, and we present the main results in the following pages.

3.2.1. Article Type

Most of the papers are empirical, with most of the papers using quantitative methods, with a specific focus on questionnaire-based surveys (e.g. Buenechea-Elberdin et al., 2017, Beltramino et al., 2020), mainly performed on a sample of firms extracted from specific databases (e.g. SABI for Spanish or Portuguese firms). Studies with secondary data (e.g. Molodchik et al., 2019) occupy the second position, however longitudinal studies are rather rare. Note that from the top journals, only Journal of Intellectual Capital published a relevant number of studies using secondary data, others prefer the surveys.

In terms of statistical analysis, the two most used approaches are practically at a tie: regression (e.g. Ting et al., 2020) and structural equation modelling (e.g. Gurlek, 2021), used in the papers published in all top journals.

The qualitative papers use mainly a case study approach (e.g. Pedro et al., 2019). From the top journals, only Journal of Intellectual Capital and Knowledge Management Research & Practice published qualitative papers, while proportionally it was very rare, as the preferred approach is quantitative.

Figure 5 Preliminary coding structure used for content analysis in NVivo

Taking the lenses of the national context studied by the authors in the empirical papers, the context most studied is Spain (e.g. Buenechea-Elberdin et al., 2017), followed by Taiwan (e.g. Cabrilo et al., 2020), China (e.g. Wang et al., 2019), United States (e.g. McDowell et al., 2018) and Italy (e.g. Agostini and Nosella, 2017). Remaining countries presented in Figure 6 have lower numbers.

In the top journals, Journal of Intellectual Capital has a wide variety of national contexts, followed by Knowledge Management Research & Practice, while the remaining top journals have less than a dozen countries in the papers they published on the topic.

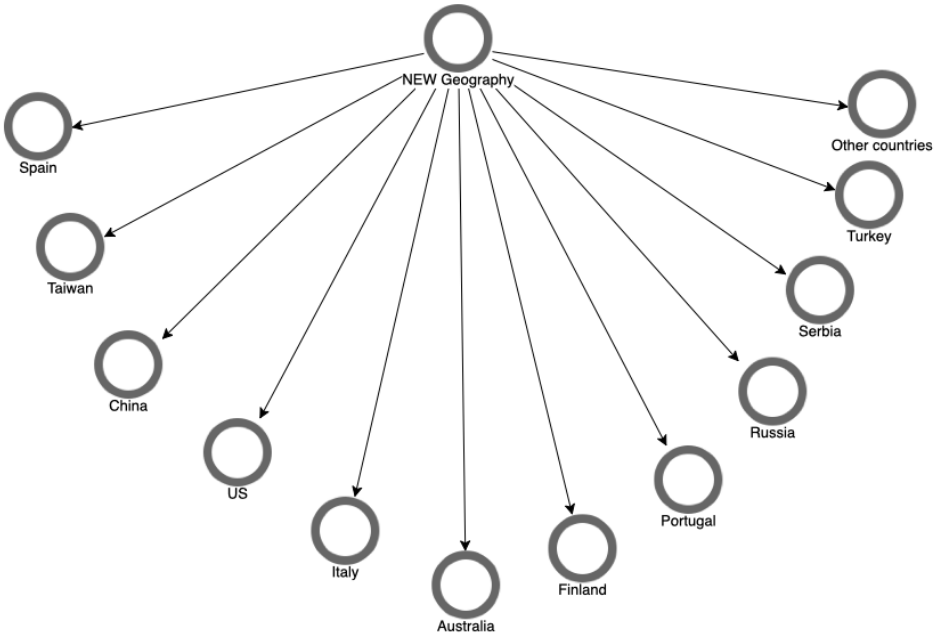

Figure 6 Geographical contexts studied by the authors

Regarding the conceptual papers, they seldom mention the type of methodology used for developing the research, which we consider a weakness. Some studies use systematic literature reviews (e.g. Paoloni et al., 2020) while other use bibliometric studies (e.g. Cezanne et al., 2019, Martin-de Castro et al., 2019), however most of them do not clarify the search process used to select the sample for the analysis, nor the process used to analyse them. From the top journals, Journal of Business Research and International Journal of Human Resources Management did not have any conceptual paper in our sample.

Figure 7 presents a simplified version of the final coding structure in NVivo on the elements associated with Article Type.

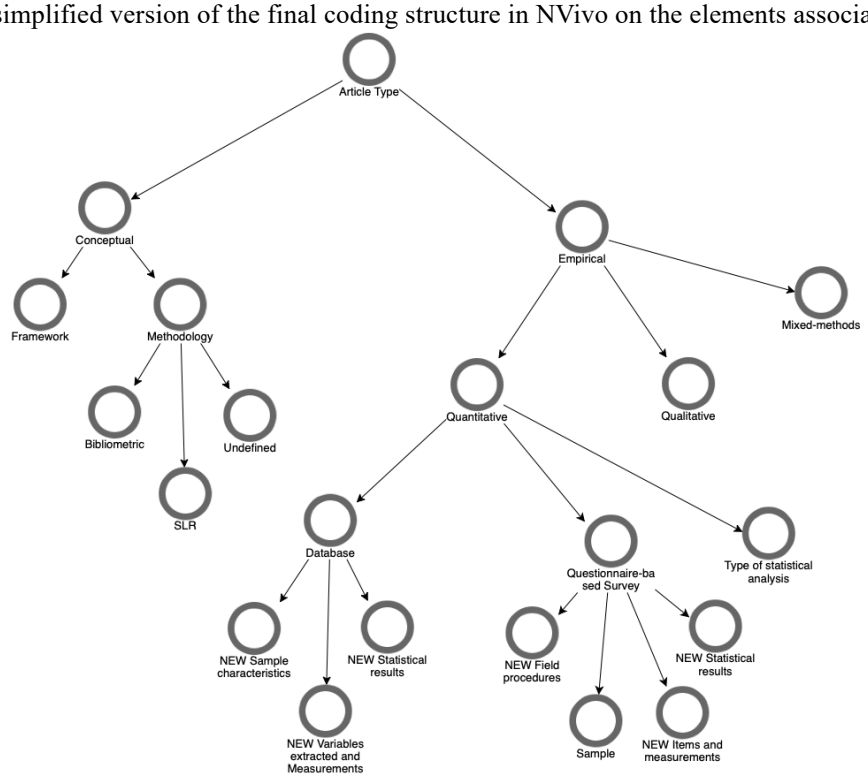

Figure 7 Simplified version of the coding structure for Article Type

3.2.2. Research Goals

The research goals are rather varied and encompass different topics. Some examples for quantitative papers (the majority in our sample) are presented in Table 1.

Table 1 Example of research goals for the quantitative papers included in the sample

Research goal	**Author**
"*impact of human, organisational and relational capital on RIP, whether the organisational and relational capital act as mediators in the relationship between human capital and RIP and whether organisational capital moderates the relationship between relational capital and RIP*[1]"	(Agostini and Nosella, 2017)
"*relationship between social capital and innovation through knowledge sharing and intellectual capital*"	
"*analyze the influence of the structural capital of SMEs in the capacity of innovation and organizational performance, in the context of an emerging country*"	(Allameh, 2018)
"*the role of human attributes, including knowledge, skills and motivation (i.e. traditional HC), learning capability (i.e. renewal capital) and entrepreneurial attitude (i.e. entrepreneurial capital) on innovation in high-tech versus low-tech companies*"	
"*reconstructs the measurement model of intellectual capital, expanding the concept to include both internal and external dimensions, both of which have the same three elements: human, structural, and relationship capital. To test the reliability and validity of this new model, we explore the impact of each element on innovation performance*"	(Beltramino et al., 2020)
"*examines how IC and KM affect each other, and also investigates their consequences, viewing three intermediate consequences (dynamic capabilities, efficiency, and innovativeness) to mediate their effects on firm performance.*"	
"*To analyse the impact of the company's technology innovation strategy on the three components of IC; To analyse the relations among the three components of IC; To analyse how IC impacts on technology innovation performance; To verify the influence of context-specific variables such as firm size, technology intensity, geographical area and experience of the company on the above-mentioned relations.*"	(Buenechea-Elberdin et al., 2017)

Source: own elaboration

3.2.3. Intellectual Capital Components

Regarding the Intellectual Capital Components, our initial coding framework contemplated human capital, which refers to the sum of employees' knowledge, competence, innovativeness, commitment and wisdom (Sardo and Serrasqueiro, 2018); structural capital, which can be seen as the basic structure of a firm that supports and empowers human capital (Bontis, 1998) and is considered the support infrastructure for the establishment and maintenance of relationships with key external stakeholders (Molodchik et al., 2014); and relational capital, which refers to the knowledge embedded in the identification, development and maintenance of external relationships (Bontis, 1999).

While this is still the dominant classification, we observed that authors use alternative classifications (see Figure 8), sometimes overlapping the dominant ones, which turn difficult the comprehension of the components and exactly what is being studied.

Although the classification of intellectual capital into the three components, human capital, structural capital and relational capital, is the dominant one, other components have been discussed recently in the literature with regards to the relationship between intellectual capital and innovation, such as organizational capital (Ahmed et al., 2019, Duodu and Rowlinson, 2019), innovation capital (Jardon et al., 2018, Ng et al., 2014), process capital (Cappellin, 2003, Phusavat et al., 2013), operational capital (Menor et al., 2007), customer capital (Chatzoglou and Chatzoudes, 2018, Verbano and Crema, 2016) and social capital (Ahmed et al., 2019, Martinez et al., 2019). Also, some authors split relational capital into external relational capital and internal relational capital (Jardon, 2015, Zaragoza-Saez et al., 2016), and trust capital (Oliveira et al., 2020).

The dominant classification of the intellectual capital components is also assumed by authors publishing in the two top journals with more paper publications, i.e., Journal of Intellectual Capital and Knowledge Management Research & Practice.

[1] RIP means Radical Innovative Performance

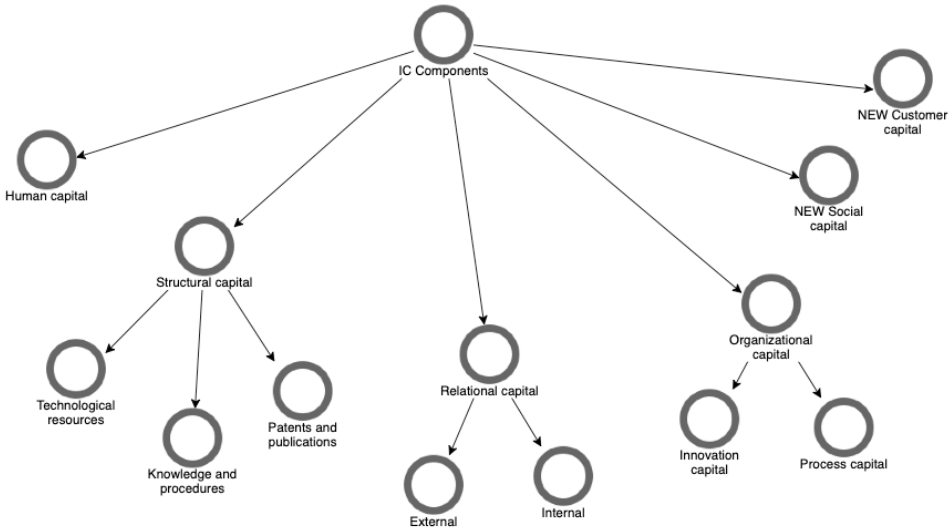

Figure 8 Intellectual Capital Components: taxonomies used in the sample

3.2.4. Relationship between Intellectual Capital and Innovation

The relationship between Intellectual Capital and Innovation was the key focus of our systematic literature review. After concluding the analysis, we identified different perspectives taken by the authors. It is difficult to identify a dominant approach and the field of study is, in our view, unconsolidated. More, differences have been identified by scholars according to the type of firm (new ventures, SMEs, incumbent, international), geographical context or industry.

Some authors will link intellectual capital to the innovative performance of the firm (e.g. Phusavat et al., 2013, McDowell et al., 2018, Wu et al., 2007), while others will consider all or specific intellectual capital components as antecedents of the development of innovative capabilities for the firm (e.g. Subramaniam and Youndt, 2005, Jardon, 2018) or influencing factors of the degree of firm innovativeness, which will eventually lead to innovative performance.

Barrena-Martinez et al. (2020), for instance, developed and tested a model relating human capital, structural capital, relational capital and absorptive capacity with open innovation success. Their results indicate that the three intellectual capital components have a positive impact on open innovation success, and the absorptive capacity plays a role in the relationships observed between human and structural capital.

Similarly, Oliveira et al. (2020) explored the relationship between knowledge sharing, intellectual capital, absorptive capacity, innovation and organizational performance and their results show that the relationship between intellectual capital and innovation is partially mediated by absorptive capacity. Relationships have been identified among all the analysed dimensions. Soo et al. (2017) also studied the role of intellectual capital in the development of absorptive capacity, which was seen to be mediating its relationship with innovation performance. Lazzarotti et al. (2015) had already studied in the past intellectual capital components as an antecedent to absorptive capacity, showing they enhanced innovative performance resulting from collaboration. In this line of research, Ahmed et al. (2019) studied the mediating role of potential and realized absorptive capacity in intellectual capital and business performance. Their results reveal that contrary to potential absorptive capacity, the realized absorptive capacity positively mediates the relationship between intellectual capital components and business performance. Furthermore, human capital and organizational capital had a major positive influence in this relationship.

Agostini and Nosella (2017) investigated the impact of intellectual capital components on radical innovation performance, and results show that human capital is directly associated with radical innovation performance, and that organizational and relational capital mediates the relationship between human capital and radical innovation performance.

Subramaniam and Youndt (2005) analysed the impact of intellectual components on incremental and radical innovative capabilities. Results show that human capital by itself negatively impacts on radical innovative capability but when interacted with social capital its effects are positive on radical innovative capability. Organizational capital positively influences incremental innovative capability.

Phusavat et al. (2013) take another perspective and conclude that innovation positively impacts intellectual capital, in contrast with other authors that indicate that it is intellectual capital that positively impacts innovation. This may indicate the

existence of endogeneity in the relationship between intellectual capital and innovation, which could be explored in future studies.

Jardon (2018) focused on SMEs and his results indicate that human capital indirectly affects innovativeness, and that the effect of relational capital is performed through the structural capital. McDowell et al. (2018) studied SMEs, as well, and their results indicate that innovativeness partially mediated the relationship between intellectual capital (specifically human capital and organizational capital) and firm performance.

Liu et al. (2020) used intellectual capital as mediator, studying the impact of organizational learning on the capacity for new service development. Their results show that intellectual capital plays a mediator role between organizational learning and new service development.

Duodu and Rowlinson (2019) studied the relationship between intellectual components and exploratory and exploitative innovation. Findings reveal that while social capital and organizational capital have a positive effect on both type of innovation, this effect was not verified for human capital.

Martinez et al. (2019) analysed the relationship between the diversity in alliance portfolios and innovation performance, and results suggest that human capital and social capital partially mediates this relationship.

3.2.5. Key Contributions

A sample of the key contributions from the last three years is included in Table 2.

Table 2 Example of key contribution from the papers published between 2018 and 2021

Contributions	***Author***
"*the three dimensions of social capital, namely the structural, relational, and cognitive social capital, had positive effects on knowledge sharing; knowledge sharing had positive effects on three components of intellectual capital (human capital, structural capital and relational capital); and intellectual capital dimensions, which in turn, lead to innovation.*"	(Allameh, 2018)
"*both firm's technology level and type of innovation affect how IC influences innovation performance*"	(Buenechea-Elberdin et al., 2018a)
"*necessity of considering the technological level of the firm as a contingency variable affecting the IC–innovation relationship*"	(Buenechea-Elberdin et al., 2018b)
"*the role of human attributes, including knowledge, skills and motivation (i.e. traditional HC), learning capability (i.e. renewal capital) and entrepreneurial attitude (i.e. entrepreneurial capital) on innovation in high-tech versus low-tech companies*"	(Buenechea-Elberdin et al., 2017)
"*human capital generates relational capital. The relational capital needs structural capital to improve the innovativeness of subsistence small businesses.*"	(Jardon, 2018)
"*results suggest the presence of at least a partial mediating influence operated by innovation on human and organizational capital and firm performance. Alternatively, social capital does not significantly influence innovation levels and firm performance, in contrast with the results of most prior research. In addition, human capital positively influences both innovation and performance, although its effect on performance is partially mediated by innovation.*"	(McDowell et al., 2018)
"*potential absorptive capacity does not intervene in the relationship between the components of IC and those of business performance. However, realized absorptive capacity, measured as the transformation and exploitation of knowledge, played a positive mediating role in the relationship between the dimensions of IC and those of business performance. Social capital was also noted as a weak predictor of business performance, while human capital and organizational capital had a profound positive influence."*	(Ahmed et al., 2019)
"Social capital (SC) and organisational capital (OC) each have significant positive linear effects on exploratory and exploitative innovation, while human capital (HC) has no direct linear effect on either innovation type. HC, however, affects both exploratory and exploitative innovation through SC or OC. None of the three IC dimensions has a significant quadratic effect on exploratory or exploitative innovation."	(Duodu and Rowlinson, 2019)
"findings from a sample of drug development trajectories show that human, structural, and social capital decrease the likelihood of discontinuation, indicating that NPD projects rich in intellectual capital take longer to be terminated"	(Subramanian and van de Vrande, 2019)
"the three IC constructs positively affect OI performance, with relational and human capital subject to diminishing returns."	(Barrena-Martinez et al., 2020)

Contributions	***Author***
"human, renewal, and entrepreneurial capital all positively affect organizational learning practices. Furthermore, organizational learning practices contribute to innovation performance on their own and in combination with the tested human-based intellectual capital dimensions."	(Cabrilo and Dahms, 2020)

Source: own elaboration

The intellectual capital components have been reported as key elements for firms' innovation performance. Previous studies have established interesting links between intellectual capital and various types of innovation, which opens new doors of opportunity to further investigate.

3.2.6. Future Research Directions

Future research directions are not particularly innovative. Most authors suggest expanding the sample or including other industries and other geographical contexts. Also, alternative statistical methods are suggested, yet there are no specific elements worth mentioning in this point. Authors seem to be mostly focused on validating their models in different contexts.

That said, it may appear rather contradictory to focus on the validation, when the field is unconsolidated. One food for thought for the scholars in this field.

4. Conclusions

The relationship between Intellectual Capital and Innovation has become a focal area of study over recent decades, with scholars recognizing Intellectual Capital as a potential source of competitive advantage and a driver of innovative capabilities. This systematic literature review reveals that while there is a considerable body of work exploring this relationship, it remains an unconsolidated field, marked by divergent theoretical perspectives, methodological approaches, and empirical findings. The fragmented nature of research is particularly evident in the contrasting ways Intellectual Capital components are defined, measured, and linked to innovation outcomes.

Our findings suggest that the traditional components of Intellectual Capital - human, structural, and relational capital - are consistently associated with firms' innovative performance. However, this relationship is complex and multidimensional, often varying based on industry, firm size, and geographical context. For example, human capital is frequently cited as a primary driver of innovation, yet its effect on radical versus incremental innovation remains an area for further exploration. Structural capital, while often positioned as a support mechanism for human capital, has also been found to play a direct role in enabling absorptive capacity and innovation ambidexterity in firms. Relational capital, which provides access to external knowledge and collaborative opportunities, is crucial for open innovation and cross-firm knowledge sharing, yet its impact can vary significantly across sectors.

Despite these developments, the field is still short of longitudinal studies that could capture the dynamic nature of the Intellectual Capital - Innovation relationship over time. Moreover, many studies rely on quantitative methodologies, particularly cross-sectional surveys and regression analyses, which may overlook the nuanced ways in which Intellectual Capital contributes to innovation in different contexts. Future research could benefit from integrating qualitative methods, such as case studies, which allow for a deeper exploration of context-specific factors. Additionally, more studies incorporating a longitudinal perspective would enable researchers to observe how IC investments translate into sustained innovation outcomes over time, thereby offering more robust insights.

Furthermore, the study of mediating and moderating variables remains underdeveloped. While there is evidence suggesting that factors like absorptive capacity, organizational learning, and technological readiness play a role in shaping the Intellectual Capital - Innovation nexus, these variables are often examined in isolation. Future research should consider more integrative models that explore how these mediating factors interact with different Intellectual Capital components to influence innovation outcomes.

In conclusion, while significant strides have been made in understanding the Intellectual Capital - Innovation relationship, there is a need for more cohesive and comprehensive research frameworks. By advancing methodological rigor and exploring new theoretical angles, scholars can better elucidate the ways in which Intellectual Capital serves as an innovation stimulus. This ongoing research effort is essential for providing managers and policymakers with actionable insights that can guide Intellectual Capital investments and innovation strategies, ultimately supporting sustainable growth.

Acknowledgements

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The use of digital marketing channels in the internationalization strategies of B2B companies:
The perception of Portuguese managers

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Abstract

In the age of globalization, digital marketing is an essential strategy for companies in all business sectors. While the literature highlights the effectiveness of digital marketing in the Business-to-Consumer (B2C) market, its adoption and performance in Business-to-Business (B2B) markets require further research. This article aims to address this gap by exploring the ability of digital marketing to facilitate the internationalization of B2B companies. Two research objectives were established: (i) to understand the attitudes of those responsible for B2B companies regarding digital marketing in their internationalization strategy; (ii) to explore the preferences and effectiveness of digital marketing channels for entering and enhancing their presence in international markets. The study employed a qualitative methodology, conducting 15 semi-structured face-to-face interviews with managers of Portuguese B2B companies, whether they had international experience or were planning to expand internationally, followed by subsequent content analysis. The results indicate that some participants remain skeptical about the effectiveness of digital marketing in the B2B context, while others recognize the role of digital channels in attracting international customers, facilitating relationship management, and justifying new investments.

Keywords: Digital channels, Digital marketing, Internationalization strategy, Technology adoption.

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1. Introduction

Globalization and the internalization of enterprises have created important opportunities for market expansion (Burakovs′kyj, & Voloshyn, 2021; Gao et al., 2010). Specifically in the case of Portuguese companies, this opportunity for internationalization becomes more pressing, as the internal market is often not enough to ensure their survival or the desired profitability. In this context, companies often choose to enter foreign markets to achieve their strategic and marketing objectives. However, an internationalization process is something much more complex than a simple entry into the international market (Nurfarida et al., 2022), and it involves taking some risks and investing in resources (Eriksson et al., 2015). Not all entrepreneurs will be willing to take on the risks inherent in internationalization and/or will have the necessary resources for this process. In this sense, digital marketing can be a way to minimize obstacles in this process and leverage the effectiveness of internationalization strategies.

Digital tools combined with traditional marketing lead to better business performance, so the potential contributions and benefits are widely recognized (e.g., Fortes et al., 2016; Lee & Falahat, 2019; Lee et al., 2019). In this context, digital marketing is an essential strategy for companies in all business sectors, including B2B markets, as demonstrated by contributions in the literature (e.g., Chong et al., 2016; Lee & Falahat, 2019; Watson et al., 2018) and may facilitate and/or enhance internationalization strategies (Limani & Broja, 2020), playing an important role in the survival, development, and success of small and new companies and new investments in the markets (Hervé et al., 2020; Hervé et al., 2021; Teixeira et al., 2018).

While the literature highlights the effectiveness of digital marketing for the Business to Consumer (B2C) market, its adoption and performance in Business to Business (B2B) markets need further research. In addition, most studies on the contributions of digital marketing in enhancing internationalization are focused on small and medium-sized enterprises. This article aims to fill these gaps by exploring the ability of digital marketing to leverage the internationalization strategies of B2B companies. Thus, two research objectives were established: (i) to understand the attitudes of those responsible for B2B companies towards digital marketing in their internationalization strategies; (ii) to explore the preference and effectiveness of digital marketing channels to enter and enhance the presence in international markets.

This article addresses a topic that is still little considered in the academic literature, as it analyzes the use of digital marketing to promote internationalization in the B2B context and the attitudes and difficulties faced by companies that neglect digital marketing when approaching global markets. The insights of B2B managers offer empirical evidence that can inspire other managers and provide relevant suggestions for future research.

This article consists of 4 main sections. After this introduction, the second section is dedicated to the literature review, offering a synthesis of the most relevant contributions to internationalization strategies and, in particular, the adoption and benefits of digital marketing by B2B companies for this purpose. Subsequently, section 3 describes the methodology conducted by the authors in conducting the empirical study and section 4 presents and discusses the main results of the empirical study. The article culminates in section 4 with the conclusion, identifying its main limitations and suggesting possibilities for future research.

2. Literature review

The literature review focuses on two main subtopics: (i) opportunities offered by the internet in internationalization strategies; (ii) the adoption and contributions of digital marketing in B2B companies.

2.1. Opportunities offered by the internet in internationalization strategies

The internationalization of companies consists of their involvement in international markets, operating within the foreign market. This internationalization process can be carried out in several ways: exporting, licensing, joint ventures, and establishment of subsidiaries, among others (Johanson & Vahlne, 1990). Small and Medium-sized Enterprises (SMEs), especially in developed regions, often internationalize to gain knowledge, adopt innovative practices, and improve their overall performance (Boermans & Roelfsema, 2016). According to Cuervo-Cazurra et al. (2015), a company's international expansion is driven by four reasons: to sell more, in which the company exploits the existing resources at home and obtains better conditions from the host country; buy better, in which the company exploits existing resources abroad and avoids poor conditions in the country of origin; upgrade, in which the company exploits new resources, and obtains better conditions from the host country; and escape, in which the company exploits new resources and avoids the poor conditions of the country of origin.

The diffusion of the internet, the development of information and communication technologies, and advances in digital technology facilitate the internationalization process of companies in various areas (Bell & Loane, 2010; Jean & Kim, 2020; Ramonienė et al., 2015). The internet enables all companies, in the B2B and B2C context, and from its inception, to improve their activities in the international market and explore new international opportunities. This has the advantage of allowing companies to reach new markets/customers, constituting a complementarity or even an alternative to physical presence (Sinkovics et al., 2013), making it possible to reduce some costs and risks inherent to internationalization. Nowadays, any company that intends to start and develop an internationalization process needs to understand the benefits and potential of the digitalization (Hervé et al., 2020; Hervé et al., 202; Lee et al, 2019; Limani & Broja, 2020).

The internet facilitates the execution of many day-to-day activities of companies, and its use as a strategic tool has increased

strongly (Pezderka & Sinkovics, 2011). The widespread use of the Internet and the advancement in digital technology has provided the opportunity for companies to leverage their information processing resources and be globally connected (Sinkovics et al., 2013). According to Bell and Loane (2010), if initially the internet was described by the academic literature as an enabler for the internationalization of companies, allowing them to establish a global presence, obtain more information about international markets and communicate effectively with these markets, more recently the literature identifies it as a creator and driver of innovative international opportunities (Bell & Loane, 2010). Over time, the academic literature has developed research on the use of the internet and Web 2.0 for the internationalization of companies. Some more theoretical approaches seek to propose research models (e.g., Alrawi, 2007; Berthon et al., 2012; Buttriss & Wilkinson, 2003; Burakovs′kyj, & Voloshyn, 2021). At the same time, other authors have conducted empirical studies with the application of qualitative methodologies (e.g., Bell & Loane, 2010; Etemad et al., 2010; Mathews & Healy, 2007; Ojala et al., 2018) and quantitative methodologies (e.g., Bianchi & Mathews, 2016; Kim, 2019; Lal, 2004; Moon & Jain, 2007; Mostafa, et al., 2005; Sinkovics et al., 2013) to better understand this phenomenon.

The deliberate use of information and communication technologies (ICT) for internationalization purposes is called "internetalization" by Bell et al. (2001) and "active online internationalization" by Yamin and Sinkovics (2006). Etemad, et al., (2010) state that "internetization" is a necessary condition for internationalization in the emerging economy, considering it as a process of adoption, diffusion and development of internet-based technologies that has been increasingly used for internationalization, especially by innovative companies.

2.2. The adoption and contributions of digital marketing in B2B companies

Digital marketing is a new marketing approach boosting traditional marketing with digital elements (Järvinen et al., 2012), namely websites, social networks, online stores, mobile applications, among others. These elements stand out as channels of communication with the customer and also as sales channels, and for allowing companies to reach their customers quickly. More recently, and as Puspaningrum (2020) points out, marketing has turned to social media, given that on these platforms companies establish closer relationships with the target audience, allowing them to influence the consumer's purchase decision-making processes and generate word-of-mouth communication. According to Torres (2012), for companies to be able to invest and define strategies, they have to previously identify the digital assets that their target audiences use the most, that is, the set of online points of contact between the company and its target audience.

Digitalization, and especially social media, has had important consequences for companies, products and brands (Muntinga et al., 2011). Digital marketing offers opportunities for SMEs to attract new customers and retain existing ones more effectively, as well as developments in digitalization, which, like social media, are positively related to the growth, performance and competitiveness of these companies (Taiminen & Karjaluoto, 2015). Thus, it becomes evident that digital marketing is indispensable nowadays for any type of business, namely in B2B companies (Angelos et al.., 2017). However, there are still differences in academic research and at the business level between B2B and B2C contexts.

Most of the academic literature focuses its studies on B2C companies (Iankova et al., 2019), highlighting themes such as customer acquisition, brand building, and purchase/post-purchase, while the academic literature in the B2B context is still scarce (Salo, 2017), being essentially directed towards segmentation, customer engagement, content provision, and lead nurturing (Vieira et al., 2019).

In the business environment, it is also noted that there is still some resistance to the adoption of digital marketing by B2B companies. The managers of these companies use social listening insufficiently in marketing activities, a practice that would be peculiarly advantageous both in the identification of business opportunities and in the recognition of the strengths and weaknesses of brands (Angelos et al., 2017). These managers still have some uncertainty about the relevance of some digital marketing tools and consider their adoption as more challenging and demanding compared to B2C companies (Iankova et al., 2019).

Digital marketing is an essential strategy for companies in all business sectors, including B2B markets, as demonstrated by recent contributions in the literature (e.g., Chong et al., 2016; Lee & Falahat, 2019; Watson et al., 2018) and may facilitate and/or enhance internationalization strategies. However, some studies show that companies do not use the full potential of new digital tools and are consequently not benefiting from the opportunities they offer (Taiminen & Karjaluoto, 2015).

Despite the clear recognition of the opportunities offered by the internet in internationalization processes and the positive indicators of the importance of digital channels in B2B companies, there are still some barriers at the business level that need further study and that require academic research in this context.

3. Methodology

This study adopted a qualitative methodology, through in-depth interviews with 15 managers of Portuguese B2B companies who had international experience or intended to expand internationally. The methodology was considered the most appropriate, meeting the defined objectives. In addition, it has been found that this methodology has been used in studies on similar topics conducted in other countries (e.g., Taiminen & Karjaluoto, 2015).

For this purpose, non-probabilistic convenience sampling was used. However, it was ensured that the sample was diversified with regard to the company's B2B business sector, size expressed by the number of employees and seniority in the Portuguese market (from startups to companies established in the market for several decades). Regarding the profile of the interviewees, they held management positions in companies (e.g., General Manager, Marketing Director, Sales Director, International Sales Director) and had significant professional experience. Table 1 presents the characterization of the sample.

These interviews were conducted face-to-face during October and November 2018 and recorded in audio format with the informed consent of the participants. Subsequently, the interviews were transcribed in full and the data were qualitatively analyzed based on content analysis.

Table 1 – Sample characterization

Enterprise	Sector B2B	Company Seniority (years old)	Number of collaborators	Internationalization	Digital Presence
E#1	Metalworking	25-49	>100	27 years old	Website only
E#2	Mould production	6-24	> 100	16 years	Website & Facebook
E#3	Industrial Automation	< 5	< 10	Since the beginning	Website & Facebook
E#4	Mirrors	25-49	50-100	24 years old	Website & Facebook
E#5	Lighting Products	< 5	50-100	1 year	Website, LinkedIn & Facebook
E#6	Research & Development	< 5	< 10	In preparation	Website & Blog
E#7	Tube Transformation	25-49	>100	Since the beginning	Site, Blog, Facebook, LinkedIn, Twitter, Instagram & Pinterest
E#8	Cleaning products	25-49	<10	In preparation	Website & Facebook
E#9	Computer science	6-24	>100	10 years	Website only
E#10	Technology Products/Services	6-24	10 to 50	In preparation	Site, Facebook & LinkedIn
E#11	Lighting Products	< 5	50-100	Since the beginning	Website, Facebook & Instagram
E#12	Ceramic products	25-49	> 100	Since the beginning	Website only
E#13	Ceramic products	6-24	>100	Since the beginning	Website, Facebook, Youtube & Instagram
E#14	Assembly and painting services	6-24	50-100	7 years	Website only
E#15	Fish Processing	>50	>100	In preparation	Site, Facebook, LinkedIn & Instagram

Source: Own elaboration, 2023

Concerning the characterization of the sample in terms of international presence, as previously mentioned, most B2B companies that participated in this study operate in international markets, with five companies having an international presence since the beginning of their activity (E#3, E#7, E#11, E#12 and E#13), and four companies are still in the preparation phase of the internationalization process (E#6, E#8, E#10 and E#15). Regarding the digital presence, four of the fifteen companies have only the institutional website and do not have any presence on social networks (E#1, E#9, E#12 and E#14). The most common social networking platform used by participants is Facebook (used by 10 companies), followed equally by LinkedIn and Instagram (each used by 4 companies).

4. Results

This section presents the results obtained from the thematic analysis of the interviews' content and is subdivided into two main subtopics: (i) perceptions regarding the digital presence of B2B companies, (ii) the effectiveness of digital marketing in their internationalization strategies.

4.1. Insights into the digital presence of B2B companies

As previously identified, four of the companies that participated in this study stand out for the fact that they are digitally present and have only the institutional website, namely because they consider that social networks are only suitable for B2C companies.

Still, this opinion was also shared by managers of companies with some presence on social networks, who considered that this type of presence was not an asset for B2B businesses:

> *"We have social networks even though we don't give them much importance. (...) Social networks are aimed at the final audience (...) and we don't target [that audience]."* (E#4)

In some cases, perceptions of social media have been particularly negative. For example, the respondent from Company 14 considered that these are, in general, dangerous for brands, as they quickly disseminate any negative feedback, which can seriously affect their reputation:

> *"I believe that a company's presence on a social network does not offer any advantages, it brings disadvantages, (...) Bad news, to say the least, in seconds you can tear down a brand, you know? In seconds he can knock down a mark."* (E#14)

However, the vast majority of the companies participating in this study have a presence on social media, especially Facebook. For these companies, it is unthinkable that digital channels should not be used in the daily life of the company:

> *"It's crucial, there's no other possibility, nowadays the dynamics of the old salesperson who walks with the folder from house to house or client to client has ceased to exist, the first research and 90% of the work is on the internet, ... For example, those in the purchasing department that's what they do. They are locked in an office researching on the internet and contacting various suppliers worldwide, just like we demand from our promoters, you have the whole world to explore, we also demand that from purchases, we have the whole world to explore."* (E#7)

These results are in line with the literature, which recognizes that digital marketing is essential for the development of their businesses (e.g., Chong et al., 2016; Jean & Kim, 2020; Lee & Falahat, 2019; Watson et al., 2018). However, only a few participants identify the potential of social networks to establish closer relationships with target audiences (Puspaningrum, 2020), confirming that investment in these strategies depends on the prior identification of the platforms used by target audiences (Torres, 2012).

4.2. Effectiveness of digital marketing in internationalization strategies

The main form of internationalization used by the participants' companies was exports and direct investment.

Some participants considered that the internet does not offer any benefit for the internationalization strategy (e.g., E#9), and several assumed that they have doubts about the advantages of digital marketing for the internationalization of companies (e.g., E#1, E#10). However, several participants considered that having a website and presence in social media marketing fosters and enhances internationalization, both by traffic to the website (E#6) and by facilitating contact with current and potential customers (E#5).

Indeed, the main advantages of digital marketing for internationalization, as highlighted by the participating companies, are related to the speed and ease of contact with external partners (suppliers and/or customers), as illustrated in the following statement:

> *"Because it allows you to get in touch with companies in an easier way, whether it's by Skype interview, videoconferences, or information sending, exchanging information. It is one of the ways that can make business easier*." (E#5)

Other participants added that digital tools are key to attracting new international customers and retaining current ones:

> *"The website is obviously one of the biggest tools we have to be able to keep in touch with our customers, attract new customers... It's the first impression for someone who is out and has no way to contact us, it's key."* (E#11)

Other opinions also highlight the ability to leverage internationalization processes and minimize barriers:

> *"There are many international customers who have met us through the website. That's going to power everything up. If we have information such as who we work with, highlighting that you will be working more and more internationally, the more likely international companies are to contact you."* (E#12)

These results are in agreement with Taiminen and Karjaluoto (2015) and Angelos et al. (2017) who highlight the positive impacts of the competitiveness and performance of companies provided by digital channels, facilitating contact with new and existing customers. The results indicate that such advantages are also evident in contexts of internationalization. However, as also pointed out by the literature, some resistance to the adoption of digital channels is evident (Angelos et al., 2017), and it is possible to infer that many Portuguese SMEs are not taking advantage of the full potential of digital tools, as suggested by Taiminen and Karjaluoto (2015), namely because they do not understand their adaptability to the B2B context, which limits their adoption and investment in these strategies.

4. Conclusion

This article explores a topic that is still little considered in the academic literature, as it analyzes the use of digital marketing to promote internationalization in the B2B context and the attitudes and difficulties faced by companies that neglect digital marketing when approaching global markets.

The results show that some participants are skeptical about the effectiveness of digital marketing in the B2B context, but most recognize the role of digital channels in attracting international customers, facilitating relationship management and justifying new investments.

From this study, it is possible to highlight two types of implications for management. For B2B companies that intend to develop internationalization channels, it is recommended to study both the preferences of their current and potential customers regarding digital communication channels, as well as extra care to identify which sources of digital information and the platforms usually used by them to collect information and increase their knowledge about potential suppliers and alternatives of products and services. In this way, it will be possible to identify which digital marketing platforms and tools can make sense to approach the target audiences. For professionals and companies in consulting, communication, and other services related to the use of digital channels, it is recommended that they clearly communicate the benefits of digital channels for B2B companies, namely in internationalization processes.

The insights of B2B managers provide empirical evidence, which can inspire other managers and offer relevant suggestions for future research. With information and concrete examples of performance and results obtained through digital channels, it will be possible to address the fears and skepticism of those responsible for B2B companies regarding digital marketing strategies for their business sectors.

Even though it is a convenience sample, not representative of Portuguese companies, the results of this study allowed us to obtain interesting clues that can help entrepreneurs who intend to explore the potential of digital marketing to expand their business to international markets, and provide other researchers interested in the subject with possible topics that could be the target of further research.

As more empirical studies on digital marketing strategies for B2B companies are essential, it is urgent to address issues related to their effectiveness, namely in attracting leads, the impact of digital communication, including, through social networks, the B2B purchase decision process, and the effects of interaction with B2B customers on their satisfaction and loyalty.

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The consumer behaviour applied to luxury furniture and decor:

An analysis of the Portuguese scenario

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Abstract

This article aims to analyze the receptivity and motivations of Portuguese consumers for the acquisition of luxury furniture and decoration. Based on a literature review and the adoption of a positivist paradigm, data were collected through the application of an online questionnaire survey between November 2021 and January 2022, to a non-probabilistic convenience sample using the snowball technique, applied to the Portuguese population. The final sample consisted of 402 individuals over the 18-years old of Portuguese nationality. The collected data were quantitatively analyzed using the IBM SPSS Statistics software (version 28.0.0.0). During the analysis were used descriptive and inferential statistical techniques. A total of 11 hypotheses were tested in the conceptual model. The inferential analysis showed a statistically significant correlation to support a total of 8 of the 11 hypotheses formulated in the research model. The results highlight the impact and importance that luxury brands have on consumer emotions, transmitting happiness, authenticity, and sophistication, translating into the consumer's desire to be associated with them. In summary, sensations play a central role in the entire process of buying luxury goods and establishing a relationship between consumers and luxury brands. The main limitation of this study was the sample approach used, that do not allow a generalization to the Portuguese population. For future research, it is recommended to expand this study to other countries, encompassing an international approach.

Keywords: consumer behaviour; consumer decision-making process; luxury; luxury goods; luxury brands.

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1. Introduction

The demand for luxury goods has been gradually increasing, as consumers can enjoy higher incomes and more consumption opportunities due to the conditions of the modern era (Husic & Cicic, 2009). Luxury has shifted from a negative notion, harming public virtue, to an essential promotion of consumption.

In recent years, the concept of luxury has expanded from materialism to time and passion, becoming more accessible. As consumers satisfy their feelings of pleasure and gratification through luxury goods, they also enhance their allure to consumers (Yeoman, 2011). It is noteworthy that luxury goods are no longer exclusively available to the wealthiest social classes, which previously held a significant part of their monopoly. This is due to the introduction of luxury goods for the middle and upper-middle classes (Savitha and Sathyanarayan, 2014, as cited in Bilge, 2015), fueling the growth of the luxury sector (Kapferer & Laurent, 2016; Paul, 2019).

Focusing on luxury furniture and decoration, these consist of movable pieces showcasing the best of elite quality and design associated with a particular period. Often crafted in metal, glass, and wood, they add aesthetic value to environments such as residences, hotels, offices, and other interior or exterior areas. Luxury furniture contributes to a luxurious lifestyle and includes elegant, sumptuous, and indulgent elements (Allied Market Research, 2022; Mordor Intelligence, 2021).

It is important to identify and understand everything that consumers value and seek when purchasing luxury goods, with a particular focus on luxury furniture and decoration. In this context, this study has two research objectives: (1) to analyze the factors influencing the consumer purchasing behavior of luxury furniture and decoration; (2) to examine the entire process of consumer interaction with luxury brands.

This article is structured into five sections, beginning with the present introduction. The second section provides a literature review on the topic, and the third section describes the methodology. The fourth section is dedicated to presenting the results, and the article culminates in the fifth section with the discussion and conclusion.

2. Literature Review

2.1. The concepts: Luxury and luxury goods

Luxury is an extremely challenging concept to define and has various interpretations (Vigneron & Johnson, 1999; Yeoman, 2011). The meaning of luxury varies across time and space. What may be considered luxurious to one person could be deemed commonplace to another (Nwankwo et al., 2014), depending on the individual's experiences and needs (Wiedmann et al., 2007). According to Vigneron and Johnson (1999), luxury refers to the highest level of prestigious brands, encompassing various physical and psychological values.

Bilge (2015) notes that consumer goods are commonly divided into three classes: luxury goods, inferior goods, and necessities. Necessities include goods that individuals with lower incomes allocate the majority of their expenses to, such as food and housing. Inferior goods are products consumed less as income levels rise, making way for luxury goods. Beyond their monetary value, luxury goods can also be associated with factors such as experience, originality, and status when viewed from different perspectives (Yeoman, 2011).

Kapferer and Bastien (2009) emphasize that one of the fundamental functions of luxury is to recreate social structure, namely social stratification. Luxury goods can bring additional benefits as symbols of a social stratum. Thus, even though not essential products for consumers, their high prices serve the function of filtering social classes and are accepted by them. In addition to the social function, pleasure and a sense of pride are integral aspects of luxury's personal dimension. Luxury cannot be considered merely as snobbery but rather as the consumption of luxury symbols. However, no luxury brand can rely solely on customer trust interested only in symbols, neglecting quality and other product characteristics. These customers can easily shift their choice from one luxury brand to another with similar recognition (Kapferer, 1997).

Dubois et al. (2001) and Nueno and Quelch (1998) identified six characteristics of luxury goods: (1) a guarantee of high quality; (2) expensive price; (3) scarcity and uniqueness; (4) timelessness; (5) brand heritage and its history; (6) superfluous goods. On the other hand, Heine (2012) describes the characteristics of luxury goods based on price, quality, aesthetics, rarity, uniqueness, and symbolism.

Regarding the categorization of luxury goods, this is done in different ways depending on their unique characteristics. Allérès (1997) proposed a division of luxury goods into three categories: (1) accessible luxury goods, where the luxury item is available to most consumers due to its affordable price; (2) intermediate luxury goods, where this type of item cannot be acquired and is not accessible to consumers with a limited budget, being only available to certain consumers; (3) unavailable luxury goods, including items that can only be acquired by elite consumers due to their special production conditions and high prices. Silverstein and Fiske's (2008) proposal also relied on three categories of luxury goods: (1) new luxury goods; (2) old luxury goods; (3) common luxury goods.

Siying (2014) schematized the comparison and facilitated the distinction between these three types of luxury goods through a comparison of price, quality, availability, appeal, and market segment (Table 1).

Table 1 – The three categories of Luxury Goods by Siying

Characteristics	New luxury goods	Old luxury goods	Common luxury goods
Price	Exorbitant	Premium	Low price
Quality	Mass scale manufacturing production	Handmade	Industrial mass production
Availability	Affordable	Private/exclusive	Dominant
Appeal	Attractive	Irrelevant	Moderate
Market segment	Consumers motivated by the luxury	Elites	Loyal consumers

Source: (Siying, 2014)

According to Siying (2014), new luxury goods are characterized by an exorbitant price, large-scale manual production, accessibility, attractiveness, and their market segment consists of luxury-driven consumers.

2.2. Luxury brands

Within the context of luxury brands, there is still no widely accepted definition among researchers (Ko et al., 2019). The difficulty in formulating a precise and universally accepted definition may be attributed to the subjective nature of luxury, subject to various interpretations over time (Cristini et al., 2017; Mortelmans, 2005). In their study, Miller & Mills (2012, p.1471) noted that previous research is characterized by "a lack of clarity regarding a definition, operationalization, and measurement of brand luxury." This observation aligns with earlier calls for a more precise definition of luxury goods marketing (Berthon et al., 2009).

Ko et al. (2019) proposed that a luxury brand is a branded product or service that, from the consumer's perspective: 1) has high quality; 2) provides authentic value through desired, functional, or emotional benefits; 3) has a prestigious image in the market, based on qualities such as craftsmanship, workmanship, or service quality; 4) is capable of charging a premium price, and 5) is able to inspire a deep connection with the consumer. However, it is important to note that the practice of premium pricing or superior quality, although increasing the likelihood of a brand being considered of luxury, it´s not the synonym of it. At least, the consumers need to perceive it as one.

Cristini et al. (2017) emphasize excellence, creativity, and exclusivity as key variables in identifying a luxury brand. A brand embodying high levels of these conditions attains the pinnacle of luxury. However, the traditional view linking luxury to these characteristics is fading, and it is increasingly rare for a brand to be perceived as luxurious without embodying all three features (Jackson & Shaw, 2009; Okonkwo, 2016). According to Pereira (2020), a brand with high excellence and exclusivity but low creativity is unlikely to be perceived as luxury.

Hudders and Pandelaere (2012) propose that luxury brands associate with uniqueness, superior quality, aesthetically pleasing design, rarity, and high cost. Consumers predominantly acquire luxury brands for symbolic reasons, reflecting their individual or social goals (Wilcox et al., 2009). Luxury brand consumption is largely determined by social function attitudes, where consumers express individuality and social status through luxury brands (Wilcox et al., 2009). Both Western and Eastern cultures see luxury brands as a means to portray individuality and/or social status (Nueno & Quelch, 1998; Vigneron & Johnson, 2004).

2.3. Attitudes and Perceptions of Luxury Consumers

Consumer attitudes, feelings, and perceptions towards luxury are among the factors shaping the luxury concept. Purchasing behaviors, brand loyalty, and satisfaction with the brand are strongly influenced by how consumers view luxury, the goods they consider luxurious, their relationship with luxury, and their perceptions of luxury (Bilge, 2015).

According to Husic and Cicic (2009), consumers of all social classes perceive luxury as a status symbol. However, Dubois et al. (2005) divided consumers into different groups based on their attitudes toward luxury. Also, Han et al. (2010) categorized consumers based on their preference for ostentatious or non-ostentatious goods and consumption motivations.

In an initial approach to luxury value, Babin et al. (1994) identified two distinct dimensions of luxury value: hedonic value and utilitarian value. Berthon et al. (2009) suggested capturing the total dimensionality of relationships between people, products, and brands to understand luxury value, conceptualized with three dimensions: symbolic, experiential, and functional. Smith and Colgate (2007), based on the three basic consumer needs—symbolic, experiential, and functional—proposed by Park et al. (1986), identified four typologies of value, including symbolic/expressive, experiential/hedonic, functional/instrumental, and cost/sacrifice. Tynan et al. (2010) further expanded the Smith and Colgate (2007) framework by adding rational value.

However, in a study by Alan et al. (2016), focused on the impact of luxury value dimensions on the reacquisition intention of luxury brands, the authors emphasized the lack of total consensus in the literature regarding the dimensions constituting luxury value. They also noted that Shukla et al. (2015) agreed that symbolic value, experiential value, and functional value are the three fundamental dimensions of luxury value.

According to Zhang and Zhao (2019), luxury consists of three important components: a series of unique characteristics such as good quality, high price, majestic materials, and a complex production process; experiential meanings, such as fantasies,

feelings, and fun that individuals can experience and enjoy; and symbolic meanings, such as high recognition and good reputation, as well as symbols of wealth, identity, and social status (Li et al., 2013; Zhang & Kim, 2013; Zhang & Cude, 2018). The identification and systematization of luxury value dimensions have been developed for decades (Zhang & Zhao, 2019).

2.4. Hypothesis and Conceptual Model

Considering that consumer behavior is the process of selecting, purchasing, and consuming products and services to satisfy consumer needs and desires (Kotler & Armstrong, 2018; Ramya & SA, 2016), and the functional value of the product encompasses utility derived from perceived quality, expected product performance, and perceived expected costs (Smith & Colgate, 2007; Sweeney & Soutar, 2001; Wiedmann et al., 2009; Zhang & Zhao, 2019). It is crucial to create brand elements, i.e., characteristics that identify and distinguish it from the competition (Kotler & Armstrong, 2018). Additionally, concern for the environment and sustainability is a topic of growing importance for consumers and society (Chen et al., 2021; Wijekoon & Sabri, 2021).

As mentioned earlier, consumers do not just buy a luxury brand because there are certain motivations that lead them to buy the brand and be satisfied with the purchase. Various factors influence a consumer's motivation to buy a luxury product (Srinivasan et al., 2014). Based on the literature review, eleven hypotheses were formulated and are explicitly stated in Table 2.

Table 2 – Hypotheses

H1	Sensations influence the Product Functional Value.
H2	Sensations are related with Environment and Sustainability.
H3	Sensations are related with Brand Elements.
H4	Sensations influence the Buying Behaviour.
H5	Product Functional Value influence the Buying Behaviour.
H6	The Environment and Sustainability are related with the Buying Behaviour.
H7	The Brand Elements influence the Buying Behaviour.
H8	Sensations influence the Relationship with Luxury Brands.
H9	Product Functional Value influence the Relationship with Luxury Brands.
H10	The Buying Behaviour influence the Relationship with Luxury Brands.
H11	The Brand Elements are related with Luxury Brands´ Relationship.

Source: Elaborated by the author

The conceptual model is represented in Figure 1. To achieve the previously established research objectives, a positivist paradigm was adopted, and a quantitative study was conducted.

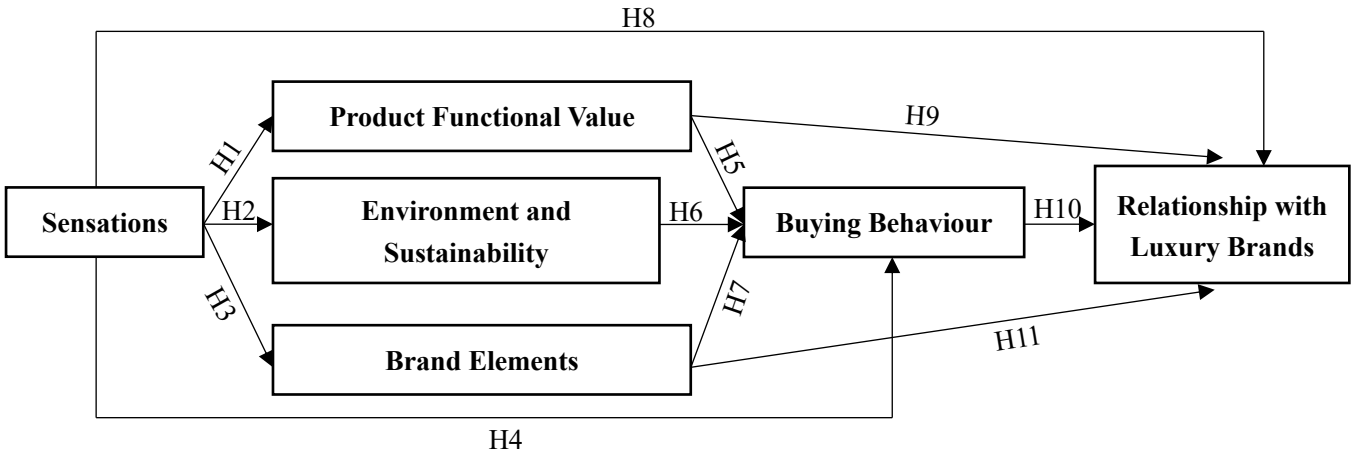


Figure 1 – Conceptual Model

Source: Elaborated by the author

3. Methodology

The study's target population was the entire adult population residing in Portugal. For data collection, a questionnaire survey was applied online to a non-probabilistic convenience sample using the "snowball" technique. Despite being aware of the disadvantages of non-probabilistic sampling, such as not being representative of the study population, it was deemed the most appropriate.

For the questionnaire's operationalization and data collection, the online questionnaire platform FormsUA was used. For the feasibility and adequacy of the questionnaire, it had the consent and approval of the Data Protection Officer (GDPR) of UA.

The questionnaire was available online from November 3, 2021, to January 10, 2022. It consisted of a total of 15 questions divided into four sections: the first section contained 5 questions regarding the socio-demographic characteristics of the participants; the second section referred to 8 questions related to the consumer's contact with luxury brands; the third and fourth sections consisted of 2 questions each, respectively, about the consumer's relationship with luxury goods and the attributes valued in luxury furniture and decoration. Previously validated scales by other authors were used. The questionnaire and the respective scales used are included in the Appendix.

In data analysis, descriptive and inferential statistical techniques were used with the IBM SPSS Statistics software (version 28.0.0.0). The questionnaire received a total of 553 responses, but after monitoring, only 402 valid responses were considered.

4. Results

4.1. Sample sociodemographic characterization

The questionnaire obtained a total of 553 responses, but after monitoring, 402 valid responses were considered.

Out of the total 402 respondents, 268 were female (66.7%) and 134 were male (33.3%). Regarding age groups, the sample proved to be diverse (minimum age: 18 years; maximum age: 81 years), with a greater concentration in the three younger age groups: 18-24 years (N=104, 25.9%), 25-34 years (N=67, 16.7%), and 35-44 years (N=93, 23.1%).

In terms of education, almost 80% of the sample had higher education (N=308, 76.6%), with 73.4% (N=295) holding at least a bachelor's degree, and 38.3% (N=154) having postgraduate qualifications or higher. Regarding socioeconomic status, the majority claimed to be in a middle position (N=215, 53.5%; X = 5.81); about one-third (N=132, 32.8%) stated they were in a high or very high socioeconomic position, while only 13.6% (N=53) considered themselves to have a low or very low socioeconomic status.

Regarding the professional situation, about half of the sample consisted of employed individuals (N=198, 49.3%), with a significant portion being students and working students (N=155, 38.5%).

4.2. Consumers´ attitudes regarding luxury goods characterization

The participants were questioned regarding the frequency with which they followed luxury brands: more than half of the sample (N=203, 50.5%) responded that they did not follow, or only rarely followed; 18.1% (N=73) stated that they followed luxury brands frequently or very frequently.

Concerning the frequency of acquiring luxury products, the obtained values highlighted that the acquisition of luxury products is not a common practice, with 73.1% (N=294) of the sample responding that they rarely or very rarely acquired luxury products; 21.4% (N=86) stated that they did so regularly, and only 5.4% (N=22) responded that they frequently acquired luxury products.

At the time of purchasing luxury products, the preferred method of acquisition is the brand's physical store (N=162, 40.3%), followed by outlets (N=114, 28.4%). The brand's online store (N=59, 14.6%) and multi-brand stores (N=49, 12.2%) represent other alternatives to consider. The opinions of friends/acquaintances do not play a decisive role in the purchase of luxury products (41.1%, N=165); for 29.4% (N=118), it is indifferent, and only 29.6% (N=119) considered the opinion of friends/acquaintances relevant. Regarding the willingness to pay high prices for products from famous brands, only 14.9% (N=60) of the sample showed receptiveness to this possibility.

About the influence of brand notoriety on the perceived quality of the product, 49% (N=197) of the participants agreed that brand notoriety influences the perceived quality of the product; 23.4% (N=94) were indifferent, and 27.7% (N=111) disagreed with the statement.

Regarding their willingness to invest more in environmentally friendly products, 74.6% (N=300) of the participants stated that they were receptive to this possibility; 19.9% (N=80) were indifferent, and only 5.5% (N=22) were not receptive. In prioritizing the purchase of environmentally friendly products, 57.5% (N=231) said they prioritize the purchase of environmentally friendly products; 30.1% (N=121) were indifferent, and 12.4% (N=50) said they do not prioritize the purchase of environmentally friendly products.

Analyzing the sensations obtained with luxury brands, on a 5-point Likert scale, happiness (X=3.97), authenticity (X=3.68), and sophistication (X=3.43) were the main sensations elicited. Prestige (X=2.95), rarity (X=2.91), and preciousness (X=2.85)

were also felt, albeit with less intensity. Finally, status (X=2.47) was a sensation that the majority of the sample (N=321, 79.9%) did not associate with the purchase of luxury furniture and/or decoration products.

Regarding the attributes valued in luxury furniture and decoration goods, the quality of materials (X=4.44) and product performance (X=4.42) were revealed to be the attributes given the greatest weight. The eternity (or durability) (X=4.34) of products and their appearance (X=3.97) were other attributes that played a relevant role. On the other hand, less importance was given to attributes that were not directly related to the product and its functioning: country of origin (X=2.78), brand name (X=2.62), and packaging (X=2.56).

4.3. Factorial analysis

The principal components method was employed, and the results revealed that the factor analysis was appropriate. Firstly, based on the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) test value of 0.835. A value close to 1 indicates that correlation patterns are relatively compact, and factor analysis should yield distinct and reliable factors (Field, 2017). Significant correlation among variables was also confirmed, as indicated by the result of the Bartlett's test of sphericity: p-value = 0.000<0.05. A seven-component solution was presented as they had eigenvalues greater than 1 (Goretzko et al., 2019), explaining 66.67% of the total variance of the original variables.

Subsequently, each component underwent an internal consistency assessment using Cronbach's Alpha. It allows for evaluating the internal consistency or reliability of the component/factor and represents the proportion of variability in responses resulting from differences among respondents (Vaske et al., 2017). Some variables had to be removed, as their elimination would increase the Alpha value. For the interpretation and evaluation of the Cronbach's Alpha value, the following criteria were considered: between 0.6 and 0.7 – reasonable internal consistency; between 0.7 and 0.9 – good internal consistency; and values equal to or higher than 0.9 – very good internal consistency (Field, 2017; George & Mallery, 2020).

Considering the results of the factor analysis and the reliability of the scales, six dimensions were identified: Sensations (SEN); Product Functional Value (PFV); Relationship with Luxury Brands (RLB); Environment and Sustainability (ES); Brand Elements (BE); Buying Behavior (BB). Table 3 illustrates the dimensions and their respective items.

Table 3 – Dimensions and items

Dimensions	Variables	Factor Loadings	Cronbach Alpha
Sensations (SEN)	SEN1 Preciosity	0,714	0,847
	SEN2 Authenticity	0,667	
	SEN3 Rarity	0,757	
	SEN4 Sophistication	0,691	
	SEN5 Prestige	0,756	
	SEN6 Happiness	0,361	
	SEN7 Status	0,639	
Product Functional Value (PFV)	PFV1 Materials Quality	0,863	0,855
	PFV2 Performance	0,842	
	PFV3 Durability	0,798	
Relationship with Luxury Brands (RLB)	RLB1 I follow luxury brands	0,813	0,804
	RLB2 I acquire luxury goods frequently	0,864	
Environment and Sustainability (ES)	ES1 I invest more money in goods that are eco-friendly	0,844	0,825
	ES2 I prefer the buy of eco-friendly goods.	0,877	
Brand Elements (BE)	BE1 Packaging	0,737	0,653
	BE2 Name	0,602	
	BE3 Country of origin	0,716	
Buying Behaviour (BB)	**BB1** I consider important the opinion of friends and family regarding luxury brands and goods.	0,747	0,627
	BB2 I´m able to pay more for goods from luxury brands.	0,488	
	BB3 The brand´s notoriety influence the goods´ perceived quality.	0,731	

Source: Elaborated by the author

4.4. Hypothesis Tests and Regression Models

In a first approach, the existence of correlation between the 6 dimensions was analyzed using the Pearson correlation coefficient (Table 4). The results show a moderate positive correlation between Sensations and Brand Elements (0.481), Sensations and Buying Behavior (0.454), Sensations and Relationship with Luxury Brands (0.411), as well as Buying Behavior and Relationship with Luxury Brands (0.412). The remaining correlations are weak or nonexistent. In a second phase, the eleven hypotheses formulated in the conceptual model were individually tested. Table 5 presents the results of the respective tests conducted at a significance level of 5%.

Table 4 – Correlations between dimensions

		RLB	SEN	BE	BB	ES	PFV
Pearson Correlation	RLB	1,000	,411	,335	,412	-,028	,074
	SEN	,411	1,000	,481	,454	,019	,354
	BE	,335	,481	1,000	,346	,171	,179
	BB	,412	,454	,346	1,000	,005	,171
	ES	-,028	,019	,171	,005	1,000	,191
	PFV	,074	,354	,179	,171	,191	1,000
Sig. (1 extremity)	RLB	.	<,001	<,001	<,001	,288	0,069
	SEN	,000	.	,000	,000	,349	,000
	BE	,000	,000	.	,000	,000	,000
	BB	,000	,000	,000	.	,458	,000
	ES	,288	,349	,000	,458	.	,000
	PFV	,069	,000	,000	,000	,000	.
N	RLB	402	402	402	402	402	402
	SEN	402	402	402	402	402	402
	BE	402	402	402	402	402	402
	BB	402	402	402	402	402	402
	ES	402	402	402	402	402	402
	PFV	402	402	402	402	402	402

Source: Elaborated by the author

Based on the test values obtained, there was statistically significant evidence to not reject eight out of eleven hypotheses. Only H2 and H6 were rejected, involving the Environment and Sustainability dimension, and H8 regarding the influence of the Product Functional Value on the Relationship with Luxury Brands.

Table 5 – Hypothesis Tests

Hypothesis	Results
H1: Sensations influence the Product Functional Value.	Supported p-value = 0,000<0,05
H2: Sensations are related with Environment and Sustainability.	Rejected p-value = 0,349>0,05
H3: Sensations are related with Brand Elements.	Supported p-value = 0,000<0,05
H4: Sensations influence the Buying Behaviour.	Supported p-value = 0,000<0,05
H5: Product Functional Value influence the Buying Behaviour.	Supported p-value = 0,000<0,05
H6: The Environment and Sustainability are related with the Buying Behaviour.	Rejected p-value = 0,458>0,05
H7: The Brand Elements influence the Buying Behaviour.	Supported p-value = 0,000<0,05
H8: Sensations influence the Luxury Brands´ Relationship.	Supported p-value = 0,000<0,05
H9: Product Functional Value influence the Luxury Brands´ Relationship.	Rejected p-value = 0,069>0,05
H10: The Buying Behaviour influence the Luxury Brands´ Relationship.	Supported p-value = 0,000<0,05
H11: The Brand Elements are related with Luxury Brands´ Relationship.	Supported p-value = 0,000<0,05

Source: Elaborated by the author

Next, multiple linear regression analysis was used to test the conceptual model using the Stepwise method. The first partial model tested had CCO as the dependent variable and SEN, VFP, ABS, and ELM as independent variables. The equation of the regression line is presented as follows:

$$BB = 1.112 + 0.375\ SEN + 0.163\ BE + error$$

Considering the equation and the test values for the different coefficients, it can be observed that these significantly differ from zero, indicating a significant regression. Two models were tested, with the two variables that met the entry criteria in the final equation (SEN and ELM). The other two variables did not meet the entry criteria (PFV and ES) and were not considered.

The multiple correlation value between the dependent variable and the independents (R=0.477) indicates a moderate positive correlation between them. The coefficient of determination (R squared) shows that about 23% (22.7%) of the variation in buying behavior is explained by SEN and BE. Even using the adjusted coefficient of determination (adjusted R squared), a more rigorous and realistic value, the variation practically does not change (22.4%) (George & Mallery, 2020). The standardized beta value (β) indicates that SEN is the variable with the greatest influence on CCO (β=0.375). Considering the test values (p), it can be concluded that BB significantly depends on SEN (p-value < 0.001) and BE (p-value = 0.001 < 0.05).

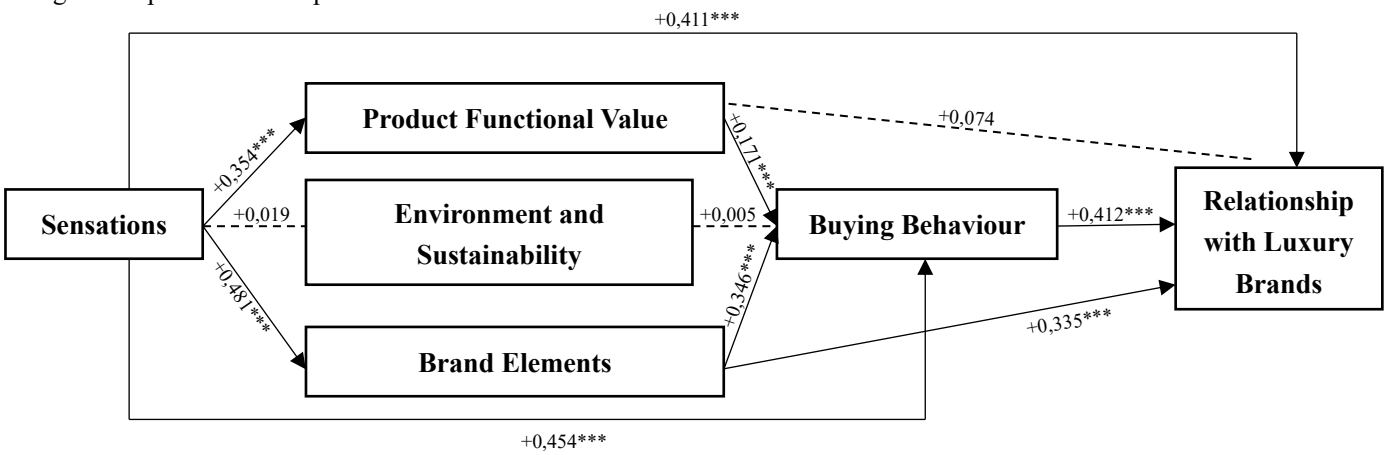
Moving to the second partial model, it sought to test the influence of the variables SEN, PFV, BE, and BB on LBR. The equation of the regression line is:

$$LBR = 0.130 + 0.296\ BB + 0.256\ SEN + 0.149\ BE + error$$

Observing the equation and the test values obtained for each coefficient, it is noted that the coefficients significantly differ from zero, indicating a significant regression. Three models were tested with the three variables that met the entry criteria in the final equation (BB, SEN, and BE). The variable PFV did not meet the entry criteria and was not considered in the model.

The multiple correlation value between the dependent variable and the independents (R=0.497) indicates a moderate positive correlation. The coefficient of determination (R squared) shows that about 25% of the variation in LBR is explained by BB, SEN, and BE. The standardized beta value (β) indicates that BB is the variable with the greatest influence on LBR (β=0.263), followed by SEN (β = 0.227) and BE (β = 0.135). Considering the test values (p), it can be concluded that LBR significantly depends on BB (p-value < 0.001), SEN (p-value < 0.001), and BE (p-value = 0.008 < 0.05).

Figure 2 represents the empirical model.



Observation: Straight line: Supported hypothesis. Dotted line – Rejected hypothesis. The value that appears in each line it´s regarding the correlation between dimensions. *** p-value <0,001. Confidence level: 99,99%.

Figure 2 – Empirical Model

Source: Elaborated by the author

In summary, the statistical results show that the Sensations dimension significantly, positively moderately influences the Product Functional Value (H2) and Brand Elements (H3). There is a weak positive influence of the Product Functional Value on Buying Behavior (H5) and Brand Elements on Buying Behavior (H7), and a moderate positive influence of Sensations on Buying Behavior (H4). Regarding the Relationship with Luxury Brands, it is weakly positively influenced by Brand Elements (H11) and moderately influenced by Sensations (H8) and Buying Behavior (H10). Observing the model, it is evident that the strongest correlation occurs between Sensations and Brand Elements.

5. Discussion and Conclusion

This study aimed to identify and understand what consumers value and seek when purchasing luxury goods, with a particular focus on luxury furniture and decoration items. It had two research objectives: (1) to analyze the factors influencing the consumer's buying behavior of luxury furniture and decoration items, (2) to analyze the complete process of consumer interaction with luxury brands.

The results lead to the conclusion that the consumer's buying behavior is primarily influenced by Sensations and Brand Elements, which are also cumulatively influenced by sensations. Thus, the purchase of luxury furniture and decoration items is marked by a highly emotional component, with sensations such as happiness, authenticity, and sophistication present, directly and indirectly impacting buying behavior, the latter through the influence of Brand Elements. Buying behavior is also influenced by the Product Functional Value, meaning that consumers place great importance on product-related attributes such as durability, performance, material quality, and appearance, rather than focusing solely on the brand. A significant number of respondents value sustainability and environmental concern, being willing to make higher investments in products created with these considerations, although this dimension did not significantly impact consumer purchasing behavior.

The results also indicate that the process of establishing consumer relationships with luxury brands is primarily influenced by their buying behavior and sensations, and to a moderate extent by brand elements. Once again, sensations play a central role throughout the process. Therefore, marketing and luxury brand managers, especially in the luxury furniture and decoration industry, should focus on creating memorable and strong sensations in consumers, as these are the main motivators for buying and building relationships with luxury brands.

This study has some limitations, notably the non-probabilistic convenience sampling technique, which prevents the results from being generalized to all Portuguese consumers. As a suggestion for future research, it is recommended to replicate the study with a representative sample of Portuguese consumers and propose that the study be replicated in other countries for an international context. Additionally, it would be relevant to incorporate more dimensions in the study and use other statistical techniques for data analysis, including structural equation modeling.

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Appendix – Survey

The following questionnaire its being developed under a Master Thesis regarding the Master´s Degree in Marketing at the Higher Institute for Accountancy and Administration of Aveiro University. Its aim is to analyze the consumer´s receptiveness to luxury goods, focusing on furniture and decoration. This survey obliges to the GRDP, therefore is confidential and anonymous. The collected data will serve solely for research and academical purposes. The duration should not exceed 5 minutes.

Section	Questions	Answer scenarios	Theorical basis
Sociodemographic Characteristics	1. Gender?	Female | Male | Prefer not to say. (multiple answer question, nominal type)	General questions to obtain sociodemographic data about the sample.
	2. Age?	Brief numerical question	
	3. Educational level:	1. Primary School | 2. Middle School (until 9th grade) | 3. High School | 4. Associate degree / Community College | 5. Bachelor's degree | 6. Master's degree or higher (Pergunta escalar, ordinal)	
	4. Considering your socioeconomical level, where you consider to be in the scale?	1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 (1 = very low / 10 = very high) (scale question, ordinal)	
	5. What is your professional situation at the moment?	Employed by someone – Self-employed – Student-employee – Unemployed – Retired (multiple answer question, nominal)	
The contact with luxury products and brands	6. Its frequent for you to follow famous brands?	1 = Very rarely | 2 = Rarely | 3 = Sometimes | 4 = Frequently | 5 = Very frequently (5-point likert scale question)	(Dabbous & Barakat, 2020)
	7. How often you usually acquire luxury products?	1 = Very rarely | 2 = Rarely | 3 = Sometimes | 4 = Frequently | 5 = Very frequently (5-point likert scale question)	(B. Zhang & Kim, 2013)
	8. Usually, how do you acquire luxury products?	On-site brand Store(s) – Online brand store(s) – multi-brands shops – Outlets – Social media marketplaces (Multiple answer question, nominal)	(Dauriz et al., 2014)
	9. I consider important the opinion of knew-ones and friends, regarding luxury brands and products.	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	(Dogan-Sudas et al., 2019)
	10. I´m receptive to pay higher prices for famous brands´ products.	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	(Tai & Tam, 1997)
	11. The brand awareness influences the product´s quality perceived.	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	12. I´m able to invest more in eco-friendly products.	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	13. Usually, I prioritize the buying of eco-friendly products.	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
The consumer-luxury goods relationship	**When acquiring luxury goods, in terms of furniture and decoration, classify, between 1 to 5, the sensations that come to your mind.**		
	14. Preciosity	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	(Becker et al., 2018; L. Zhang & Zhao, 2019)
	15. Authenticity	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	16. Rarity	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	17. Sophistication	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	18. Prestige	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	

Section	Questions	Answer scenarios	Theorical basis
	19. Happiness	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	20. Status	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
Luxury furniture and decoration attributes	**When you are buying luxury furniture and decoration, classify between 1 to 5, the attributes that you give the most priority.**		
	21. Appearance	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	(Sweeney & Soutar, 2001; R. Zhang, 2019)
	22. Materials quality	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	23. Performance	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	24. Eternity (or durability)	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	25. Packaging	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	26. Brand´s name	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	
	27. Country of Origin	1 = I totally disagree | 2 = I disagree | 3 = Neutral | 4 = I agree | 5 = I totally disagree (scale question, 5-point likert scale)	

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Understanding AI's Role in Shaping Consumer Choices

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Abstract

The rapid evolution of artificial intelligence (AI) has substantially transformed marketing and the way consumers make decisions. This study investigates the impact of transparency and perceived control on the acceptance of personalized recommendations made by AI systems. The research was conducted with 81 participants through online questionnaires collected between March and April 2024. The structural model used analyzed the relationships between transparency, perceived control, perception of AI, and consumers' purchasing decisions. The results reveal that transparency and perceived control act as critical mediators in the relationship between the perception of AI and acceptance of personalized recommendations, influencing consumer trust as well as their concerns about privacy and ethics in the use of data. The findings highlight that clear communication about how AI operates and offers recommendations can increase the perception of transparency, giving consumers a deeper understanding of the processes involved. At the same time, giving users more control over personalized preferences can lead to greater engagement and trust in AI-generated recommendations. Thus, companies looking to deploy personalized recommendation systems should focus on developing strategies that emphasize transparency and offer significant control to the user. The findings indicate that such approaches can significantly contribute to increasing the acceptance of personalized recommendations while addressing ethical and privacy concerns in the use of data.

Keywords: Intelligence; Transparency; Perceived Control; Digital Marketing; Consumer Decision.

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1. Introduction

The rapid evolution of artificial intelligence has significantly transformed the field of marketing and the way consumers make decisions. Current literature highlights an important gap: the limited understanding of the role of transparency and perceived control in the impact of artificial intelligence (AI) on consumer decision-making. This points to the need to explore transparency and control mechanisms, given that transparency, is recognized as a critical factor in establishing trust between consumers and AI systems. Despite this importance, there is a lack of clarity on how transparency and perceived control directly influence consumers' perception of personalized recommendations made by AI.

This identified gap leads to the following research questions (RQ) that could significantly contribute to the academic discourse on the relationship between transparency and perceived control of AI tools and the consumer's purchasing decision:

RQ1: How does perceived transparency influence the acceptance of personalized recommendations by AI?
RQ2: How do different levels of perceived control impact consumer decision-making when interacting with AI systems?

To answer these research questions, our study objective aims to investigate how transparency and perceived control of AI tools act as mediators in the relationship between the perception of AI and the consumer's purchasing decision.

By addressing these questions, this study aims to offer valuable insights for practitioners and researchers, contributing to a deeper understanding of the role of transparency and perceived control in consumers' interaction with AI systems in marketing. This objective allows us to: i) analyze the influence of perceived transparency on consumer trust in AI systems; ii) assess how different levels of control affect the acceptance of personalized recommendations; iii) investigate how transparency and control mediate the relationship between consumers' perceptions and concerns about AI and their purchasing decisions.

To carry out this study, we used questionnaire surveys, where it was possible to obtain 81 participants over two months, from March to April 2024. The results obtained made it possible to test the structural model and carry out a path analysis that confirmed the hypotheses under study, as well as proving that the data fit the model.

This article consists of six main sections. After this introduction, the second section is dedicated to the literature review, which summarizes contributions on artificial intelligence in digital marketing, consumer perceptions and experiences, consumer decisions and their impact on purchasing decisions, transparency and control perceived by consumers, and consumer concerns about AI personalization. Subsequently, the third section presents the methodology of this study, the fourth section consists of the results obtained and the fifth section presents the discussion. The article ends with a conclusion, the main limitations, suggestions for future research, and practical and theoretical implications.

2. Literature Review

2.1. The double face of artificial intelligence in marketing: advanced personalization and privacy

The growing implementation of artificial intelligence (AI) in marketing has profoundly transformed business practices and interactions between companies and consumers. AI's ability to analyze large volumes of data allows for more precise and personalized communication, adjusting marketing strategies to consumers' individual needs in real-time (Liu et al., 2021). This level of personalization has shown the potential to significantly improve the consumer experience, increasing satisfaction and brand loyalty (Zhang & Qi, 2019).

However, this growing reliance on AI also raises significant concerns, especially concerning privacy and the ethical use of data. AI's ability to collect, store, and process personal information has highlighted the need for stricter regulations to protect consumers (Lavelle-Hill et al., 2020). Consumer expectations regarding transparency and control over their data are becoming increasingly demanding, forcing companies to adapt their policies and practices to fulfill these requirements (Kumar et al., 2019). In addition, the impact of AI on consumer purchasing behavior is remarkable, especially about impulse purchases. AI can identify behavioral and emotional patterns that predict when a consumer is more inclined to make an unplanned purchase (Wang et al., 2022). This knowledge allows companies to optimize their marketing strategies to present products at the most opportune moment, increasing impulse sales.

On the other hand, AI also has the potential to positively influence more conscious and ethical purchasing behavior. For example, AI systems can highlight fair trade or ecologically sustainable products, encouraging consumers to make choices that are in line with their personal values and social concerns (De Pelsmacker & Janssens, 2007). Thus, AI not only facilitates more efficient commercial transactions but can also contribute to greater social awareness and responsibility among consumers and companies (Oke et al., 2023). The following hypothesis is therefore proposed:

H 1: Consumers' perceptions and experiences lead them to develop concerns about AI personalization.

AI in marketing is therefore reshaping interactions between companies and consumers in complex and multifaceted ways. While

it offers significant improvements in personalization and marketing effectiveness, it also raises ethical questions and privacy challenges that cannot be ignored (Davenport et al., 2020). Companies wishing to take advantage of AI must therefore consider these factors carefully and ethically, ensuring that the technology is used in a way that respects and enriches the consumer experience (Du & Xie, 2021). In this sense, we formulate the following hypothesis:

H 1.1: Concerns about AI personalization mediate the relationship between consumers' concerns and experiences and their consumption decisions.

2.2. Consumer decision-making influenced by ai transparency and perceived control

Consumer decision-making is intrinsically linked to their perceptions and experiences. Previous studies (Kim et al., 2021; Korsunova et al., 2023; Maggioni et al., 2019; Qin et al., 2021; Zhang & Doucette, 2019) highlight that factors such as safety, convenience, well-being, and ease of use shape the consumer experience and, consequently, influence their choices. These perceptions, mediated by sensory and emotional experience, determine patterns of behavior in the purchase of products and services, highlighting the importance of an in-depth understanding of consumer needs and desires to guide effective marketing and product development strategies. The following hypothesis is therefore proposed:

H 2: Consumers' perceptions and experiences drive their decision-making.

The growing integration of AI in marketing makes it crucial to understand how these technologies shape consumer perception and experience. Transparency in AI systems is essential to establishing trust. Clarity about how recommendations are made and the presentation of understandable information about decision-making processes improves consumer trust in these systems, leading to greater acceptance of suggestions provided by AI (Li et al., 2019).

Transparency also influences the consumer's perception of fairness, who becomes more receptive to decisions when they perceive that AI acts fairly (Simonson & Sela, 2011).

Consumers' perceived control over interactions with AI systems is also crucial, as the ability to adjust and modify the recommendations provided by AI results in more positive experiences (Yan et al., 2017). For example, the ability to customize search filters or recommendation preferences increases consumer engagement with the technology.

Positive consumer perceptions and experiences of AI depend largely on the degree of transparency and control provided. AI systems that enable personalization and provide clear information on decision-making create a more satisfying experience for the consumer (Ferreira, Rei, and Moreira). In this sense, AI can help consumers achieve their goals, but only when they perceive that the technology is aligned with their objectives and offers direct control over their decisions (Gollwitzer & Sheeran, 2009). In this sense, we formulate the following hypotheses:

H 3: Consumer perceptions and experiences are directly related to transparency and perceived control over tools and AI.
H 3.1: Transparency and perceived control over tools and AI mediate the relationship between consumer perceptions and experiences and consumer decision-making.
H 4: Transparency and perceived control over tools and AI are directly related to concerns about AI personalization.

Figure 1 shows the causal relationships between the previously presented research hypotheses.

3. Method

To fill the existing gap in the literature, which consists in the limited understanding of the role of transparency and perceived control in the impact of artificial intelligence (AI) on consumer decision-making, this study addresses research questions that can significantly enrich the academic discourse on the relationship between transparency, perceived control, and consumer purchasing decision. The research questions (RQs) are as follows:

RQ1: How does perceived transparency influence the acceptance of personalized recommendations by AI?
RQ2: How do different levels of perceived control impact consumer decision-making when interacting with AI systems?

By answering these questions, this study seeks to provide valuable insights for both practitioners and researchers, contributing to a deeper understanding of the role of transparency and perceived control in the interaction between consumers and AI systems in marketing.

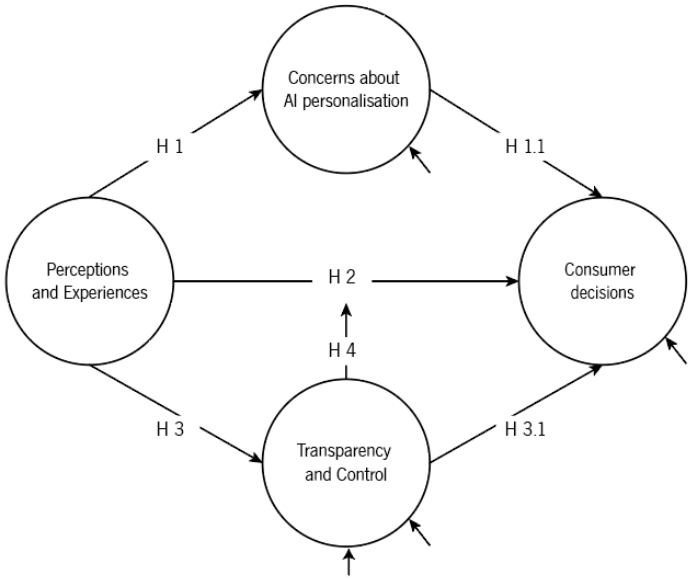


Figure 1 - Proposed Structural Model

Source: Author

The main objective of this research is to understand how transparency and perceived control of AI tools influence the relationship between consumers' perception of AI and their purchasing decisions. To achieve this objective, the following specific points have been defined: i) analyze the effect of perceived transparency on consumer trust in AI systems; ii) evaluate how different levels of perceived control affect the acceptance of personalized recommendations; iii) investigate how transparency and perceived control act as mediators between consumers' perceptions and concerns about AI and their purchasing decisions.

To gain these insights, the research was conducted online, using a non-probability convenience sample, over two months, from March to April 2024.

Initially, participants were asked to give their informed consent, which detailed various aspects of the research project including its objectives and the confidentiality safeguards in place. They were then asked to respond to several questionnaires concerning different aspects of digital marketing and artificial intelligence. These questionnaires covered topics such as general perceptions of AI, consumer experiences, the impact of these technologies on purchasing decisions, and specific concerns and expectations felt by consumers. The survey concluded with a socio-demographic questionnaire that collected personal information from the participants. This thorough methodology was designed to collect significant insights into current consumer attitudes towards AI and digital marketing.

3.1. Sample characteristics

The sample has 81 participants, 39 (48.1%) men, and 42 (51.9%) women. The age of the participants is between 35 and 67 years, with an average age of 51.36 years (SD= 7.95%), all are of Portuguese nationality.

This study was characterized by the regional and academic heterogeneity of its participants, as illustrated in Table 1. Data analysis revealed a preponderance of respondents from the Centre region, making up 63% of the sample, followed by a substantial representation from the North with 24.7%. The metropolitan areas of Lisbon, the Alentejo, and the Algarve showed more modest participation, each contributing less than 10% of the participants.

Furthermore, the educational profile of the respondents proved to be remarkably inclined towards advanced stages of academic training, with an overwhelming majority of 67.9% holding a doctorate. Master's degree holders accounted for 17.3%, while participants with post-doctoral training accounted for 7.4%. Undergraduate and postgraduate training levels had a minimal presence in the sample.

3.2. Instruments

Table 2 provides a comprehensive overview of consumer perceptions and experiences concerning the personalization promoted by Artificial Intelligence (AI) in online marketing.

Table 1 – Distribution of participants per region

Region	Number of participants
North	20 (24.7%)
Center	51 (63%)
Lisbon Metropolitan Area	8 (9.9%)
Alentejo	1 (1.2%)
Algarve	1 (1.2%)
Undergraduate	4 (4.9%)
Postgraduate	1 (1.2%)
Masters	14 (17.3%)
Doctorate	55 (67.9%)
Post-Doctorate	6 (7.4%)
Aggregation	1 (1.2%)

Source: Author

Table 2 – Consumer perceptions of AI personalization in online marketing

	M	SD
Perceptions and Experiences (α = .79)		
AI significantly improves the relevance of the adverts I see online.	3.14	.787
Personalized shopping experiences created by AI make my online browsing more efficient.	3.11	.873
My negative experiences with personalized marketing by AI have been minimal or non-existent.	3.01	.783
Consumer Decisions (α = .58)		
I value personalized product/service recommendations made by AI systems.	2.80	.993
Personalized AI recommendations often influence my online purchasing decisions.	2.27	1.08
I prefer direct interactions with humans to AI-automated interactions during the purchase process.	1.77	.978
Transparency and Control (α=.68)		
I would like to have more control over how my data is used for personalization by AI.	4.51	.654
Transparency from companies about the use of AI in marketing is fundamental to my trust.	4.40	.736
Concerns about AI Personalisation (α=0.70)		
Excessive personalization by AI in marketing makes me feel uncomfortable. (inverted)	4.14	.833
Adverts that seem to 'know too much' about my personal interests cause concern. (inverted)	4.21	.832

Source: Author

To assess perceptions and consumer experiences, a three-dimensional scale was developed (e.g., 'AI significantly improves the relevance of the adverts I see online."). This scale showed an acceptable level of internal consistency with a Cronbach's alpha of .79, which is in line with the parameters established by Gliem & Gliem (2003). Participants showed a moderately positive perception of the relevance of personalized ads and the efficiency of shopping experiences promoted by AI, with averages of 3.14 and 3.11 respectively. In addition, consumers reported minimal or no negative experiences with personalized marketing (M = 3.01). However, the relatively high standard deviations suggest considerable variation in individual perceptions.

About the evaluation of consumer decisions and their impact on purchasing decisions, another three-dimensional scale was developed (e.g., 'I value personalized product/service recommendations made by AI systems.'), where it registered an internal consistency index considered poor (α=.58). This dimension revealed that although consumers value personalized recommendations (M=2.80), their influence on purchasing decisions is still limited (M=2.27). Furthermore, consumers prefer direct interactions with humans over automated interactions by AI during the purchasing process (M=1.77).

Regarding transparency and control perceived by consumers, a two-dimensional scale was created (e.g., 'I would like to have more control over how my data is used for personalization by AI.'). This scale obtained a questionable internal consistency index (α=.68). The dimension showed strong consumer concerns about transparency and control in the use of their data for personalization. The average of 4.51 for 'desire for greater control over data' and 4.40 for 'transparency fundamental to trust' indicates that consumers want greater participation and understanding of how their data is used.

Finally, to probe consumers' concerns about AI personalization, a two-dimensional scale was established (e.g., 'Excessive personalization by AI in marketing makes me feel uncomfortable.'), which showed an acceptable internal consistency index (α=0.70). Consumers showed significant discomfort with excessive personalization, expressing concerns about ads that seem to know too much about their personal interests (M=4.21) and discomfort with excessive personalization (M=4.14).

All the scales were answered on a Likert-type response scale, ranging from 1 (totally disagree) to 5 (totally agree), thus enabling a quantitative ranking of the respondents' attitudes and perceptions.

4. Results

Statistical analyses were performed using the Statistical Package for the Social Science (IBM SPSS), version 29.0, and the Analysis of Moment Structures (AMOS), version 29.0.

Table 3 shows the correlations between the variables analyzed, as well as the internal consistency indices of the structural model variables for the total sample (n=81). The magnitude of the correlations shows the presence of moderate (.30 < r < .50) and strong (r > .50) relationships (Cohen, 1988) between the variables, with no signs of multicollinearity. In addition, most of the correlations are statistically significant (p < .10), meeting the assumption of linearity.

Table 3 – Correlations between study variables

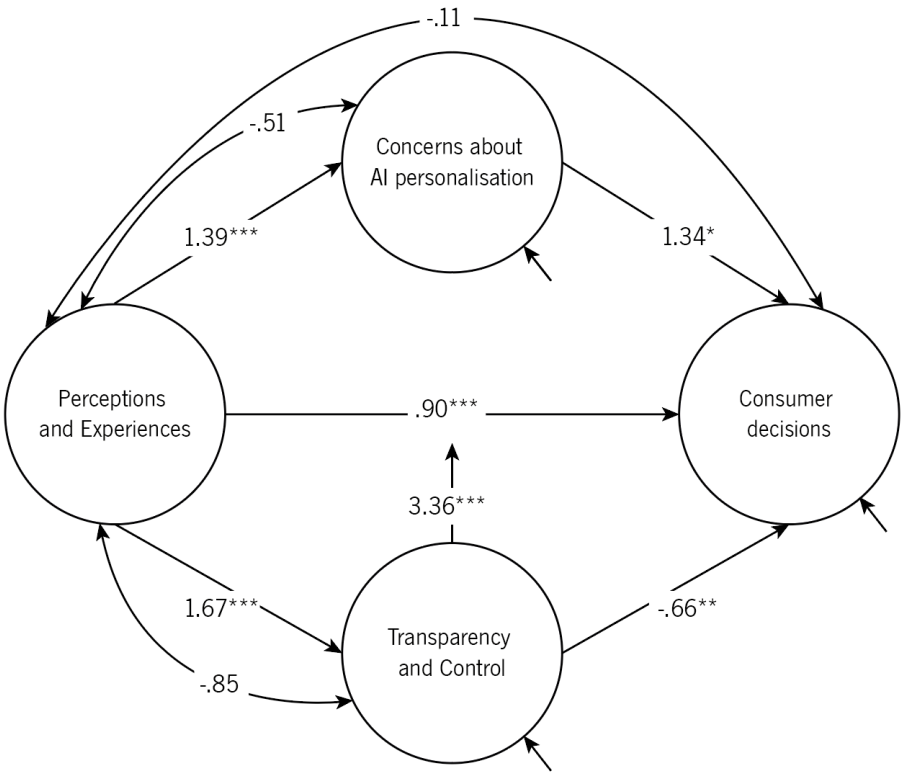
	Perceptions and Experiences	Consumer Decisions	Transparency and Control
Perceptions and Experiences	.	.	.
Consumer Decisions	.510***	.	.
Transparency and Control	.072	-.185*	.
Concerns about AI Personalisation	. 124	-373***	.529***

Source: Author

Path analysis was carried out to assess the suitability of the structural model to the data and check whether the hypotheses previously formulated were confirmed, thus validating the existence of the proposed relationships between the constructs.

The final structural model showed a very good CFI value (≥.95; for the present sample 1), a very good GFI value (≥.95; for the present sample 1), an unacceptable RMSEA value (.05>RMSEA<.10; for the present sample .35) and an AIC value of 20.00.

Figure 2 shows the standardized estimates between the constructs of the final structural model. These estimates were evaluated and normalized to provide an accurate and academically rigorous representation of the relationships between these key components.



Note: * p < 0.10; ** p < 0.05; *** p < 0.01.

Figure 2 - Final Structural Model

Source: Author

Based on these findings, all the initially proposed hypotheses can be validated.

5. Discussion

The coefficient of 1.39 (***), indicating a strong positive relationship between ‘Perceptions and Experiences’ and ‘Concerns about AI Personalisation’, suggests that consumer perceptions and experiences play a crucial role in shaping concerns about AI personalization. However, the direct relationship between perceptions/experiences and concerns can vary considerably between different consumer segments. Younger consumers, for example, may be more accustomed to personalization systems and therefore less concerned about privacy compared to older consumers (Liu et al., 2021). The sample used in the study is predominantly made up of highly educated individuals, possibly biasing the results towards a more critical view.

A coefficient of 0.90 (***) reveals a direct relationship between consumers' perceptions/experiences and their purchasing decisions. Zhang & Qi (2019) and Zhang & Doucette (2019) also suggest that positive perceptions of AI influence favourable decisions, improving the consumer experience. However, the positive influence can be mediated by other factors not considered in the model, such as brand trust or previous experiences with online shopping, as consumer perceptions can be affected by previous experiences with personalized recommendations (Kim et al., 2021). The ‘Consumer Decisions’ variable is assessed using a scale with a relatively low internal consistency index ($\alpha = .58$), suggesting that it may not capture the full complexity of the decision-making process.

With a coefficient of 1.67 (***), there is a strong link between consumer perceptions and the importance of transparency and control over data. This confirms the studies by Kumar et al. (2019) and Lavelle-Hill et al. (2020), which emphasize the growing consumer demand for transparency in AI personalization processes. However, transparency and control are complex concepts. How each consumer understands and values them can differ substantially, especially between those who are familiar with AI systems (Lavelle-Hill et al., 2020). In addition, Yan et al. (2017) points out that the types of control (active/passive) can significantly influence consumer perception, limiting understanding of the mediating effect between perceptions and decisions.

The significant relationship between transparency/control and concerns about AI personalization (β=.3.36***) is consistent with previous research. Simonson & Sela (2011) reinforce that consumers who perceive a lack of transparency tend to have greater concerns about personalization. However, the simplified approach to the concept of transparency does not consider the different forms of communication (visual, textual, etc.) and how these impact consumers' understanding of AI personalization (Du & Xie, 2021). Furthermore, there is a lack of information on how different levels of transparency and control (e.g. full, partial) affect consumer concerns.

The relationship between transparency/control and consumption decisions (β= -0.66**) suggests that greater transparency can reduce impulsive consumption decisions, as indicated by Maggioni et al. (2019). However, this relationship may be more complex than shown, as excessive transparency can overwhelm consumers with irrelevant information, making the decision-making process more difficult (Kim et al., 2021; Davenport et al., 2020). The negative relationship may depend heavily on the cultural context, which is not explored in this study. Yan et al. (2017) points out that consumers' perceptions of control can vary significantly between different cultures, influencing how transparency and control impact their decisions.

The positive influence (β=.1.34*) between concerns and decisions suggests that even concerns about AI do not necessarily prevent purchasing decisions. Consumers who have concerns about AI can still be influenced in their purchasing decisions, confirming the findings of Wang et al. (2022). However, concerns can lead to compensatory behaviors, such as actively seeking less invasive alternatives (Oke et al., 2023). The sample may not be representative of all consumer segments, and the effects of concerns may differ between different demographic groups.

The indirect influence of perceptions/experiences on consumption decisions through concerns is significant. However, it is unclear whether this indirect influence is consistent across different levels of AI perception, suggesting a possible moderation by familiarity with the technology (Lavelle-Hill et al., 2020). Mediation through transparency and control indicates that positive perceptions lead to better decisions when mediated by trust in AI systems. However, the lack of consideration of types of control (active/passive) limits understanding of the mediating effect (Yan et al., 2017). Davenport et al. (2020) highlights the need for a better understanding of the nuances between different levels of transparency and control to obtain a more complete view of consumer behavior in the context of AI.

4. Conclusion

The main findings show that the perception of transparency generates trust and significantly increases consumer acceptance of AI recommendations. Similarly, perceived control, through customizable filters and preferences, allows consumers to personalize recommendations, having a positive impact on their decision-making. Ultimately, it highlights the importance of designing AI systems that prioritize transparency and allow users to take control, promoting trust and a deeper connection with consumers.

The article achieves its aim through the structural model and hypotheses tested which confirm the importance of transparency and control in promoting trust and acceptance, leading to actionable strategies for marketers. The research enriches the understanding of both practitioners and academics by revealing the key drivers of consumer behavior when interacting with AI in marketing.

In response to the first research question, it was found that consumers are more likely to accept personalized recommendations

when companies clearly explain how AI generates them and maintain fair practices. Transparency positively influences consumers' perception of fairness, making them more receptive to personalized AI suggestions. In addition, perceived control plays a significant role. When users can adjust recommendations and customize search filters, it fosters a sense of control over their interactions with AI. This increases their acceptance of and engagement with personalized recommendations. Transparency and control thus act as mediators between AI perceptions and purchasing decisions.

In response to the second question: How do different levels of perceived control impact consumer decision-making when interacting with AI systems?, the research concluded that consumer decision-making is significantly affected by perceived control, which is related to their ability to personalize or modify recommendations. Transparency in AI recommendations create trust, leading to greater acceptance. Consumers are more likely to interact positively with AI systems that enable personalization and control since they align with their goals. The results suggest that transparency and perceived control act as modifiers in shaping consumer perceptions, concerns, and decisions. Greater perceived control can improve consumer acceptance of AI recommendations, thus affecting purchasing behavior.

This study has some limitations that should be acknowledged. The relatively small and homogeneous sample of 81 participants limits the generalizability of its findings to wider populations. Future research could involve larger and more diverse samples to increase external validity. In addition, the cross-sectional design used in this study captured data at a single point in time, which limits insight into the impact of transparency and control on consumer acceptance of AI over time. Longitudinal studies would be valuable to provide deeper insights into this dynamic. In addition, reliance on self-reported measures can lead to social desirability bias, which could distort the results. Future studies could address this issue by supplementing surveys with behavioral data to obtain more objective information.

Theoretically, this study contributes to the field by advancing trust theory and highlighting how transparency and control are critical factors influencing consumer trust in AI systems. It also contributes to the understanding of consumer decision-making models, particularly in how transparency and perceived control mediate the acceptance of AI recommendations. Furthermore, the study enriches the literature on ethical AI by highlighting the importance of fairness, transparency, and control in the development of consumer-centric recommender systems.

In practice, marketers should consider designing AI systems with transparency and control features, such as providing customizable explanations and filters, to increase consumer acceptance.

By offering greater control, marketers can give consumers the chance to personalize their recommendations, increasing engagement and satisfaction. Furthermore, implementing transparent practices can help companies comply with data privacy regulations and align with consumer expectations regarding the ethical use of AI.

In summary, this study allows us to increase our understanding of the significant roles of transparency and perceived control in shaping consumer interactions with AI systems for personalized recommendations.

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Game-based Learning in Higher Education: Where Do We Stand?

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Abstract

In the last decade, game-based learning has been increasingly used in higher education (HE) across various disciplines, from language studies to engineering and medical fields. Scholars have examined key success factors, facilitators, and challenges of game-based learning integration (GBL) in higher education. While some literature reviews exist, they primarily address issues like cultural differences or technological impact without offering a comprehensive synthesis. This study addresses this gap through a systematic literature review of articles from the ISI Web of Science Current Contents database, spanning from 1998 to 2020. The study's final sample of 288 articles underwent two levels of analysis: a bibliometric analysis to highlight significant publications and authors, followed by a content analysis to identify primary research questions, methodologies, and suggested future directions for advancing game-based learning research. Our findings provide an integrated overview of game-based learning's role in higher education, offering a framework for future studies to build on existing insights and address ongoing challenges in applying game-based learning effectively in various educational settings.

Keywords: Game-based Learning; serious games; gamification; higher education

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1. Introduction

The prevalence of digital technologies has driven the development of innovative teaching strategies aimed at engaging and motivating students in higher education. Interactive learning environments allow the incorporation of game elements that have demonstrated to capture student attention, motivate towards goals and promote competition, effective teamwork and communication. Game-based learning (GBL) systems and gamification incorporate game mechanics, e.g., points, competition, and collaboration—into educational frameworks to stimulate engagement, enhance student motivation, and foster teamwork and communication skills (Subhash and Cudney, 2018).

Their application spans various fields, ranging from language acquisition to technical disciplines like engineering, healthcare, and business, making them versatile instruments for diverse educational contexts, as they increase student engagement and support diverse learning styles. Also, incorporating game mechanics can enhance learning outcomes by facilitating goal-oriented behaviors and promoting an enjoyable, competitive learning environment. Additionally, mobile-based GBL strategies have gained prominence for providing flexibility and convenience, enabling learning outside traditional classroom settings and adapting to the habits of digital-native students (Subhash and Cudney, 2018; Troussas et al., 2020).

Key studies have highlighted distinct concepts within GBL, including gamification, serious games, and game-based learning, each offering unique applications and outcomes. Gamification integrates game-like elements within non-game contexts, as illustrated by Brady and Andersen (2019), while serious games focus on educational content delivered through a gaming interface. The potential of these approaches is vast, yet there is a notable absence of a unified theoretical framework that consolidates the findings across different contexts and methodologies, leading to inconsistent outcomes and interpretations.

To fill the identified gap, this research generates knowledge through the integration of published research in journals, Web of Science, more specifically in ISI Current Contents, in the Social & Behavioral Sciences Database between 1998 and 2020.

The paper is organised into three sections. The first one is the current introduction. The second one is the methodology chapter, in which we incorporate the relevant aspects for the systematic literature review. The third section presents the results obtained from the systematic literature review, namely descriptive statistics on the relevant sample, as well as the main authors, years of publication and main journals, in section 3.1., and the results of the content analysis and literature maps with the main schools of thought identified and the main thematic areas of study, in section 3.2. In the fourth and last section, we present the critical discussion and also indicate future research directions.

2. Methodology

A systematic review is a comprehensive research methodology that involves both quantitative, bibliographic analysis and qualitative, thematic analysis (Saur-Amaral, Reis Soares, & Proenca, 2018). To develop our research, we followed a three-step approach (Saur-Amaral et al., 2013): a) *Planning:* development of the review protocol; b) *Research:* implementation of the review protocol by three independent researchers; c) *Reporting:* analysis of the results and development of literature maps.

In our study, we have followed established conventions by concentrating solely on peer-reviewed academic journal articles in English. This selective approach serves to uphold the quality of the literature considered while also ensuring that our sample remains manageable for in-depth analysis.

We searched for “gamification”, “game-based learning” and “serious games” combined with “higher education” in Topic, in three separate searches on ISI Current Contents, Social & Behavioral Sciences Database, using as filter the period between 1998 and 2020.

After the search, the data was exported to Endnote 20, and a first selection of valid results was obtained (998 articles). Then, all results were read and all papers that did not relate with the topic of the systematic search were eliminated.

A total of 288 results remained after this step. Next, a qualitative analysis was developed using NVivo on the results imported from Endnote.

3. Results

We present our results as follows. First, we present the bibliometric analysis, where the yearly distribution of papers, as well as top authors and journals are shown. Second and last, we present the results of the content analysis, which reveals key topics studied by the authors.

3.1. Bibliometric analysis

Regarding paper distribution per year (see Figure 1), there has been a flat tendency between 1998 and 2004, with only one publication per year and a slow increase of publications between 2005 and 2014. An ascendant trend in the number of publications happened from 2015 onwards. This reveals an increasing interest in the topic.

A similar tendency is observed when coming to the number of journals that published papers on GBL over the years (see Figure 2). In 2020, the number of journals that published papers on GBL was 27.

Regarding scientific journals that were most representative in terms of the number of publications in the analysed period (see Table 1), we find Computers & Education, Sustainability, British Journal of Educational Technology, Educational Technology & Society and Computers in Human Behavior. Considering that Sustainability is an eclectic journal with an encompassing editorial policy, we may conclude there is a predominance of education technology-oriented journals.

In the first years analyzed, there was no specialization in the papers published. Only from 2015, the GBL started to appear more in the technology and education-oriented journals. The Top 5 journals represent 37% of all publications.

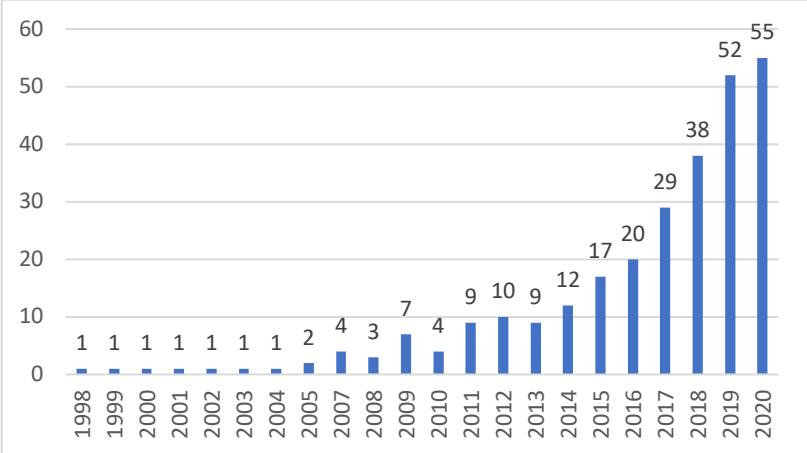

Figure 1 - Number of GBL papers distributed per Publication Year (1998 to 2020)

Source: Own elaboration

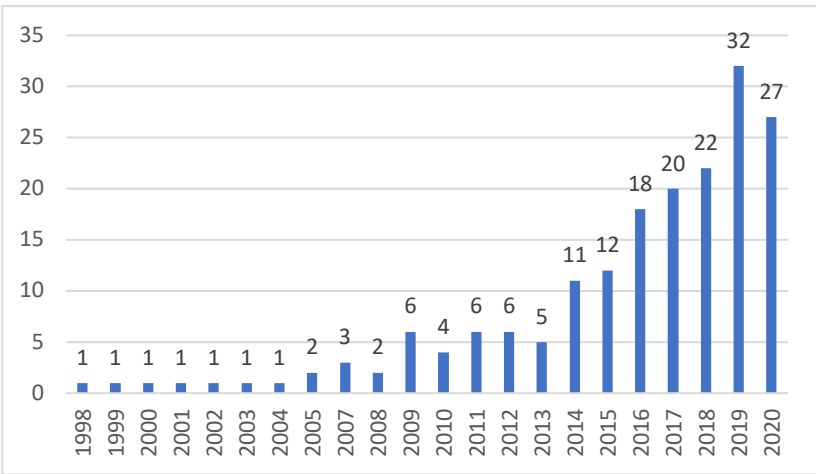

Figure 2 - Number of Journals that published GBL papers per Publication Year (1998 to 2020)

Source: Own elaboration

Table 1 – Top five journals per number of GBL papers published (1998 to 2020)

Journal	Percentage of total papers published
Computers & Education	14%
Sustainability	9%
British Journal of Educational Technology	5%
Educational Technology & Society	4%
Computers in Human Behavior	4%

Source: Own elaboration

Regarding top authors, considering the period covered by our search (1998-2020) we may conclude that there is no dominant author (see Figure 3). The author that published most GBL papers is Hwang (5 papers), followed by Perez-Lopez, Zaman, Mora-Gonzalez, O'Leary, van Roy, Whitton, Connolly and Delgado-Fernandez (each with 3 papers).

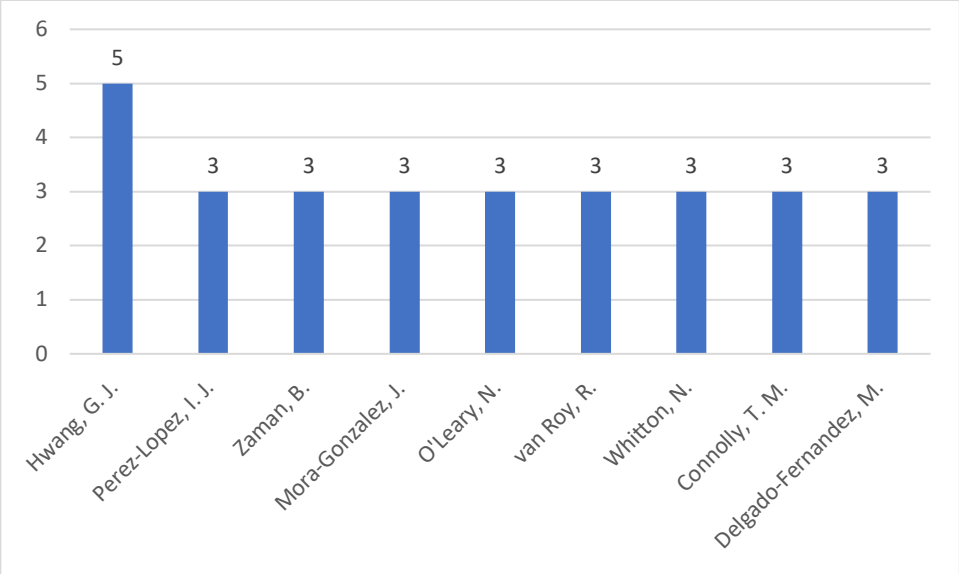

Figure 3 - Top authors that published GBL papers (1998 to 2020)

Source: Own elaboration

The bibliometric analysis reveals an increasing interest of the academic community in studying game-based learning and there are specific journals that publish more GBL papers as part of their editorial policy (emphasis on Computers & Education). However, there are still no dominant authors and there seems to be space for groups of researchers to focus on this topic as a medium-long term research strategy.

4. Content analysis

The qualitative analysis was performed in NVivo 12, based on the content analysis of the abstracts of the sample. As it may be observed in Figure 4, the most frequent words were linked to gaming, learning, students and educators, and it is worth observing that learning, students and teachers (educators) all appear related in the overall analysis of the GBL sample.

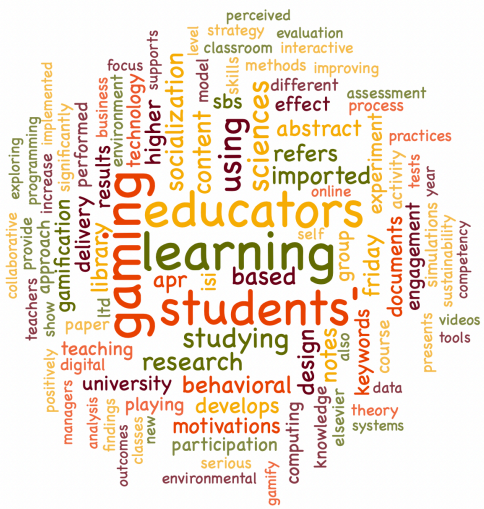

Figure 4 - Word Frequency Query in NVivo - GBL papers (1998 to 2020)

Source: Own elaboration

Gaming appears in most of the papers, as it would be expected due to the search equations used to obtain the sample, but the remaining three words are also very frequent in the papers, as illustrated in Figure 5.

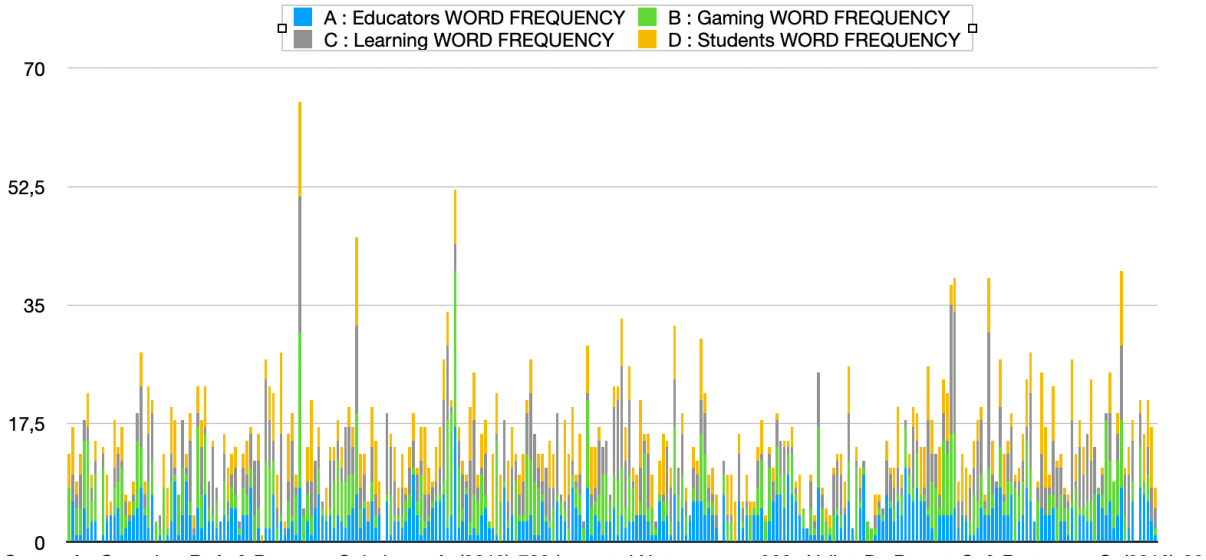

Figure 5 - Presence of most frequent words in the abstracts - GBL papers (1998 to 2020)

Source: Own elaboration

In terms of concepts, three major approaches are used by the scholars: gamification, game-based learning and serious games. Gamification, defined as "*one type of active learning approach that incentivizes student participation by incorporating gaming elements into the learning experience*" (Brady and Andersen, 2019) is the most frequently used approach (see Figure 6).

Authors focus on GBL using three different perspectives. They use existing games and apply them in HE context, at different levels (undergraduates, postgraduates or executive training), they create games and test them in HE context or they use the concept of gameful design (See Figure 7). Applying existing games is the most used focus.

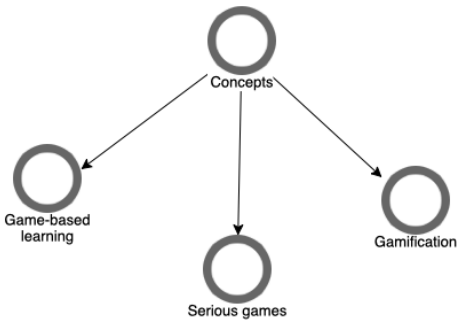

Figure 6 - Concepts (NVivo Map view)

Source: Own elaboration

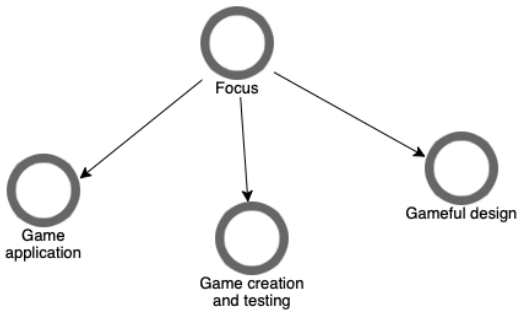

Figure 7 - GBL focus (NVivo Map view)

Source: Own elaboration

In terms of choice of application medium, most authors choose digital games, frequently associated to students "digital native" generation. A common used tool is Kahoot!, one of "the most popular game-based learning platforms, with 70 million monthly active unique users" (Wang and Tahir, 2020).

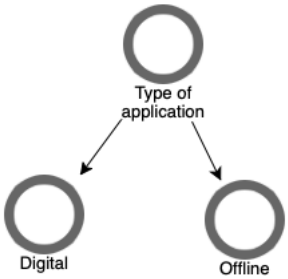

Figure 8 - Type of application medium (NVivo Map view)

Source: Own elaboration

Regarding the geographical context, authors study GBL in different countries. United Kingdom is the most frequently chosen context, followed by United States, Netherlands, Italy, Spain and France (see Figure 9). In some papers, combined studies are performed, e.g. (Capatina et al., 2018) where simulation tool called Simbound is tested at three European universities in Grenoble (France), Milan (Italy) and Galati (Romania).

Some areas of study in HE are more frequently used as object of studying GBL, as seen in Figure 10. Management / Business is the most used in the sample, both for "soft-skills" (e.g. conflict management in (Bruno et al., 2018)) and for more technical endeavors (e.g. project portfolio in (Barbosa and Rodrigues, 2020) or operations management in (Brandon-Jones et al., 2012)). In medicine and nursing, GBL was used for diagnosis (e.g. (Agudelo-Londono et al., 2019) or capacity to work under pressure (e.g. (Gomez-Urquiza et al., 2019)). Engineering, computer science and maths were other frequently used areas.

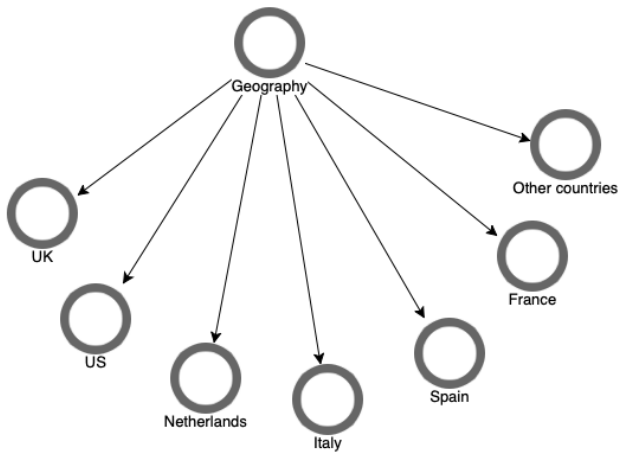

Figure 9 - Geographical context (NVivo Map view)

Source: Own elaboration

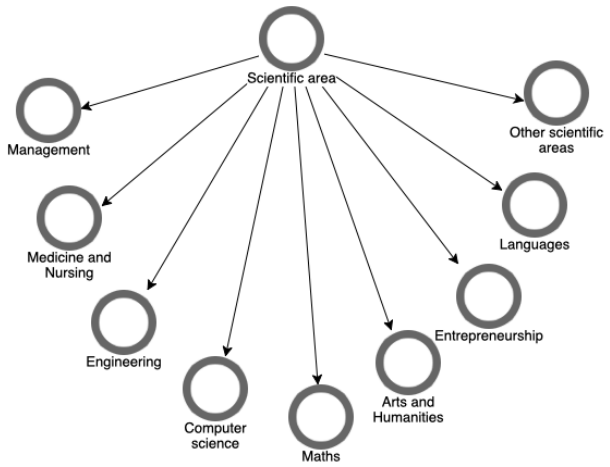

Figure 10 - Scientific areas (NVivo Map view)

Source: Own elaboration

Finally, regarding methodologies (see Figure 11), authors used as the most frequent method the survey, either alone, or in combination with experiments. Qualitative studies were also frequent and used to understand the reaction of the students to newly created or existing games.

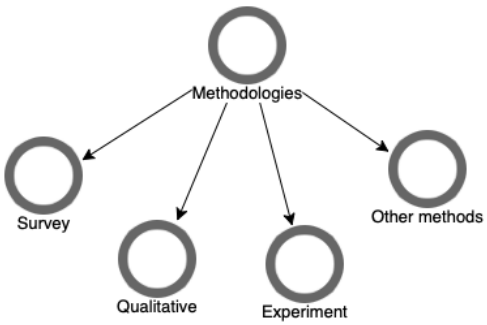

Figure 11 - Methodologies (NVivo Map view)

Source: Own elaboration

The results from the papers vary, and it is possible to identify papers focusing on different student profiles and different teacher profiles, as well, as well as a set of motivational factors for students and teachers to engage in GBL and a set of facilitating factors to promote the success of GBL implementation in HE.

5. Conclusions

Our paper was focused on a systematic literature review aiming to review and integrate the contributions regarding game-based learning in HE. Our results indicate that there has been an increasing interest in the topic in the last years, and that there are already some journals publishing an important number of papers related to GBL. Emphasis falls on Computer & Education, who published 14% of all papers from our sample. However, no author or research group has emerged as a prominent leader, indicating that GBL remains a relatively open field for new contributions and collaborative research initiatives.

Our analysis highlights several takeaways. GBL applications are mainly focused on digital and interactive platforms, leveraging students' familiarity with digital tools and their affinity for technology-driven experiences. This aligns with studies emphasizing the importance of digital natives' adaptability to mobile and web-based learning platforms. However, most studies concentrate on evaluating existing games and identifying success factors and facilitators of learning, rather than developing new games tailored to specific educational objectives.

Different methodologies have been employed in GBL research, involving surveys and experimental designs that aim to capture immediate learning outcomes or motivational shifts, indicating a possible tendency to start the consolidation of this field. Future research directions may focus on the application of existing games and the usage of quantitative methods to further allow the development of GBL academic knowledge considering different cultural and disciplinary contexts.

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Editorial

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Editorial

In the fourth edition of our journal, we present a selection of scholarly works encompassing four traditional papers: two systematic literature reviews related to green brand equity and artificial intelligence for innovation, and two empirical papers focused on artificial intelligence and internal marketing orientation in higher education.

Kicking off this edition is the systematic literature review by Pedro Magalhães and Irina Saur-Amaral, which explores the emerging concept of Green Brand Equity (GBE). Drawing on 41 academic articles sourced from Web of Science and Scopus, the study examines the dimensions, antecedents, and impacts of GBE, namely green trust, satisfaction, and brand image, highlighting its importance in aligning environmental responsibility with competitive advantage. The authors provide both a conceptual synthesis and practical guidance, noting the detrimental effects of greenwashing and calling for more cross-cultural studies to refine the framework. Results may be useful (from a theoretical perspective) for companies committed to sustainability and reputation building in increasingly eco-conscious markets.

The second paper, by Irina Saur-Amaral, Teresa Aragonez, and João Miguel Lopes, also employs a systematic literature review methodology, focusing this time on the connection between Artificial Intelligence (AI) and innovation management in business and engineering. Analyzing 858 articles from the ISI Web of Science, the authors identify key application areas, ranging from healthcare to aerospace, and emphasize AI's role in enhancing operational efficiency, decision-making, and sustainability. The paper maps out major research clusters and methodologies, while also raising critical issues such as data privacy, explainability, and ethical concerns. The study concludes by outlining promising directions for integrating AI with other technologies, e.g., Internet of Things, and proposes an agenda for future research.

The third contribution, authored by Bruno Costa and colleagues, explores perceptions of AI in the context of rapid technological change, combining theoretical perspectives (notably dynamic capabilities theory) with original survey data from 143 respondents. The study uses descriptive analysis and chi-square tests to examine demographic differences in AI awareness and attitudes, revealing interesting gender and cultural patterns. Results suggest a shared optimism about the role of AI in facilitating modern life, despite persistent concerns regarding job displacement, data security, and ethical implications. This paper provides a reflection on the human dimensions of technological disruption.

Closing the edition is a quantitative study by Carla Brás and Irina Saur-Amaral, which researches Internal Marketing Orientation (IMO) in a Portuguese public university. Using a validated multidimensional model and responses from 67 staff members, the authors combine regression and cluster analysis to assess perceptions of communication and responsiveness across different staff segments. Their findings identify three distinct profiles (Disconnected, Ambivalent, and Engaged) and highlight the need for differentiated communication strategies within higher education institutions. The study makes both methodological and practical contributions to internal marketing research, particularly in academic contexts where employee engagement is key to institutional performance.

We thank all contributing authors, the editorial team, reviewers, and our community for their invaluable support in shaping this third edition. We trust that these four papers will serve as a valuable resource for scholars interested in the realms of branding, internal marketing and artificial intelligence.

Happy readings!

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Green Brand Equity:
A Systematic Literature Review

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Abstract

This paper presents a systematic literature review on Green Brand Equity (GBE), an emerging concept integrating sustainability and environmental responsibility within brand equity frameworks. The review synthesizes findings from 41 academic articles sourced from Web of Science and Scopus, employing a rigorous selection and filtering process. Through descriptive and qualitative analyses, this study explores the dimensions, antecedents, and impacts of GBE, including green trust, satisfaction, and brand image. Results highlight the growing academic interest in GBE since 2010, with significant increases post-2021. The study underscores GBE's role in fostering competitive advantages, enhancing customer loyalty, and supporting sustainability goals. Additionally, it identifies the negative effects of greenwashing on consumer trust and GBE. While significant advancements are noted, the review calls for more cross-cultural and sector-specific studies to broaden GBE frameworks. These insights provide strategic guidance for businesses aiming to align environmental responsibility with market success.

Keywords: Green Brand Equity, Systematic Literature Review, Green Trust, Green Satisfaction, Brand Image

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1. Introduction

Due to the increasing focus on environmental sustainability, brands worldwide are increasingly turning to conspicuous sustainability as a development strategy and are attempting to act in more environmentally friendly ways to gain competitive advantage (Li et al., 2019). The task for companies is to identify opportunities to augment their products' environmental credentials to strengthen their brand equity (Chen, 2010). In this context, companies must actively recalibrate their brand management strategies toward the concentrated construction and development of green brand equity (GBE) (Hue, 2024).

This study conducts a systematic literature review of academic articles focusing on green brand equity, aiming to synthesize existing research and identify key trends, challenges and opportunities. A systematic literature review is a methodology that allows identifying, evaluating and interpreting available research relevant to a particular research question, or topic area, or phenomenon of interest (Kitchenham, 2004). According to Kitchenham (2004), performing systematic reviews is a key to summarize the existing evidence concerning a specific topic, to identify any gaps in current research to suggest areas for further investigation, and to provide a background to appropriately position new research activities.

By analyzing published studies, this review provides a retrospective evaluation of the evolution of the GBE concept while also highlighting emerging patterns that could inform future research. It draws on scientific articles indexed in Web of Science and Scopus, covering studies on GBE, obtained through rigorous search and filtering protocols. An initial sample of 163 academic papers was identified and, after validation, a final sample of 41 papers was used.

The paper is organized as follows. First, we describe the methodology adopted for the systematic literature review, detailing the search protocol and filtering criteria. Second, we present the results of the review, including descriptive statistics and a qualitative analysis of the core themes and contributions to the literature.

2. Methodology

Based on the suggestions made by Tranfield et al. (2003) and Saur-Amaral (2012), a systematic literature review was carried out.

The bibliographic research was directed to the theme "green brand equity" and was conducted in Web of Science Core Collection and Scopus, selected for their recognized quality. The choice of two databases aimed to guarantee a higher number of results. The keywords defined for the search were "green brand equity", "green" and "brand equity".

Specific search equations were established for each database: (TOPIC (green AND "brand equity")) OR (TOPIC ("green brand equity")) for Web of Science and (TITLE-ABS-KEY (green AND "brand equity")) OR (TITLE-ABS-KEY ("green brand equity")) for Scopus.

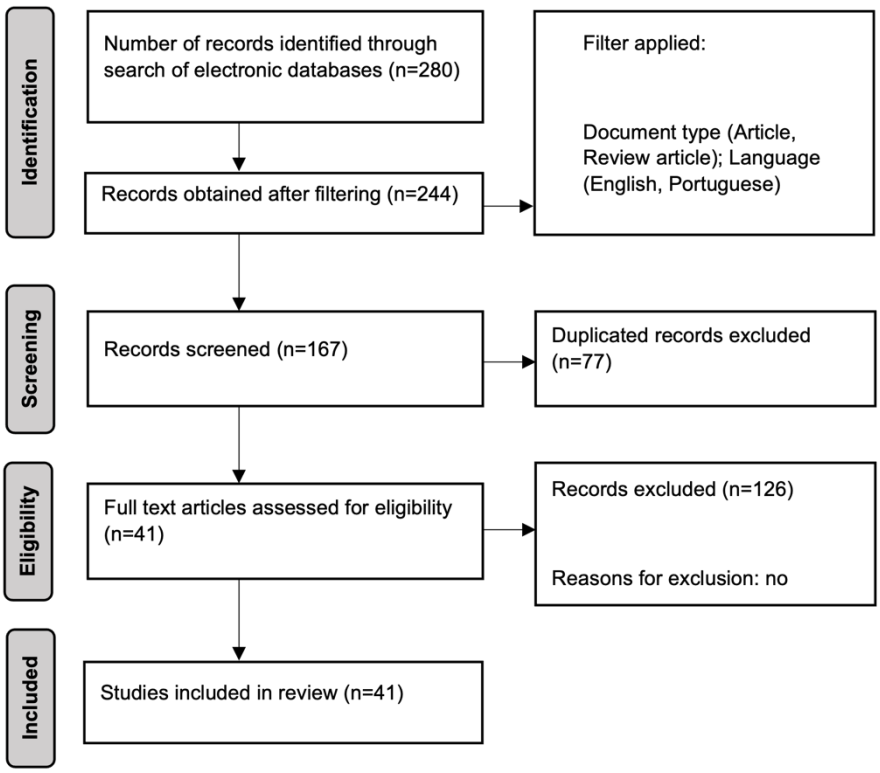

Figure 1 – Representation of the methodological approach

Source: Own elaboration

Filters were applied to refine the search results – a filter was applied regarding the type of document, making the results only Article or Review Article and a filter related to the language, keeping only documents in English and Portuguese.

A total of 141 scientific articles were obtained from Web of Science and another 103 from Scopus. A comparative analysis of the results from both databases was then carried out to eliminate possible duplicate articles, which resulted in the exclusion of 77 articles. This left 167 articles for analysis. Each article was carefully reviewed to ensure its relevance to the research topic. After this analysis, 123 articles that did not meet the study objective were excluded, leaving 44 final articles. Subsequently, three scientific articles were excluded because their access was blocked, leaving 41 articles for analysis.

An overview of the search and selection process is summarized in Figure 1.

3. Results

3.1. Descriptive Statistics

As illustrated in Figure 2, the first paper publications related to green brand equity appeared in 2014. Between 2014 and 2020, the publication frequency was rather low. After 2021, there was an increase in the number of publications, reaching the peak of publications in 2023, with 10 paper publications. In 2024, the number of publications was slightly lower than the year before, but the search was made in October, which indicates that, by the end of the year, the number of publications may reach a new peak. Although the number of publications related to green brand equity is low, these results indicate an increasing interest in this topic.

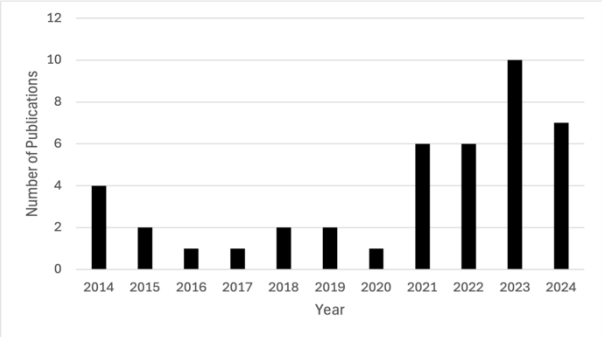

Figure 2 – Paper distribution per year

Source: Own elaboration

Most journals listed in Figure 3 have only one publication on this topic. The journals with the highest number of publications are Environment Development and Sustainability (n=3) and Sustainability (n=3), followed by Cogent Business and Management, Corporate Social Responsibility and Environmental Management, Journal of Business Ethics, Journal of Promotion Management and Quality and Quantity, with two publication each. The journals where the publications related to Green Brand Equity were made cover various areas, including environmental science, business, marketing, and management, reveling that green brand equity is being studied from different perspectives.

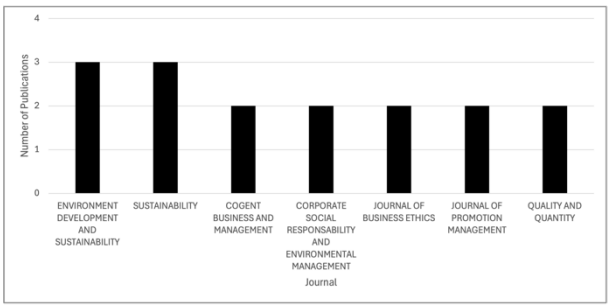

Figure 3 – Number of papers per journals (minimum 2 papers)

Source: Own elaboration

Figure 4 depicts the authors with more than one publication. The author with the most publications on green brand equity is Ha, T., with a total of four publications in the analyzed period.

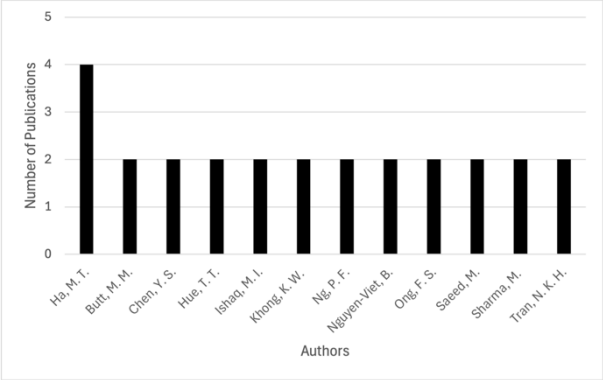

Figure 4 – Number of papers per author (authors with at least 2 publications)

Source: Own elaboration

3.2. Qualitative Analysis

After the descriptive analysis was completed, the selected papers were imported into NVivo 15, where a comprehensive content analysis was conducted to identify key themes and patterns. Regular coding was used to systematically organize the data (see Figure 5), while specific coding focused on identifying key themes to provide deeper insights into the research topic.

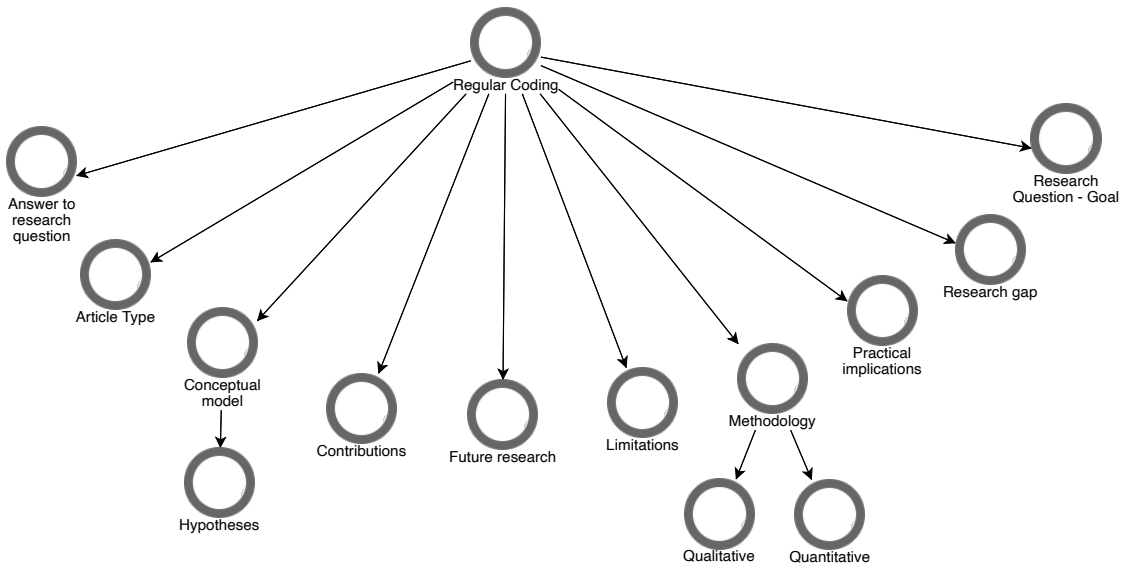

Figure 5 – Coding structure used for content analysis

Source: Own elaboration

3.2.1. Article Type

An extensive review of 41 articles was conducted, where the article type of each one was analyzed (see Figure 6), revealing a strong emphasis on quantitative research methods, especially through questionnaire-based surveys (e.g., Chen, 2010, Chang and Chen, 2014, Butt et al., 2017, Saeed et al., 2023). In addition to these studies, the review noted a smaller quantity of conceptual and qualitative works that provides theoretical insights using approaches like focus groups and group discussions to explore their subjects thoroughly (e.g., Bulsara et al., 2014, Chahal et al., 2014, Hue and Oanh, 2023). This combination of methodologies highlights the variety of research approaches within the examined literature.

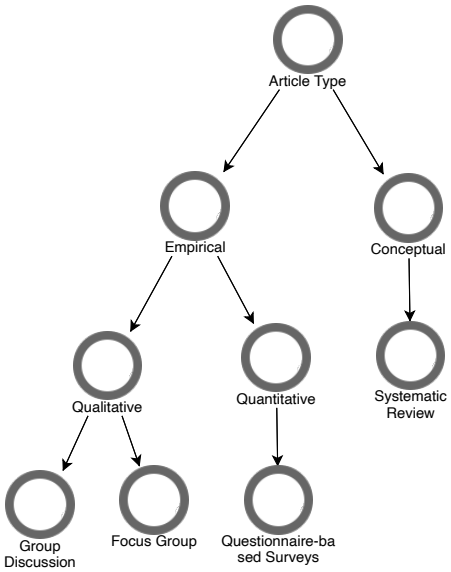

Figure 6 – Coding structure for Article Type

Source: Own elaboration

3.2.2. Research Goals

Research goals are diverse. Some examples are presented in Table 1.

Table 1 – Example of research goals for the quantitative papers included in the sample

Research Goal	Author
"develop a process for Green brand management by categorizing the existing literature on the basis of Green business functions, Green business issues and Green brand equity"	(Bulsara et al., 2014)
"examine and analyze the antecedents of SGMO and also to examine the moderating role of education and role of income between antecedents and SGMO"	(Chahal et al., 2014)
"explore the relationships among green perceived quality, green brand awareness, green perceived risk, and green brand equity"	(Chang and Chen, 2014)
"examine the relationships between brand concepts (perceived brand quality and brand credibility) and the concepts of green brand (green brand image (GBI), green brand-perceived value (GBPV), and green brand equity (GBE))"	(Delafrooz and Goli, 2015)
"investigate the direct impact of promotion tools (attitude toward green advertising and attitude toward green sponsorship) on green CBBE components, as well as green purchase intention" and "examine the interrelationships between these green CBBE components.."	(Dinh et al., 2023)
"examine (1) the outcome of green trust, green satisfaction and green brand image on green brand equity, (2) whether the association between green brand equity and green brand image is mediated by green trust, and green satisfaction, and (3) whether green trust operates as a mediator for the relationship between green brand equity and green satisfaction"	(Ha, 2020)

Research Goal	Author
"examine the impact of greenwash on green brand equity and analyse the mediation effects of green brand image, green satisfaction and green trust as well as the moderating effect of information and knowledge"	(Ha et al., 2022)
"investigate the effects of green brand equity (GBE) on green brand attachment (GBA), green self-brand connection (GSBC), green brand attitude (GBAT) and green word of mouth (GWOM)"	(Mehdikhani and Valmohammadi, 2022)
"investigate the relationship between three dimensions of green customer-based brand equity (green brand awareness, green brand quality, and green brand image) and green brand buying behavior (GBBB) directly and through green brand loyalty (GBL)"	(Saeed et al., 2023)

Source: Own elaboration

3.2.3. Keywords and Topic Analysis

To provide a visual representation of the most frequently used keywords in the literature, a word cloud was created, showcasing the occurrence of each keyword (see Figure 7).

Figure 7 – Word Frequency Query based on all abstracts in the sample

Source: Own elaboration

The 10 most frequent used keywords are presented in Table 2. The most prominent keywords are "green brand equity", "green brand image", "green marketing", "green trust" and "green satisfaction" suggesting that the core focus of the literature revolves around between branding and consumer perceptions.

Table 2 – Word Frequency Query based on all keywords in the sample

Words	Occurrences
Green brand equity	32
Green brand image	13
Green marketing	11
Green trust	11
Green satisfaction	7
Green purchase intention	6
Brand credibility	5
Green advertising	4
Vietnam	4
Word-of-mouth	4

Source: Own elaboration

The sample was uploaded to VOS Viewer, which was utilized to identify the most frequently cited words in the abstracts, providing a visual representation of the central concepts and themes emerging from the literature on green brand equity.

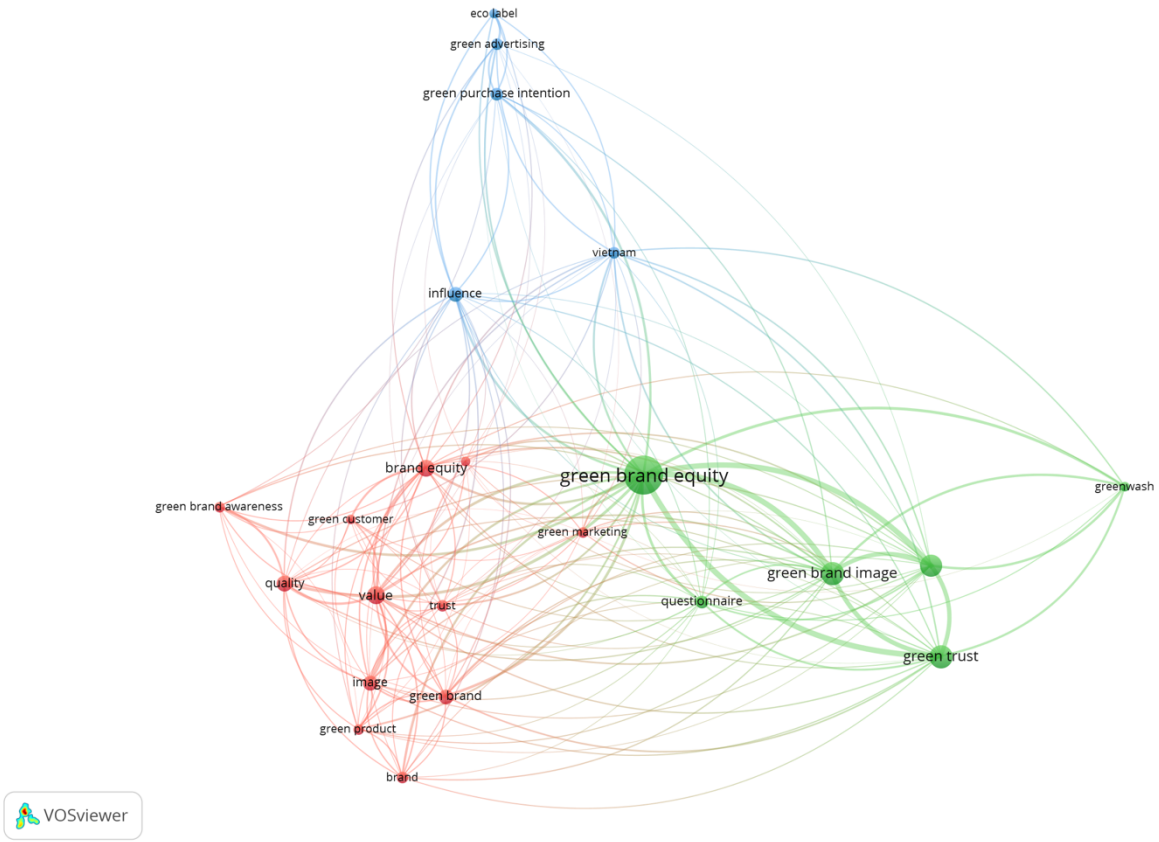

Figure 8 – VOS Viewer map: central concepts

Source: Own elaboration

As shown in Figure 8, "green brand equity" occupies a central position in the network, highlighting its pivotal role as the focal concept of this research. When analyzing the abstracts, three clusters can be identified: (1) green cluster including terms such as "green brand image" and "green trust"; (2) red cluster including terms such as "brand equity" and "green brand"; (3) blue cluster including terms such as "green purchase intention" and "green advertising".

3.2.4. Thematic Analysis

The qualitative analysis was performed in NVivo 15 and the full texts of the 41 papers were screened and coded.

3.2.4.1. Green Brand Equity and related concepts

Green Brand Equity (GBE) is an evolving concept that integrates the principles of sustainability and environmental responsibility into the traditional framework of brand equity. It is defined as the collection of brand-related assets and liabilities linked to a brand's commitment to environmental concerns, which add to or subtract from the value provided by a product or service (Chen, 2010, Ishaq, 2021). As consumer preferences increasingly favor eco-friendly brands, GBE has become a critical strategy for firms seeking competitive advantage, differentiation, and compliance with international environmental regulations (Chang and Chen, 2014, Ha, 2021).

Chen (2010) introduced GBE as "a set of brand assets and liabilities about green commitments and environmental concerns linked to a brand, its name, and symbol that add to or subtract from the value provided by a product or service". Later, Ishaq (2021) included economic, environmental, and social concerns, as well as a brand's eco-friendly commitments.

The primary objective of GBE is to raise environmental awareness, which firms can leverage to gain competitive advantage by targeting environmentally conscious consumers (Delafrooz and Goli, 2015).

Several studies have identified some dimensions and key components of GBE. Most of the GBE studies focused on its relationships with green-related antecedents, such as green brand image, green satisfaction and green trust (Górska-Warsewicz et al., 2021).

Chen (2010) defined **green brand images** as "a set of perceptions of a brand in a consumer's mind linked to environmental commitments and environmental concerns". A positive green brand image fulfills consumers' environmental desires, enhances trust, and reduces perceived risks, thereby strengthening GBE (Jannah et al., 2024). Bekk et al. (2016) defends that green brand image adds (or subtracts) value to the brand and, thus, increases the brand's green equity independent from the objective environmental characteristics of the economic good. It has been proved that green brand Image positively influences GBE (Chen, 2010, Kang and Hur, 2012, Ng et al., 2014, Bekk et al., 2016, Butt et al., 2017) and in green trust and green satisfaction (Chen, 2010, Ng et al., 2014, Bekk et al., 2016, Sharma, 2024).

Green trust is defined by Chen (2010) as "a willingness to depend on a product, service or brand based on the belief or expectation resulting from its credibility, benevolence and ability about its environmental performance". Green trust implies the willingness to rely on a brand based on trust or expectations stemming from its ability to carry out environmentally friendly activities (Chen, 2010).

There is a positive relation between green trust and GBE (Chen, 2010, Kang and Hur, 2012, Konuk et al., 2015, Bekk et al., 2016, Ha et al., 2022, Górska-Warsewicz et al., 2021). It was also proved that green trust positively influences green satisfaction (Chen, 2010; Kang & Hur, 2011) and leads to stronger green purchasing intentions (Górska-Warsewicz et al., 2021, Chang and Chen, 2014, Nguyen-Viet, 2022).

Green satisfaction is defined as a pleasurable level of consumption-related fulfilment to satisfy a customer's environmental desires, sustainable expectations and green needs (Chen, 2010). It has been demonstrated a positive influence of green satisfaction on green brand equity (Chen, 2010, Kang and Hur, 2012, Ng et al., 2014, Bekk et al., 2016). It has also a positively relationship with green brand image (Ng et al., 2014, Bekk et al., 2016) and green trust (Kang and Hur, 2012, Chang and Chen, 2014).

In addition to these, past research identified **green attitude, green loyalty, green brand perceived value, green perceived risk, green association, social influence, leadership, sustainability, brand association and green awareness** as GBE components (Chen, 2010, Kang and Hur, 2012, Bekk et al., 2016, Ng et al., 2014, Ishaq, 2021, Górska-Warsewicz et al., 2021). Conversely, **greenwashing** affects negatively GBE (Akturan, 2018, Qayyum et al., 2023).

Strong GBE positively impacts brand attitude, purchase intentions and positive word-of-mouth (Bekk et al., 2016, Butt et al., 2017). Also, high GBE reduces consumer perceived risk and provide competitive advantages for the companies, such as premium pricing, consumer loyalty and market differentiation (Chen, 2010, Butt et al., 2017, Ha, 2021).

3.2.5. Key Contributions

Some examples of the key contributions are presented in Table 3.

Table 3 – Examples of key contributions

Contributions	Author
"The results showed that green brand image, green satisfaction, and green trust are positively related to green brand equity. Furthermore, the positive relationship between green brand image and green brand equity is partially mediated by green satisfaction and green trust. Hence, investing on resources to increase green brand image, green satisfaction, and green trust is helpful to enhance green brand equity."	(Chen, 2010)
"This study demonstrates that investing resources in improving firms' green perceived quality and green brand awareness can not only decrease their green perceived risk, but also enable them to enhance their green brand equity."	(Chang and Chen, 2014)
"The results confirmed that a positive relationship exists between consumer concern for environmental values and general attitudes towards green products. Both these constructs influence consumers' knowledge structure of a green brand (image and associations). Furthermore, a strong relationship exists between consumers' knowledge structure (image and associations) and their relational preference (trust and brand equity) with green brands."	(Butt et al., 2017)
"Green brand associations and brand credibility positively affect green brand equity, and green brand equity has a positive and strong impact on purchase intention of consumers. In addition to that greenwashing negatively affects green brand associations and brand credibility, and therefore, indirectly influence green brand equity and purchase intention."	(Akturan, 2018)
"Green skepticism has a significant negative effect on green brand attachment, and green brand attachment has a significant positive effect on green brand equity."	(Khan et al., 2022)
"The results suggest that green marketing mix tools positively impact green customer-based brand equity creation."	(Nguyen et al., 2023)

Contributions	Author
"The findings of the study suggest that it is crucial to simultaneously focus on the following factors, with the preference order of brand perceived quality, green perceived value, green satisfaction, green trust, and green brand image."	(Hue and Oanh, 2023)
"Consumers' previous brand experience is important. The most promising indicators are brand image and green trust for GBE."	(Tung and Vigneron, 2023)
"The research results demonstrate that key components of GBE, including green satisfaction, green trust, and green perceived value, influence consumers' intention to engage in word-of-mouth communication about the green brand."	(Hue, 2024)
"Green Brand Image has a significant positive effect on Green Brand Equity, Green Brand Image has a significant positive effect on Green Trust, Green Satisfaction has a significant positive effect on Green Brand Equity, Green Trust has a significant positive effect on Green Brand Equity, Green Brand Image has a significant positive effect on Green Brand Equity mediated by Green Trust, and Green Satisfaction have a significant positive effect on Green Brand Equity mediated by Green Trust"	(Jannah et al., 2024)

Source: Own elaboration

3.2.6. Future Research

The future research directions in the analyzed studies are relatively limited. Most authors suggest testing their findings with different products or across a wider range of product categories. They also recommend exploring other sectors, countries, and cultures to see if the results hold in different contexts.

4. Conclusion

Conducting systematic reviews is essential for summarizing existing evidence on a specific topic (Kitchenham, 2004). This systematic literature review offers a comprehensive exploration of Green Brand Equity (GBE), a concept at the intersection of sustainability and brand management. Through the analysis of 41 papers, this study provides valuable insights into the core dimensions of GBE, including green trust, green satisfaction, and green brand image. These elements collectively form the foundation for building strong green brands that resonate with environmentally conscious consumers.

The findings reveal that GBE is a significant driver of competitive advantage, influencing brand loyalty, purchase intention, and positive word-of-mouth. In that way, consumers' preference for brands with credible environmental commitments enhances their trust and satisfaction, reinforcing GBE. In another way, practices such as greenwashing plays a critical role in GBE, reducing consumer confidence and undermining the authenticity of green branding efforts.

The temporal analysis of publications demonstrates a growing interest in GBE over the last decade, with a notable surge in studies after 2021. This trend reflects the increasing prioritization of sustainability in both academic and industry contexts. Furthermore, the thematic analysis highlights that much progress has been made in understanding GBE's components and impacts. However, there is a need for more cross-cultural and sector-specific studies to generalize GBE frameworks and future research should focus on emerging dimensions of GBE.

This study underscores the strategic importance of GBE as a tool for differentiation and market success in an era marked by environmental awareness. By embedding authentic green values into brand equity strategies, businesses not only enhance their reputation and customer loyalty but also contribute to broader sustainability goals. Addressing the challenges and leveraging the opportunities within GBE will be instrumental for organizations aiming to align profitability with environmental responsibility.

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Artificial Intelligence for Innovation in Business & Engineering

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Abstract

The increasing focus on artificial intelligence (AI) since 2023, especially due to ChatGPT, has left gaps in understanding its application and impact in research and development, as well as innovation management. This article aims to systematically analyze scholarly publications on AI and innovation, addressing questions about AI's use, benefits, challenges, and best practices in innovation management. Utilizing a systematic literature review methodology, the study analyzes 858 articles from ISI Web of Science, filtered by business economics and engineering fields. Results show a concentration of publications in top journals, with IEEE Access leading. Content analysis highlights AI's role in various sectors, such as healthcare and aerospace, and its contribution to operational efficiency and sustainability. The study provides insights into AI's potential, challenges like data privacy, and future research directions focusing on ethical considerations and integration with emerging technologies.

Keywords: Artificial Intelligence; Innovation Management; Systematic Literature Review; AI in R&D; Innovation Practices; Data Privacy; Operational Efficiency; Sustainable Development; AI Integration; Ethical Considerations.

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1. Introduction

Companies have been innovating using different strategies, and the artificial intelligence "revolution" has pushed forward the change from a traditional business model to a digitalized business model (Chatterjee et al., 2022). The way of managing innovation arguably requires renovation and change (Hutchinson, 2021).

With the increase in attention over the role of Artificial Intelligence (AI), that got into focus in 2023 mainly due to ChatGPT, there is still little knowledge over how scholars have been looking at its usage and impact in research and development, as well as innovation and innovation management. Do innovation managers use AI in their companies? If so, for what purpose? Are there good practices worth sharing? Are there hurdles that come with this new tool? Are there privacy or intellectual property concerns?

So, all these questions being raised, the focus of the current submission is on the systematic analysis of scholarly publication on the topic of AI and Innovation, aiming to analyze, integrate and seek relevant answers to the questions posed. The research uses a systematic literature review methodology and provides a more detailed and complex understanding of the roles, methodologies, contributions, and future directions of AI in innovation as typically discussed in scientific literature.

We start by presenting the methodology, then we look into the results, using a quantitative and a qualitative approach, and we finish with conclusions.

2. Methodology

Some reviews have been developed by scholars on the topic of AI (Akter et al., 2023, Cioffi et al., 2020, Kumar et al., 2023, Pereira et al., 2023, Whittaker et al., 2023, Zirar, 2023, Zirar et al., 2023), however they approach specific topics, e.g. the role of AI on workers, the impact on consumer – machine relationship (Pentina et al., 2023), the usage of AI technology per se, on sustainability (Di Vaio et al., 2020) or specific industries (Ali et al., 2023). In some cases, the sample of papers analyzed is not very high.

Systematic literature review is a methodology that has been used in several reviews (Ali et al., 2023, Ardito et al., 2022, Li et al., 2023, Pereira et al., 2023, Pentina et al., 2023), and that is the methodology we adopt in this research, as well. As mentioned by several scholars (e.g., Aragonez et al., 2021, de Santana Porte et al., 2015, Saur-Amaral et al., 2018, Tranfield et al., 2003), the systematic literature reviews are divided in three phases: planning, execution and reporting.

After an initial planning of the research goals, a search was performed on ISI Web of Science, in the Current Contents Content, with no time filter (from 1998 to date).

Results were filtered to include only scientific articles and reviews, and the research areas selected were business economics and engineering, as they are two key research fields related to innovation management.

All abstracts were read by both researchers and a total of 858 valid results were obtained, which were further exported to Endnote. VOS Viewer was used to cluster the topics before the qualitative analysis. Finally, the results were analysed in NVivo, using a content analysis approach.

3. Results

3.1. Descriptive Statistics

The final sample of articles was exported from Endnote and cleaned up for the descriptive statistical analysis. As we may observe in Figure 1, the publication of articles on the analyzed topic was rather scarce until 2016. In 2017, nine articles were published, and from 2018 onwards the number increased significantly, reaching a total of 296 articles in 2023.

There is a visible concentration of publications in the top journals. IEEE Access is the most prolific publication, with 76 articles from 2018 to 2023, and an average of 20 papers per year in 2022 and 2023. Applied Sciences – Basel and Journal of Business Research follow with 38 and 28 publications. Technovation is the 6th journal, with 22 publications and Journal of Innovation and Knowledge occupies the 10th place (see Figure 2).

The authors with most articles published are Vinit Parida (8 articles), Alexander Brem (7 articles), Yogesh K. Dwivedi and Francesco Schiavone (5 articles) (see Figure 3).

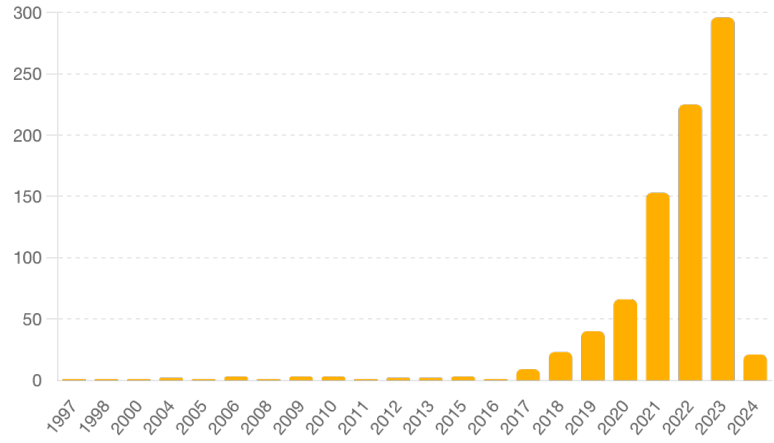

Figure 1 - Distribution of articles per publication year

Source: Own elaboration

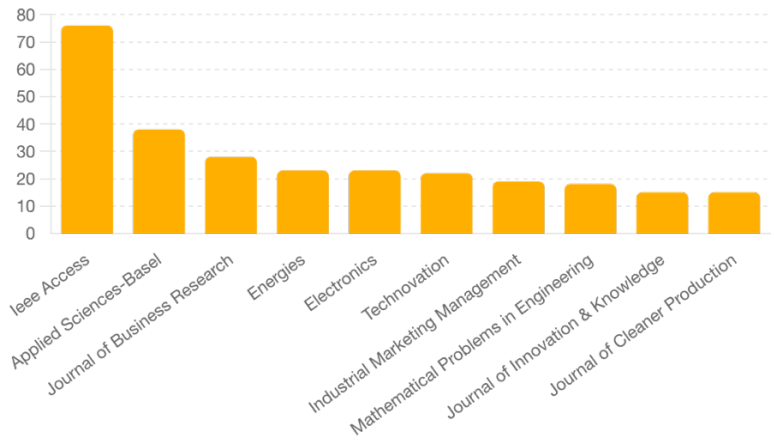

Figure 2 - Distribution of articles per scientific journal – Top 10

Source: Own elaboration

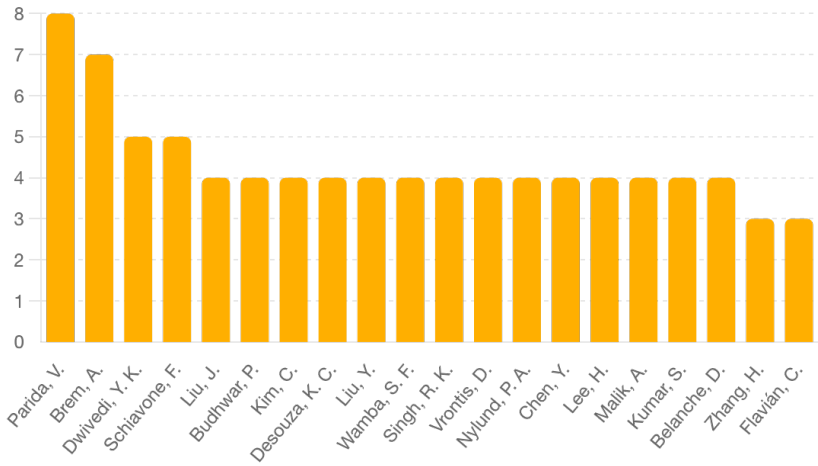

Figure 3 - Distribution of articles per author – Top 20

Source: Own elaboration

Vinit Parida's research focuses on AI business model innovation and transformation, particularly in manufacturing and industrial ecosystems. He emphasizes the need for aligning AI capabilities with value creation and capture mechanisms to commercialize AI technologies successfully. His studies cover digital servitization, the shift from traditional products to smart solutions, and the dynamics of revenue enhancement through digital offerings. Additionally, he explores agile co-creation processes for digital service innovations and smart factory implementation, providing frameworks for integrating AI into manufacturing to achieve efficiency and sustainability.

Alexander Brem's research addresses AI and digital technologies in innovation management, focusing on retail, manufacturing, and sustainability. He examines how digital entrepreneurs and public-private partnerships can leverage hybrid value creation to tackle showrooming in retail. His framework for AI in innovation management highlights AI's dual role as an originator and facilitator of innovation. He also explores digital transformation's broader implications and the support of frugal innovation for Sustainable Development Goals (SDGs). Additionally, his work on trust in AI-generated knowledge addresses ensuring stakeholder trust in AI applications.

Yogesh Dwivedi's research focuses on AI applications in healthcare, digital entrepreneurship, and innovation research. His systematic reviews provide insights into AI's benefits, challenges, and methodologies in healthcare. He explores touchless travel during pandemics through AI and robotics, and theorizes AI acceptance in digital entrepreneurship, offering a conceptual framework for adoption factors. Additionally, his research on machine autonomy for elderly rehabilitation highlights the importance of trust in AI applications for vulnerable populations, balancing machine intelligence with consumer trust.

Francesco Schiavone's research primarily focuses on AI's impact in the healthcare sector, examining innovation adoption, value co-creation, and competitive positioning within healthcare networks. He explores how AI enhances value co-creation in industrial markets and impacts human resources performance in healthcare organizations. He also investigates AI's role in improving the competitive positioning of healthcare organizations and its influence on the venture creation process, providing theoretical propositions. His work underscores AI's critical role in driving innovation and competitiveness in healthcare.

3.2. Thematic Analysis with VOS Viewer – Keywords and Topic Analysis

The sample was exported from Endnote and analysed with VOS Viewer to identify major research areas and topics. As it may be observed in Figure 4, the articles are from engineering and business and economics, which was expectable considering the nature of the search. When analyzing the abstracts and keywords, four clusters can be identified (see Figure 5): machine learning / deep learning, Internet of Things (IoT), digital technology / blockchain, business and innovation effects.

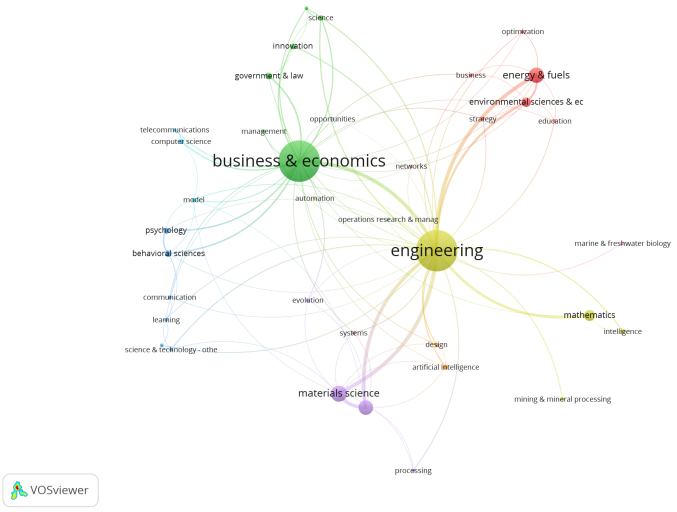

Figure 4 - Major topics in the sample – VOS Viewer graphical representation

Source: Own elaboration

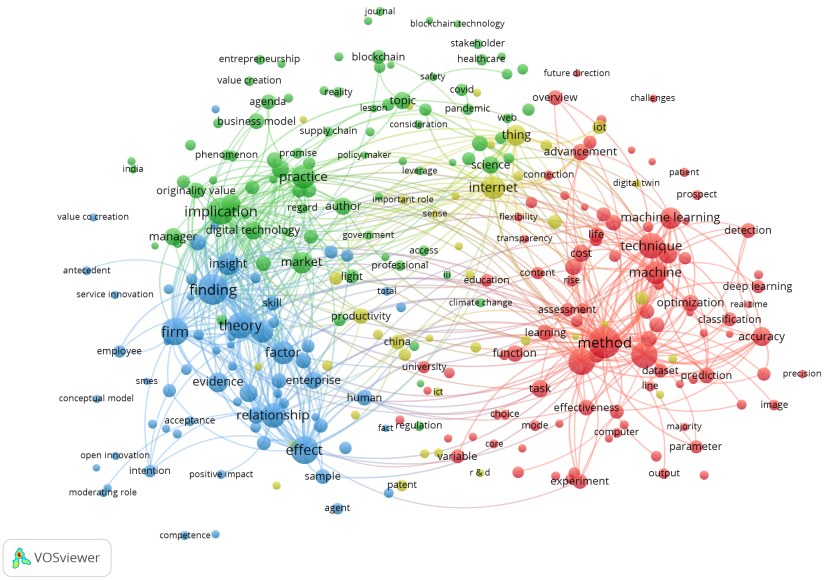

Figure 5 - Clusters of topics in the sample – VOS Viewer graphical representation

Source: Own elaboration

3.3. Thematic Analysis with NVivo

The qualitative analysis was performed in NVivo 15, based on the content analysis of the abstracts of the sample. It reflects that different lenses have been used by scholars.

3.3.1 Artificial Intelligence and Innovation

Authors often explore how AI drives advancements across various sectors, including healthcare, where it might predict patient outcomes or improve diagnostic accuracy and patient outcomes through machine learning and data analytics (Abbate et al., 2023, Schmidt et al., 2022, Lebovitz et al., 2022) or it might support the drug discovery process (Lou and Wu, 2021, Liu et al., 2019); in aerospace, for optimizing design and maintenance processes, integrated with blockchain to enhance the operational efficiency and the supply chain (Abdulrahman et al., 2023); in nuclear sector, to predict thermal-hydraulic parameters of nuclear reactors using deep learning algorithms (Lu et al., 2021); in environmental science, to support and monitor environmental parameters, to promote the use of renewable energy development (Liu et al., 2024) and sustainable development (Di Vaio et al., 2020, Ebolor et al., 2022, Jiang et al., 2021); and within business, to automate and refine decision-making processes (Goto, 2023).

The interplay between AI and blockchain reflects the concern for enhanced security and transparency in transactions and data management, in different industries (Abdulrahman et al., 2023, Akter et al., 2022, Chen et al., 2022).

AI applications in R&D focus on enhancing research capabilities through data analytics, automation, and predictive modelling (Zhai et al., 2023, Ahmed et al., 2023, Andronie et al., 2023, Balcioglu et al., 2023, Barro and Davenport, 2019, Nezhad et al., 2024). This includes areas like healthcare, materials science, and engineering.

AI drives innovation by enabling new product developments, improving service delivery, and creating novel business models (Botega and Silva, 2020, Broekhuizen et al., 2023, Chen et al., 2021, Kandampully et al., 2023, Payne et al., 2021, Wexler and Oberlander, 2021, Cioffi et al., 2020, Lebovitz et al., 2022). This spans various industries including digital entrepreneurship, financial services, and smart manufacturing.

AI contributes to innovation management by enhancing decision-making processes, optimizing operations, and fostering sustainable and ethical business practices (Acquarone et al., 2023, Agramelal et al., 2023, Schmid et al., 2022, Malik et al., 2021, Dahlke et al., 2024).

Scholarly contributions include insights into AI's potential for driving innovation, addressing challenges like data management and regulatory compliance (Rojek et al., 2023, Abbate et al., 2023, Ahmed et al., 2022).

The methodologies range from quantitative analyses, employing statistical or machine learning techniques to assess AI's impact on performance metrics (Abou-Foul et al., 2023, Baabdullah et al., 2021, Badini et al., 2023), to qualitative studies that explore the implementation and adoption of AI technologies within organizations (Allal-Chérif et al., 2023, Åström et al., 2022). Simulation models and algorithm development are also used to address specific industry challenges, e.g., optimizing supply chains or energy consumption (Borsato and Lorentz, 2023, Jacobsen et al., 2023).

Future research directions point at the need to improve AI's integration into industry practices (Amjad et al., 2020, Baabdullah

et al., 2021, Castro et al., 2021) and to enhance its ethical and societal impacts, including its impact on employment and privacy (Galetsi et al., 2023, Campbell et al., 2022, Chouk and Mani, 2022, Daza and Ilozumba, 2022). There is a strong emphasis on developing more robust, explainable AI models that stakeholders can trust and understand. Other directions point towards the integration of AI with other emerging technologies, like the Internet of Things (IoT), to explore new innovation paths (Buhmann and Fieseler, 2023, Wang et al., 2023, Robertson et al., 2022, Wang and Lee, 2023, Tsolakis et al., 2022, Buster et al., 2021).

In some industries, e.g., pharma, AI is seen as a way to further enhance personalized medicine by integrating genomic, proteomic, and other omics data to tailor treatments to individual patients, or explore the combination of AI and nanotechnology for more efficient drug delivery systems, focusing on targeted therapies and minimal side effects (Abbate et al., 2023, Lou and Wu, 2021). It may be also used for advance materials discovery to unveal new materials with unique properties for applications in energy storage, electronics, and other high-tech industries (Schmid et al., 2022, Lu et al., 2021) or for social innovation, addressing challenges in healthcare, education, and social services (Kumar et al., 2023).

3.3.2 Best Practices and Barriers when Using AI

The role of AI in innovation, R&D, and new product or technology development has become increasingly important, focusing on enhancing creativity, reducing time-to-market, and improving efficiency (Ameen et al., 2022, Abrardi et al., 2022, Agramelal et al., 2023, Oduro et al., 2023).

AI is a recent technology, and both practitioners and scholars are studying it to identify the best way to use it. Several scholars argue that combining AI with traditional research methods may increase the accuracy and efficiency, and be used to support complex decision-making processes and strategic planning in R&D (Abbate et al., 2023, Acquarone et al., 2023, Schmid et al., 2022), or to encourage an organizational culture that embraces innovation (Chatterjee et al., 2022). AI may be also used to interact with consumers, learning and adapting to their changing needs and improving their experience (Pentina et al., 2023, Kumar et al., 2023), to attract and retain talent skilled in AI and innovation management (Malik et al., 2021), yet they should be interpretable and transparent to gain trust and facilitate adoption (Liu et al., 2024, Schmid et al., 2022).

However, there are difficulties in integrating AI solutions with legacy systems (Lee et al., 2022), regulatory challenges and difficulties in ensuring compliance and data privacy (Di Vaio et al., 2020, Whittaker et al., 2023), organizational resistance to adopting new AI technologies and processes (Grashof and Kopka, 2023), while maintaining high-quality, comprehensive datasets for AI training and keeping pace with the rapid advancements in AI technology may be challenging (Lebovitz et al., 2022, Dahlke et al., 2024).

3.3.3 Implications for Innovation Management Practitioners

AI provides data-driven insights and predictive analytics that can significantly enhance decision-making processes. It can streamline operations through automation of routine tasks, thus allowing practitioners to focus on more strategic activities, including process optimization, supply chain management, and customer relationship management. Practitioners may also leverage AI tools to analyze market trends, forecast product success, and optimize resource allocation (Acquarone et al., 2023, Abdulrahman et al., 2023).

By integrating AI into the innovation process, organizations can accelerate the development and commercialization of new products and services. AI-driven R&D can lead to faster discovery of insights and reduction in time-to-market, allowing to personalize customer interactions and improve service delivery. This may lead to higher customer satisfaction and loyalty (Goto, 2023, Pentina et al., 2023).

However, independently of the benefits, special care should be taken to ensure that AI models are free from biases that could affect outcomes, ensure that the AI-driven processes are accurate, transparent and accountable, and that data privacy is ensured and safe from human and cyber threats (Goto, 2023, Acquarone et al., 2023, Kumar et al., 2023, Abdulrahman et al., 2023). Also, collaboration should be promoted in the R&D and innovation departments, along the supply chain and in local or regional innovation ecosystems, as well as alignment with organizational strategic goals (Broekhuizen et al., 2023, Faraj and Leonardi, 2022, Gebhardt et al., 2022, Kolary and Mohanraj, 2023).

5. Conclusions

We set out to systematically analyze the application and impact of AI in R&D and innovation management, addressing questions about AI's usage, benefits, challenges, and best practices. Utilizing a comprehensive systematic literature review methodology, we examined 858 scholarly articles from the ISI Web of Science, filtered by business, economics, and engineering fields. The findings offer several contributions and practical implications for academia and industry.

The key objective of our research was to fill the knowledge gap regarding the role of AI in R&D and innovation management. The results indicate a growing concentration of AI-related publications in top journals, with IEEE Access leading the way, followed by Applied Sciences - Basel and the Journal of Business Research. AI has diverse applications, e.g. in healthcare,

aerospace, or sustainable development. There is an increasing scholarly interest in AI's potential to drive innovation and operational efficiency.

Key contributions of our study include a detailed mapping of AI's role in enhancing research capabilities through data analytics, automation, and predictive modelling. E.g., in healthcare, AI improves diagnostic accuracy and patient outcomes, while in aerospace, it optimizes design and maintenance processes. We also identify the integration of AI with blockchain technology to enhance transparency and security in various industries, further illustrating AI's transformative impact.

From a theoretical perspective, our study enriches the existing body of knowledge by providing a comprehensive overview of AI's applications and implications in R&D and innovation management. It highlights the methodologies employed in AI research, ranging from quantitative analyses using statistical and machine learning techniques to qualitative studies exploring AI adoption within organizations. Additionally, the study outlines future research directions, emphasizing the need for developing robust, explainable AI models that stakeholders can trust and understand.

There are, as well, valuable insights for innovation management practitioners. AI can significantly enhance decision-making processes, streamline operations, and accelerate the development and commercialization of new products and services. However, we also point out several challenges that need to be addressed to fully realize AI's potential. These include e.g., data privacy concerns, the integration of AI solutions with legacy systems, regulatory and compliance issues, and the need to manage organizational resistance to AI adoption.

Future research should focus on addressing these challenges by developing more robust and transparent AI models and exploring the integration of AI with other emerging technologies such as the Internet of Things (IoT). This integration could open new pathways for innovation, particularly in areas like smart manufacturing, healthcare, and environmental sustainability.

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Challenges and Opportunities of Artificial Intelligence Regarding Rapid Technological Change

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Abstract

Artificial Intelligence (AI) attempts to replicate human traits/capabilities through the development of computer systems, capable of performing tasks/functions that would otherwise require human intervention. There has been a tremendous increase in the use of this tool and no sign that this will change, in the near future. The purpose of this study is to analyse the challenges and opportunities of AI regarding rapid technological change. Therefore, a survey was created (143 participants) based on this theme, focusing on different perspectives by gender and nationality. Chi-square tests were performed, and through the results we concluded that there is an apparent association between gender and being informed about AI. Further support exists for the null hypothesis that there is no association between gender and being against AI. Additionally, we concluded that Portuguese, Spanish, and Italian individuals, in general, align with their perception of technological change and development (the Portuguese perhaps being humbler). Finally, more in-depth research is warranted in the AI era on whether the female gender will perhaps continue to be victim of a lack of self-confidence in the work environment and possibly feeling the "impostor syndrome".

Keywords: Artificial Intelligence, dynamic capability theory, ethical boundaries, chi-square test.

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1. Introduction

This study explores the challenges and opportunities presented by Artificial Intelligence (AI) amidst the rapid technological development of today. AI is currently becoming a significant part of people's lives, work, and various sectors in which numerous companies are inserted. Industries, organisations and individuals are increasingly more dependent on AI, as it executes certain tasks progressively quicker and more efficiently than humans. Therefore, it is crucial, as technology advances, to understand the challenges and opportunities of AI, to better comprehend and prepare for a more AI dependent future.

For example, students alert to the [excessive] usage of AI in course assignments by colleagues and encourage teachers to control for this usage. A solution is the implementation of ZeroGPT to check just how much AI was used in the writing of an assignment (a percentage is given by the application). All assignments should provide an audit trail (a best practice) showing how AI was used in a project.

The study is divided into six parts. A literature review where topics such as Dynamic Capability Theory, AI in an organisational environment, and AI as a tool for research are explored. The following section contains the methodology. It articulates how both the study, and a survey were made by the authors, in terms of reasoning and rationale. The succeeding section consists of the results, where the data derived from the conducted survey is presented and rigorously analysed through Cronbach's Alpha Coefficient and Chi-square tests. The subsequent section comprises the discussion, which contains the following subtopics: Are males more aware and informed of AI than females? Or are females more perfectionist concerning what is considered being aware and informed? Is there a cultural alignment between Portuguese, Spanish, and Italian individuals on their perception of technological change and development? Technology as a modern lifestyle facilitator; Artificial Intelligence's future implications in society, the workplace, data security/collection, and politics.

The study, which discusses various topics, has the potential to enrich the reader's understanding of the theme at hand. Given the amount of information and data in the article, it is likely to provide significant insight into knowledge about AI, and the challenges and opportunities of this technology, in both the present and the future.

2. Literature review

2.1. Dynamic capability theory

While a variety of definitions of the term dynamic capability have been suggested, this study will use the definition first suggested by Teece et al. (1997). The author saw it as a framework to analyse the sources and methods of wealth creation and capture by private enterprise firms operating in environments of rapid technological change. According to Teece, dynamic capability theory is used in an attempt to provide a structure on how or why decision makers decide when there is a deep uncertainty to wager, or speculate, about the future. As aforementioned, it is the ability to manage an organisation and the environment, in addition to structuring the organisation, in the midst of ongoing change. This theory can be distinguished as operational skills that are currently involved in operating procedures in an organisation (Teece et al., 1997). According to Helfat et al. (2007), however, dynamic capability mentions "the capacity of an organisation to purposefully create, extend, or modify its resource base".

Three dynamic capabilities are necessary in order to meet new challenges. Organisations and their employees need the capability to learn quickly and to build strategic assets. New strategic assets such as capability, technology and customer feedback have to be integrated within the company. Existing strategic assets have to be transformed or reconfigured (Teece et al., 2007). For analytical purposes, Teece (2007) indicated that a dynamic capability can be enacted as the aptitude to "(1) sense and shape opportunities and threats, (2) seize opportunities, and (3) sustain competitiveness by improving, combining, protecting, and, when necessary, reconfiguring the business enterprise's resources" (Vu, 2020). To further explain the three capabilities: sensing - means identifying and assessing opportunities outside your company; seizing - refers to mobilising your resources to capture value from those opportunities; and transforming - by constantly renewing those assets (Kleiner, 2013). As previously mentioned, it can also be seen as spotting the capability of an organisation to explore and scan opportunities throughout markets and technologies (Teece et al., 2007). The definitions reflect a means to transform investment in research and development studies into new opportunities.

For a better understanding, Kleiner (2013) provides the strategic example of Nokia and compares it to Apple. Nokia missed the smartphone revolution because the company was not well equipped for sensing, especially compared to Apple, which was embedded in the milieu that was breeding the next generation of smartphones. Steve Jobs sensed what customers wanted, and he also knew what technologists were doing. Step by step, he built the capabilities that Apple needed. For example, to make the iPod work, Apple developed capabilities in digital rights management and handheld device design.

2.2. Rapid technological change in modern society

Rapid technological change involves, particularly, Artificial Intelligence, the Internet, machine learning, robotics, nanotechnology, biotechnology, renewable technology and 3D printing (UNCTAD, 2019). At present, some organisations are finding themselves endangered by this rapid technological development, while other corporations are compelled to embrace the changes of new technologies and business models to join the technological revolution (Hamdani et al., 2018). This is evidence that big tech companies are growing vigorously year after year, jeopardising many other industries in the market.

As pointed out previously, this phenomenon of technological development has been witnessed for the last few decades, derived by the possibility to collect and process a vast amount of data at exceptional speed, incorporating the use of artificial intelligence (AI) for better and smarter decision making (Hamdani et al., 2018). This is especially visible since data knowledge has come to be public domain knowledge. This substantial change is incorporated by big corporations for the reason exemplified in a report by Hamdani et al. (2018).

Modern society as we know it today, is full of big and constant technological changes. Companies, in order to keep up with these changes, have had to adapt and evolve to ensure ongoing growth and success. As a result, due to these rapid changes, certain technologies have assisted organisations to better understand their own consumers, and in some cases, to stand out from their competition (Cascio & Montealegre, 2016).

Decision making is one of the most important aspects of a company, and with the help of AI, the decision-making process has completely changed in many ways (Stone et al., 2020). Ethical considerations of researchers about this topic can vary, but it is difficult to deny the implications of AI when it comes to data analysis (Nassar & Kamal, 2021). Not only is analysing data an important activity to optimise processes and increase the overall efficiency of a business but analysing the different types of data in analytic data platforms is a crucial and essential way of gaining invaluable insights into consumer behaviour (Khade, 2016). This transformation can guarantee a more informed and better decision-making process and allow companies to adapt to the various markets and satisfy the different needs of their existing and future customers.

2.3 Artificial intelligence (AI)

2.3.1 Impact and applications in organisations

Organisations have been increasing their diversity in conversational agents, namely chatbots, as an innovative approach of interaction with customers. The implementation of AI as a connection between companies and consumers is present in websites, social media, and instant messaging apps (Jiang et al., 2022). A chatbot can be defined as a combination of "a program" (Kshetri, 2021) with "artificial intelligence" (Kshetri, 2021), with the purpose of helping automate customer service through interactions with humans. AI technology can be given the means to carry out interactions resorting to natural language, a conversational tone, and social cues (especially if it possesses a voice system as one of its features). The accurate replication of human traits can be achieved by chatbots through machine learning techniques and innovative algorithms (Nguyen et al., 2023).

AI has an extremely wide range of applications, having the power to affect most existing industries, possibly even reshaping several. This spectrum includes how companies' employees are affected by the technology, since an increased use and development of AI will increase the demand for highly skilled workers (Xu et al., 2023). According to Lakhani (2023), "AI won't replace humans - but humans with AI will replace humans without AI". A positive correlation between AI-savvy employees and their income growth can also be verified as AI is progressively implemented in functions and projects (Xu et al., 2023). Furthermore, despite the predictions that advances in this technology will replace many jobs, the growth in labour demand on certain organisational functions, such as accounting, finance, social information, and healthcare consultation is increasing. This phenomenon arises from the stimulating effect of AI on creativity, derived from the relationship between human and machine (Weiguo et al., 2020).

2.3.2 An innovative tool for research purposes

The usage of AI chatbots in research has increased in recent years. They can collaborate, communicate, and automate tasks, such as data tracking, mining and analysis. By processing information in a fast and accurate manner, AI provides researchers in multiple fields with the means to increase informed decision-making and facilitate pattern recognition in data sets. For instance, AI can identify a multitude of treatments and correlations in healthcare, through patient data analysis. Furthermore, by making use of this technology, economists are provided with forecasting models and swifter financial data examination (Cain et al., 2023). Moreover, AI is also integrated in disaster damage assessment, as a means of accelerating "aid responses and reconstruction efforts" (Hanson et al., 2023).

AI deep learning models' applications in academic research have also broadened. Deep learning models can be defined as "language models created to produce responses to textual stimuli that are indistinguishable from those produced by a human". By implementing AI within qualitative research, researchers are able to obtain aid in theme and content analyses, literature review

information filtering, and "conceptualization purposes". Originally costly in both time and resources, the previously mentioned research work can now be efficiently carried out with the help of this technology. AI is able to summarise large amounts of data and generate research questions based on processed information originating from both text and images (Christou, 2023). In addition to qualitative research, quantitative research can also be enhanced by resorting to statistical and simulation-oriented AI-based tools. They are capable of not only writing necessary code for statistical analysis using specific software, but also of conducting simulations and tests on delicate and complicated procedures (Esplugas, 2023).

2.3.3. The need for AI regulations and control

AI systems are evolving so fast that a call for a 6-month long pause appeared in order "to give AI companies and regulators time to formulate safeguards to protect society from potential risks of the technology". While AI is inarguably a tremendously useful tool, it poses many unregulated risks due to its rapid advancement that caught many off-guard. An open letter addressing this issue lists many concerns, among which are privacy issues and data protection, the spread of misinformation, and especially the development of "non-human minds that might eventually outnumber, outsmart, obsolete, and replace us", thus risking losing control of our civilization (Clarke, 2023).

An AI (or a chatbot) must first be trained on data. If this data is not diverse enough, or is rather biased, the results or decisions made by that AI will reflect the biases in the data, and perhaps even the biases of their creators. For instance, a chatbot assisting in the hiring process may be biased against certain groups of people or provide misinformation to a student in need of content. Furthermore, we do not understand how exactly these systems make decisions. Such a lack of transparency makes it difficult for researchers, for example, to trust the results of work done or assisted by AI and reproduce its findings. Lack of process means that they cannot make decisions or judge a situation in the same way a human can – they cannot make decisions independently. As such, AI cannot be held accountable, yet the increasing reliance on chatbots in organisations, academia, and by the general population alike raises concerns about the responsibility for the outcomes of these decisions (Cain et al., 2023). Some hypothesise that we may be re-inventing slavery that allows a clear conscience as we do not (yet) officially consider AI an autonomous being (Letheren et al., 2020). We wonder if an AI system could be a responsible actor of their actions instead of the human using the AI (Chia et al., 2023). Currently, AI is extremely unregulated and has potential for misuse by governments, corporations, and malicious individuals in order to control, manipulate, and restrict access to information (Cain et al., 2023). Even if harm is not intentional, organisations must keep in mind the unintended consequences of poorly programmed or designed AI (Letheren et al., 2020). Privacy, and especially breach of privacy and data, is also an emerging concern. Critics worry that the data used to train AI models might enable the technology to reproduce identifiable information or be tricked into revealing or collecting such information (Clarke, 2023). Moreover, hackers can take advantage of the power of AI to develop more advanced cyberattacks, hence getting around security measures, to exploit weaknesses in systems (Marr, 2023).

2.3.4. Artificial intelligence advertising and education: opportunities and threats

AI assistance has a vast potential in advertising. Artificial Intelligence is capable of analysing, interpreting, and creating vast amounts of data. While that introduces many potential promises, it also plagues us with potential perils. Personalised advertisements, tailored to each customer by collecting and processing their data, allow for more variation than ever before. However, such a number of advertising campaigns would be difficult to monitor and track. Major brands typically hold relatively homogenous associations among the wider public, but that associated brand meaning could now splinter. Consistency would be threatened by dozens or even thousands of different advertisement versions that come with personalisation (Campbell et al., 2022).

In the face of increasingly competent automation, many jobs would be (and are already) in danger of becoming obsolete (Letheren et al., 2020). In the US, AI contributed to nearly 4,000 job losses in May 2023, according to data from Challenger, Gray & Christmas. This can be explained by the intensification of interest in performing advanced organizational tasks and lightening workloads (Napolitano, 2023). Human workers may be displaced in fields like data analysis and research assistance (Cain et al., 2023). Because of the increased variety of advertisements, being creative may become more challenging. Creative teams might see a shift toward engineering and technical employees, therefore creative roles may become industrialised. Furthermore, the brands may turn toward personal decoders and virtual brand ambassadors instead of macro-celebrities, even going as far as using macro-celebrities' "deepfakes" instead (Campbell et al., 2022). Deepfakes can already cause significant damage, and the potential for harm could increase as technology evolves. For example, fake footage of a company CEO sharing unsavoury political ideologies via social media could seriously damage the company's reputation (Letheren et al., 2020). Regarding costs, while these could be greatly reduced by shrinking the advertising teams, they would soar in sight of new expenses of digital security and monitoring fake content from potential brand attacks or content thieves (which could be more easily engineered with the help of AI), and the need for increased server power in order to track more data for personalised advertising (Campbell et al., 2022).

Consumers experiencing disadvantages stemming from their finances, age, education, gender identity, race etc., may be excluded from fully taking part in an AI future – either because human agents would be unavailable to them, or because they would not be able to afford or use the technology to access AI (Letheren et al., 2020). Furthermore, AI has potential for errors or misinterpretations because they need more context or human help, which could lead to customer dissatisfaction, sense of alienation and disconnection. AI and chatbots are not human and cannot offer the same empathy and personal connection that human interaction can provide. Chatbots can be perceived as impersonal, leading to a lack of customer trust and loyalty (Cain et al., 2023).

Chatbots have a potential to be used in education as a supplement to traditional teaching methods. Unfortunately, they cannot provide the same level of support and guidance as human teachers. Additionally, they could malfunction or provide incorrect information, which could cause confusion and frustration for students. Moreover, it can negatively impact academic learning outcomes and decision-making. AI is often misused in order to complete assignments or take online exams in place of students. Another example of academic misconduct is plagiarism, such as copying text from online sources without proper attribution and using AI-powered writing assistants to rewrite text in an attempt to pass it off as a student's own work. Students no longer need to create original content, which can negatively affect their vocabulary development, among other educational aspects. Unnatural language prompts can negatively impact students' language evolution (Cain et al., 2023).

A set of clear ethical guidelines and standards for AI usage is desperately needed. Researchers, marketers, and others must receive education and/or training on ethical use of Artificial Intelligence and chatbots. Systems that detect and prevent unethical AI usage should be developed (Cain et al. 2023). We must keep in mind that actions have consequences in the world, and that AI reflects those actions (Letheren et al., 2020).

3. Methodology

We began our study by defining its theme. After a thorough literature review based on the methodology proposed by Remenyi (2013), we decided to explore the challenges and opportunities of Artificial Intelligence (AI), in the dynamic capability theory frame (in the current era of rapid technological change). Furthermore, how do people, as individuals and consumers, and organisations, as suppliers of products/services, perceive AI as a tool and a provider of value, or as a threat?

We conducted our research (from November 1, 2023, to November 15, 2023) through the Scopus and EBSCO databases, in order to find relevant documents for our study. The following search words and abbreviations were used in connection with the Boolean operators “AND”; “OR”: “Dynamic capability theory”, “Rapid technological change”, “Artificial Intelligence”, “AI”, “customers”, “consumers”, “dangers”, “threats”, “opportunities”, “research”. After sorting the documents, articles, books and conferences deemed as important for our work, we selected a total of 12 academic articles.

For further exploration of the subject, quantitative research (Saunders et al., 2019) was deemed necessary. Therefore, we created a survey, placed online in late 2023, through which 143 answers were collected. This quantitative data will support or refute the following hypotheses.

H0 (null hypothesis): There is no association between gender and being informed about AI.
H1 (alternate hypothesis): There is an association between gender and being informed about AI.
H2 (null hypothesis): There is no association between gender and being against AI.
H3 (alternate hypothesis): There is an association between gender and being against AI.

In addition, we wish to answer: Do Portuguese, Spanish, and Italian individuals align with their perception of technological change and development?

To reach a wider audience, we shared it through social media (a convenience sample - which is very popular in exploratory studies in business - though they warrant future more in-depth research (Bryman and Bell, 2015). Our survey consisted of twenty-two questions that firstly characterised respondents by demographic variables. Subsequently, they were inquired about their perspective and awareness of Artificial Intelligence, and how it affected them. In addition, they were asked how many electronic devices they use daily, and their level of dependence on them. Furthermore, we inquired the respondents on their stance regarding rapid and frequent technological changes. Lastly, they were asked about their perception on the main drivers behind technological development, in both the recent past and future, from an organisational standpoint. This survey was available for all types of users, in order to obtain a broader perspective.

In the next section we will analyse the answers to the survey, and a chi-square test (test of independence or of association) will also be performed (inferential statistics, where we infer knowledge from a sample - to see if statistically significant relationships exist) (Saunders & Cooper, 1993).

4. Results

4.1. Characterisation of the Sample

Regarding gender distribution, 49.7% of our survey participants identify as female, while 48.2% identify as male, and 2.1% as other. Their age range spans from 18 to 27 or more years old, with a notable concentration in the Generation Z demographic, primarily falling between 18 and 24 years old (Figure 1).

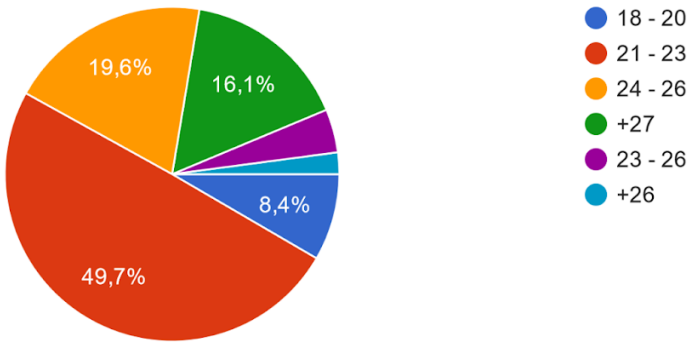

Figure 1 – Respondents by age

Source: Created by the authors

In addition, 30.1% of our respondents are Italian, and 25.9% are Portuguese, with the two nationalities combined accounting for most participants. Nonetheless, there are also respondents from Spain, Timor, Germany, France, Slovenia, Poland, Croatia, Turkey, Brazil, Indonesia, Austria, Hungary, Angola, Canada, the U.S.A, Romania, Panama, Mexico, the Netherlands, Belgium, Sweden and Lithuania. Concerning level of education, our sample ranges from High School to PhD. However, most of our respondents hold bachelor's degrees, as shown in Figure 2.

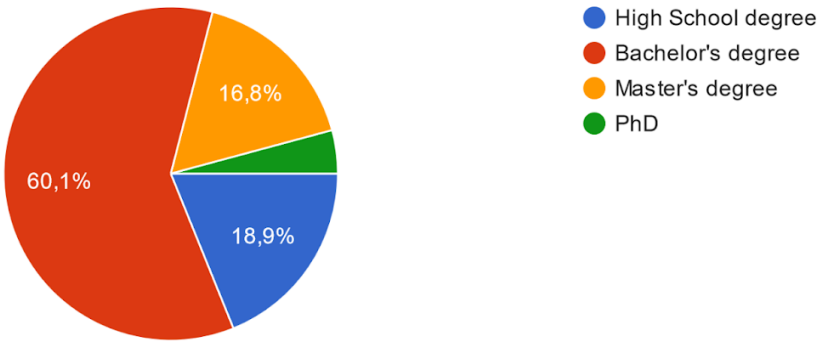

Figure 2 – Respondents by level of education

Source: Created by the authors

Furthermore, the large majority of respondents (84.6%) is currently enrolled in a university (Figure 3).

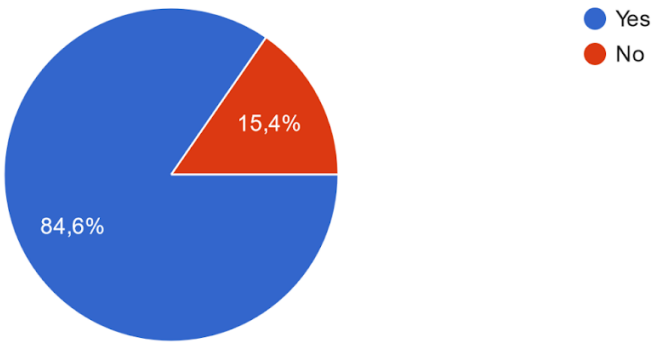

Figure 3 – Respondents by current university enrolment status

Source: Created by the authors

Moreover, 65% of our sample consists of individuals who are currently students as a sole occupation. The remaining 35% stated being a working student, an employee, a manager, a lecturer, a freelancer, a teacher, an administrator, unemployed, or retired, as displayed in Figure 4.

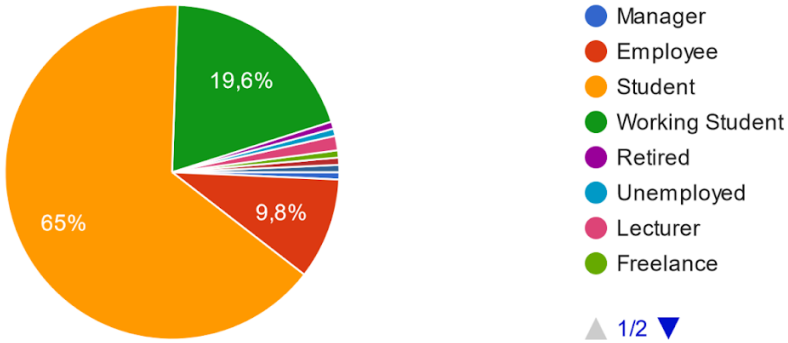

Figure 4 – Respondents by current occupation

Source: Created by the authors

Lastly, concerning both the respondents' current and future work fields, most responses pointed towards engineering (26.6%) and management (24.5%). Education and economics follow, comprising 10.5% and 8.4% of the responses, respectively. Furthermore, the remaining answers are very diverse, as shown in Figure 5.

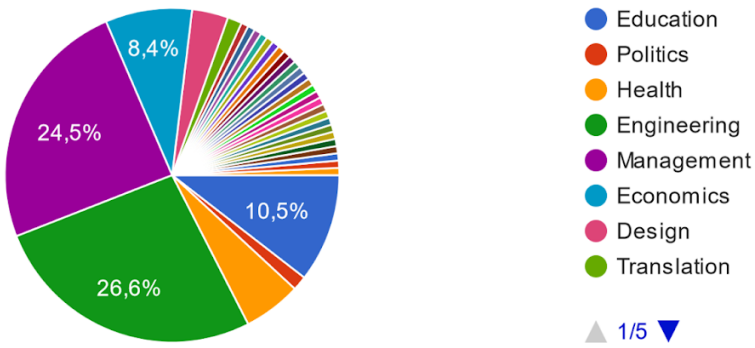

Figure 5 – Respondents by current and future work field

Source: Created by the authors

4.2. Cronbach's Alpha

An internal consistency analysis using Cronbach's Alpha Coefficient was conducted. This method measures the average correlation between questions and has, as an expected result, a value above 0.7 and below 0.9 (Da Hora et al., 2010).

The obtained alpha value considering all the Likert scale questions of the survey (7) was: (0.374). Furthermore, after removing the items with the lowest correlation value, the maximum alpha value achieved was (0.659), as shown in Table 1.

Table 1 – Cronbach's Alpha results

Consistency Statistics	
Cronbach's Alpha	**Number of Items**
0.374	7
0.659	3

Source: Created by the authors

The applicability of this method contemplates several assumptions to be considered valid, e.g. *"the survey must be applied to a significant and heterogeneous sample: When designing a questionnaire for experts, reliability cannot be internally gauged, because it is implied that experts tend to rather have the same opinion on the subject under discussion, decreasing the total variability of the survey and thus decreasing the alpha"* (Da Hora et al., 2010, p. 6).

The sample can be characterised by a predominance of Southern Europeans, who share many cultural aspects and values. In addition, most of the participants are a part of the same age group, Generation Z, which had an early exposure to technological devices. Thus, a very large percentage of our respondents is on a similar wavelength regarding the theme, decreasing the variability of the answers obtained, and consequently the Cronbach Alpha Coefficient.

4.3. Chi-Square test analyses

Only three survey respondents identified their gender as "other". Therefore, it was deemed necessary to exclude these participants when performing the chi-square tests (143-3=140), so as to maintain the data's statistical relevance. The prerequisites for the chi-square test were met albeit for a 2x2 contingency table the continuity correction had to be used. Table 2 summarizes the chi-square test results ("a negative value of Phi indicates that the variables are inversely related, or when one variable increases, the other decreases").

Table 2 – Chi-square results

Problem / Chi-square tests	**Continuity correction**	**Phi (2x2 table)**
Gender and being aware and informed about Artificial Intelligence and its applications.	0.006	-0.249
Gender and being against the use of Artificial Intelligence or similar tools.	0.480	N/A

Source: Created by the authors

The first chi-square test shows that males are apparently more aware and informed about Artificial Intelligence and its applications as compared to females. We concluded that there is an apparent association between an individual's gender and their awareness and knowledge regarding AI (see Tables 3, 4 and 5). Continuity correction p-value 0,006 < 0,05. This statistically significant association between the variables provides support for hypothesis 1 (H1).

*Table 3 – Cross-tabulation – What is your gender? * 3) I am very aware and informed about artificial intelligence and its applications*

			3) I am very aware and informed about artificial intelligence and its applications		
			Agree	Disagree	Total
What is your gender?	Female	Count	36	33	69
		Expected count	44.4	24.6	69
	Male	Count	54	17	71
		Expected count	45.6	25.4	71
Total		Count	90	50	140
		Expected count	90	50	140

Source: Created by the authors

Table 4 - Chi-square test - What is your gender? * 3) I am very aware and informed about artificial intelligence and its applications

	Value	**Degrees of freedom (df)**	**Asymptotic significance (Bilateral)**
Pearson Chi-square	8.693[a]	1	0.003
Continuity Correction[b]	7.684	1	0.006
Nº valid cases	140		

a. 0 cells (0%) expect a count less than 5. The minimum expected count is 24.64.

b. Computed only for a 2x2 table.

Source: Created by the authors

Table 5 - Symmetric measures - What is your gender? * 3) I am very aware and informed about Artificial Intelligence and its applications

	Value	Approximate significance
Phi (2x2 table)	-0.249	0.003
Nº of valid cases	140	

Source: Created by the authors

However, the second chi-square test shows that gender is independent of being for or against the use of Artificial Intelligence or similar tools. Continuity correction p-value 0,480 > 0,05. Therefore, there is apparently no statistically significant association between the variables (see Tables 6 and 7). Most of the survey respondents (73.6% approximately, excluding the three respondents who identified as "other" gender-wise) supports the usage of AI technology. This demonstrates that regardless of being male or female, most respondents support AI usage, providing support for hypothesis 2 (H2).

Table 6 – Cross-tabulation - What is your gender? * 1) I am against the use of Artificial Intelligence or similar tools

			1) I am against the use of artificial intelligence or similar tools		
			Agree	Disagree	Total
What is your gender?	Female	Count	17	52	69
		Expected count	14.8	54.2	69
	Male	Count	13	58	71
		Expected count	15.2	55.8	71
Total		Count	30	110	140
		Expected count	30	110	140

Source: Created by the authors

Table 7 – Chi-square test - What is your gender? * 1) I am against the use of artificial intelligence or similar tools

	Value	Degrees of freedom (df)	Asymptotic significance (Bilateral)
Pearson Chi-square	0.832[a]	1	0.362
Continuity Correction[b]	0.499	1	0.480
Nº valid cases	140		

a. 0 cells (0%) expect a count less than 5. The minimum expected count is 14.79.

b. Computed only for a 2x2 table.

Source: Created by the authors

4.4. Analysis of the survey results regarding the alignment in respect of technological change and development

In addition to the previous hypotheses, we intend to answer the question of whether or not Portuguese, Spanish, and Italian individuals align regarding their perception of technological change and development. Thus, we will analyse the survey questions and respective results that allow for a response to the additional question. This includes Questions "Technology - 1)", "Technology - 2)" and "Technology - 3)". Furthermore, the questions addressing both the sample's nationality and age range, previously shown (see 4.1 Characterisation of the sample), will be used as evidence in the statistics.

Question "Technology - 1)" inquires respondents on whether they are very informed and aware of the rapid technology change trend (see Figure 6). Approximately 83.7% of the Italians, 81.1% of the Portuguese, and 87.5% of the Spanish responded in agreement.

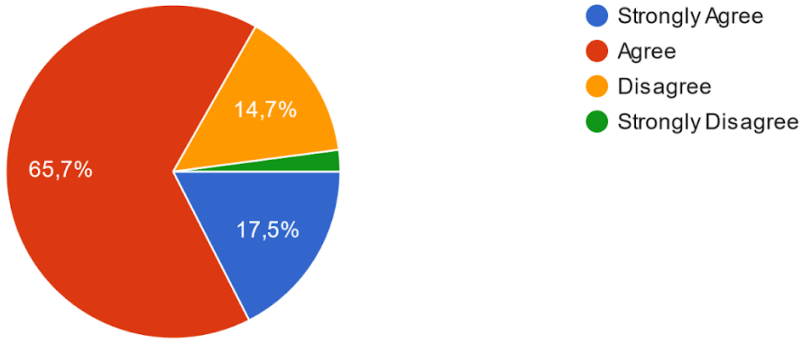

Figure 6 – Respondents on rapid technology change trends - knowledge and awareness

Source: Created by the authors

In the following question, "Technology - 2)", the respondents were asked if they find it easy to keep up with frequent technological change (see Figure 7). Approximately 83.7% of the Italians, 64.9% of the Portuguese, and 81.3% of the Spanish answered affirmatively.

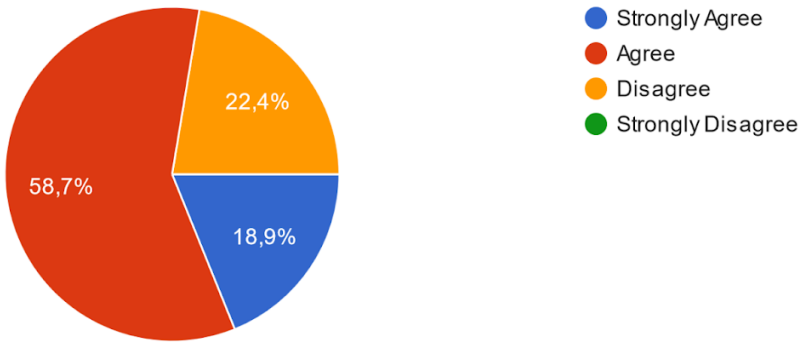

Figure 7 – Respondents on ease to keep up with frequent technological change

Source: Created by the authors

Last of all, in the question "Technology - 3)", respondents were inquired on whether or not technology development has made their lives easier (see Figure 8). Approximately 90.7% of the Italians, 97.3% of the Portuguese and 100% of the Spanish answered in agreement.

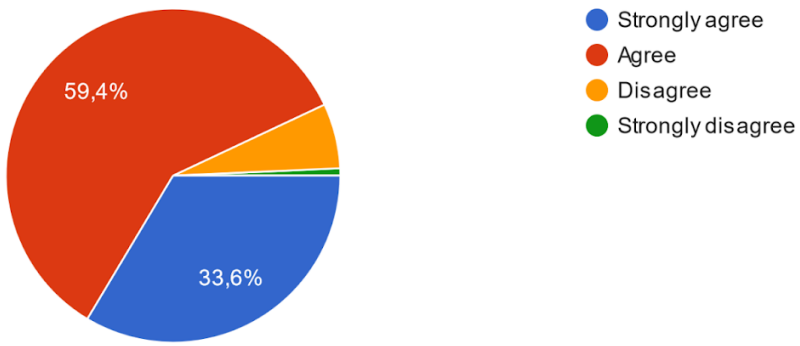

Figure 8 – Respondents on technology development facilitating their lives

Source: Created by the authors

5. Discussion

5.1 Are males more aware and informed of AI than females? Or are females more perfectionist concerning what is considered being aware and informed?

These are generalizations and perceptions that may not hold true universally, which causes different opinions. However, we perceive that most of the society has the same mindset. The perception that males are more informed or have more confidence in their knowledge may originate from societal norms/standards.

Males are told they can achieve great academic accomplishments, even if they, for instance, struggle in class. This motivating speech is also present in interpersonal relationships, when they struggle to make connections with other people. On the other hand, females are told differently, causing perhaps a lack of confidence. The attempt to meet very demanding societal standards and expectations may be the reason behind the female struggle with perfectionism.

Male individuals tend to not attribute as much importance to what others say and tend to not feel the need to be perfect - they are who they are. This is noticeable in our chi-square test. In the question "I am very aware and informed regarding Artificial Intelligence and its applications", each gender holds a very different perspective. In 71 males, 54 consider themselves to be aware of AI in general, which accounts for 76% of their answers. However, this belief is not as strong among the females. Only 52% are aware and informed of AI, meaning almost half of the female respondents do not consider themselves knowledgeable on this topic.

5.2 Cultural alignment between Portuguese, Spanish, and Italian individuals on their perception of technological change and development

Southern European nations share many cultural traits and lifestyles, which could be linked to similar geographical attributes and a common background. This can be confirmed by the survey responses, which made it evident that Portuguese, Italians, and Spaniards generally align on the questions we provided regarding technology. The only slight difference between the Portuguese opinions and the others' (Italians and Spanish ones) is visible in the different agreement rate on the second answer: "Technology - 2)". The respondents were asked if they find it easy to keep up with frequent technological change. Comparing the results, these show that approximately 83.7% of Italians, 64.9% of Portuguese, and 81.3% of Spanish answered affirmatively. That means a difference of 18.8% between Italians and Portuguese and a difference of 16.4% between Spaniards and Portuguese.

This could suggest that generally, Portuguese people adapt slower or with more effort to changes in technology, or that the Portuguese are less optimistic about their ability to adapt to new technologies. These findings presuppose keeping up with technological change throughout the ongoing development of technology in this century, confirming that they follow the growth and evolution of this ever-changing trend. This brought us back to Teece's Dynamic Capability theory, described as the ability to manage an organisation and the environment, in addition to structuring the organisation in an ongoing change (Teece et al., 1997). When the tendency is moving forward, people tend to float with the stream, to remain updated on the world surrounding them.

5.3 Technology as a modern lifestyle facilitator

It is observable in the survey's findings that a significant number of respondents agreed that technological development has greatly facilitated their day-to-day lives. In fact, approximately 93% of the individuals answered in agreement (see Figure 8). This can be explained by the constant introduction of newer technology, indicating and reflecting the public's wants and needs. As society's demands and requests increase globally, technological change initiatives from big tech companies constantly move forward. In doing so, organisations around the world change the quality of people's lives through modifications in several fields/sectors, such as communication, transportation, and healthcare. These innovative technological advances are therefore mostly perceived as substantial lifestyle facilitators.

5.4 Artificial Intelligence's future implications in society, the workplace, data security/collection, and politics

In this section some of the most quoted fears and concerns received via the survey's open-ended questions will be discussed. The reasons why the insights on the previously mentioned topics are generally aligned in a negative way could be explained by different factors, and it is important to further investigate the main reasons that shape a negative opinion towards AI, in future research. However, we perceive some of them to be: culture, the spreading of media sensationalism, and uncertainty towards the future due to rapid technological change and a lack of faith in the regulating organs.

The provided open questions were: "You agreed to the previous statement: I believe Artificial Intelligence will replace my work in the future. Can you specify why in a short sentence?" (28 answers); "Do you have any further information/comments or suggestions you would like to share?" (30 answers)

The first concern about AI that stood out was the fear of being replaced by AI machinery and software, with the most quoted jobs being in the fields of design/marketing (cited 6 times), programming (cited 4 times), translation (cited 2 times), and repetitive labour (cited twice). The main reasons, when specified, were because AI tools are faster (cited 4 times) and cheaper (cited 3 times).

The fear and unacceptance of a new, disrupting technology could be the leitmotif, since these respondents' opinion was focused on substitution in today's working activities by computers and robots. A new set of skills will probably be required by the next generation of workers, as many jobs will be out of fashion, and new ones will require collaboration between humans and AI. This calls for reconsideration, since some jobs will continue being supervised by humans, or will need to be performed by humans. Professions like lawyers, doctors, teachers and politicians require a level of ethical nuances that Artificial Intelligence could not achieve in the near future. There are also functions that will be difficult to substitute, given their completely personalised and complex nature, such as nurses, caregivers and hairdressers.

Perhaps being replaced by machines and computers in repetitive tasks could be a freedom act, in a way. As the industrial revolution freed horses, AI technology could free humans from several demanding types of work. There are multiple social implications that are involved in this scenario, which would manifest in the form of complex social and lifestyle adaptations. There is a big opportunity for AI technology to help society. However, it is likely that the global elites will benefit the most from it, and not the masses, who do not possess the resources to explore these new technologies to the fullest. Therefore, there is a considerable risk that AI implementation will augment the social differences between upper and lower classes.

6. Conclusions

There is an apparent association between an individual's gender and their level of knowledge and awareness of AI. As per our sample, males – also called the gender of "lost opportunity" by researchers in Portugal (less ambitious in academic terms, preferring to go to work sooner and being less perfectionist than their female counterparts; more content with the status quo... which favours them) – self-report higher AI knowledge and awareness than their female counterparts, which can perhaps be explained by a difference in self-confidence between genders, as well as meticulousness/perfectionism when approaching a subject. According to Pierre-Bravo (2018): "Madeleine Albright made history as America´s first female Secretary of State. But like many women, she has at times struggled to speak out confidently, especially in meetings where she's been surrounded entirely by men". Indeed, according to Albright: "It was intimidating... You listen carefully, think you are going to say something, and you think, 'No, it'll sound stupid.' And then you don't say it. And then some man says it and everybody thinks it's brilliant. And then you're mad at yourself for not saying anything." (cited in Pierre-Bravo, 2018). Albright has been credited for saying that there is no room in the job market for mediocre women (Pierre-Bravo, 2018). On the other hand, we have met many mediocre men in different roles in the work environment.

However, there is not an association between gender and one's stance regarding AI. Concerning being for/against AI, by analysing our sample's results, it is visible that most respondents, regardless of their gender, support the usage of AI or similar tools. This can be linked to how much technology facilitates modern lifestyles, in which most of our sample, from both genders, responded in agreement.

Finally, regarding the additional question, by cross-examining the data from our survey's "Questionnaire - Technology" section

with the three biggest sample groups nationality-wise, it was concluded that the perceptions of Portuguese, Italian, and Spanish respondents on technological change and development strongly align. The explanation for this may reside in the large number of similar cultural aspects and traits shared by these Southern European respondents, which could lead to a similar perspective on the theme. Albeit Portuguese respondents still self-reported greater difficulty (16.4% less able than the Spanish and 18.8% less able than the Italians) in keeping up with frequent technological change. This may be indicative of the Portuguese being humbler (please see Hofstede, 2001, for a discussion on masculinity versus femininity), more realistic, and not necessarily being less able or competent.

Limitations of this exploratory study include its rather small sample (143 answers) and its convenience nature. In future, more in-depth studies are warranted, to ascertain whether our study indeed points in the right direction. There is perhaps a link between what we found, regarding the lack of confidence by women in their own knowledge of AI, and impostor syndrome: "the persistent inability to believe that one's success is deserved or has been legitimately achieved as a result of one's own efforts or skills." (Oxford Languages).

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Understanding Internal Marketing Orientation in Higher Education

Evidence from a Portuguese Public University

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Abstract

This paper studies the internal marketing orientation (IMO) within a Portuguese public university, applying a validated multidimensional model comprising informal information creation, formal information creation, information dissemination, and responsiveness. Using a questionnaire-based survey which was distributed to the entire population of teaching staff, non-teaching staff and researchers at a Portuguese university, and based on a sample of 67 respondents, the study combines descriptive analysis, regression modelling, and cluster analysis to identify patterns in internal communication. The findings confirm the internal consistency of IMO dimensions and show that formal information creation significantly predicts information dissemination, while both dissemination and informal information creation positively influence perceptions of responsiveness. Using cluster analysis, we identify three distinct staff profiles (Disconnected, Ambivalent, and Engaged) with different perceptions of internal marketing. The positive effects of formal communication on dissemination are only observed among the Engaged group, suggesting that alignment with the institution moderates the impact of internal marketing efforts. These results suggest that the university should move beyond one-size-fits-all communication models and adopt differentiated, group-specific strategies. By combining psychometric measurement with staff segmentation, the study provides methodological and strategic contributions to internal marketing research and practice in university settings.

Keywords: Internal marketing orientation; Higher education institutions; Organizational communication; Employee engagement; Information dissemination; Organizational responsiveness; Cluster analysis; Regression modelling.

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1. Introduction

In recent decades, internal marketing has gained growing attention in organizational research, particularly in service-oriented institutions where employee satisfaction and engagement are essential prerequisites for high-quality service delivery (Berry & Parasuraman, 1991; Lings & Greenley, 2005). Rooted in the premise that employees constitute an internal market, internal marketing orientation (IMO) proposes that organizations must generate, disseminate and respond to intelligence about employees' needs and expectations, mirroring the principles of external market orientation (Grönroos, 1990; Lings & Greenley, 2009). In higher education institutions (HEIs), this alignment has become increasingly relevant in the face of institutional growth, structural complexity, and the pressures of competitive repositioning.

Despite its acknowledged importance, empirical evidence on internal marketing in HEIs remains scarce, particularly in non-Anglophone contexts and often lacks quantitative validation. Addressing this gap, the present study examines the internal marketing orientation of a Portuguese public university, focusing on how different staff members perceive the organization's efforts in four core dimensions: Informal Information Creation, Formal Face-to-Face Information Creation, Information Dissemination, and Responsiveness (Lings & Greenley, 2005; Santos & Gonçalves, 2010). The research question guiding this study is: *To what extent do staff members perceive the internal marketing orientation of their university, and how do these perceptions vary across organizational groups and influence responsiveness?*

To answer this question, a structured questionnaire based on the IMO model was administered to all teaching, non-teaching and research staff of the university. From the 67 valid responses obtained, quantitative analysis was conducted to explore central tendencies, test relationships between IMO dimensions, and identify staff clusters based on shared perceptions of internal marketing practices.

The paper is structured as follows. Section 2 reviews the theoretical foundations of internal marketing orientation and its application in higher education. Section 3 presents the methodology, including the conceptual framework, measurement instruments, and data collection procedures. Section 4 outlines the empirical findings, while Section 5 discusses the implications of these results. The paper concludes in Section 6 with practical recommendations and directions for future research.

2. Internal Marketing Orientation (IMO)

IMO is a multidimensional construct grounded in the idea that employees are the organization's internal customers, and that jobs should be managed as internal products (Grönroos, 1990; Berry, 1981). It aligns managerial practices with the goal of fostering employee satisfaction, engagement, and alignment with strategic objectives, thereby creating conditions for improved external service quality (Kotler, 2000; Lings & Greenley, 2005). The construct evolved from early notions of internal marketing as primarily related to training and motivation (Sasser & Arbeit, 1976), toward a more comprehensive model of market-sensing and responsiveness within the internal environment (Lings & Greenley, 2009; Gounaris, 2008).

The model proposed by Lings and Greenley (2005) identifies five behavioural dimensions of IMO: informal information creation, formal face-to-face information creation, formal written information creation, information dissemination, and responsiveness. These dimensions are operationalized based on the principles of external market orientation (Kohli & Jaworski, 1990), emphasizing the need to systematically gather intelligence on employee needs, disseminate it across the organization, and implement appropriate responses.

Empirical studies have validated the positive effects of IMO on various organizational outcomes, including employee satisfaction, commitment, compliance, and customer satisfaction (Ahmed & Rafiq, 2003; Bansal et al., 2001; Piercy & Morgan, 1990). In particular, responsiveness to employees' feedback and concerns has been associated with stronger perceptions of organizational support and a greater likelihood of staff acting in line with institutional goals (Eisenberger et al., 2001; Vieira-dos Santos & Gonçalves, 2018).

In higher education, however, the application of internal marketing remains underexplored. Recent work by Vieira-dos Santos and Gonçalves (2018) demonstrates that a supportive organizational culture and internal communication mechanisms contribute positively to perceived organizational support among HEI staff. Nevertheless, most studies in this context are qualitative or descriptive, and few apply validated IMO models to analyse the perceptions of diverse university stakeholders.

The present study builds on this foundation by applying the Lings and Greenley (2005) framework to assess how teaching, research and technical-administrative staff in a Portuguese university perceive the institution's internal marketing orientation. By exploring both the mean evaluations and the interrelationships between IMO dimensions, the study seeks to contribute to the empirical grounding of internal marketing in the higher education sector.

3. Methodology

3.1. Research Design and Objectives

This study adopts a quantitative research design to assess the IMO of a Portuguese public university. Drawing on the model developed by Lings and Greenley (2005) and adapted for the Portuguese context by Santos and Gonçalves (2010), the research aims to evaluate how different groups of staff - academic, research, and administrative - perceive the university's performance in terms of internal information generation, dissemination, and responsiveness.

The main research objectives are: to measure the perceived levels of IMO dimensions across the university staff; to examine differences in perceptions across professional categories and organizational contexts; to analyse the interrelationships between IMO dimensions; and to identify staff clusters based on their evaluation of internal marketing practices, and derive implications for targeted internal communication strategies.

3.2 Conceptual Framework

The conceptual model guiding this study comprises four dimensions of internal marketing orientation (see Figure 1).

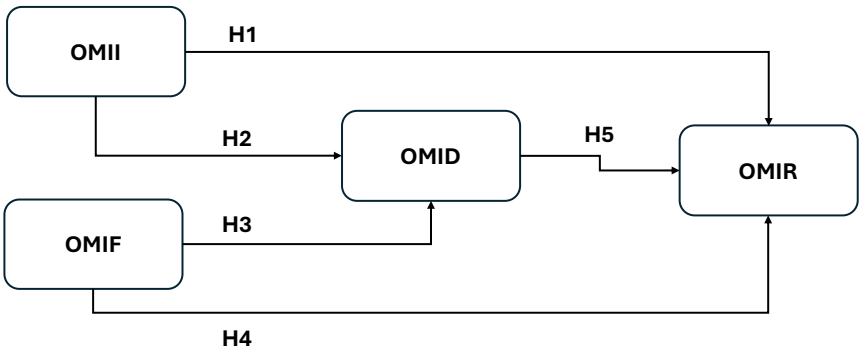

Figure 1 – Conceptual Model

The four dimensions depicted are:

- IMO - Informal information creation (OMII): the extent to which the organization gathers intelligence through informal interactions (e.g., spontaneous conversations, informal feedback);
- IMO - Formal Face-to-Face information creation (OMIF): the use of structured interactions, such as meetings or formal interviews, to collect input from staff;
- IMO - Information dissemination (OMID): the degree to which relevant information is shared across hierarchical and functional levels;
- IMO - Responsiveness (OMIR): the organization's capacity to act upon the information received and implement changes aligned with staff expectations.

While the original model includes a fifth dimension (IMO - Formal written information creation), it was excluded from the questionnaire in this study, following a pilot phase which indicated limited relevance in the institutional context under analysis.

3.3 Data Collection

Data were collected through an online questionnaire distributed between February 2 and March 10, 2025, to the entire population of staff at the university, including faculty members, researchers, and administrative personnel. The instrument used a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree) to assess agreement with a set of statements representing the four IMO dimensions.

Prior to distribution, five pilot tests were conducted to ensure clarity and face validity. Based on feedback, minor adjustments were made to the structure and wording of the items. The final version of the questionnaire included 13 items: 7 items assessing Informal and Formal information creation, and 6 items assessing Information dissemination and Responsiveness.

3.4 Sample

A total of 67 valid responses were obtained. Respondents represented various organizational units within the university, including departments, laboratories, and administrative services. The sample included individuals with different academic backgrounds and hierarchical positions, allowing for exploratory analysis of subgroup differences.

3.5 Data Analysis

Descriptive statistics were used to examine the central tendencies of each IMO dimension. Group comparisons were performed using non-parametric tests to detect statistically significant differences in perceptions based on academic qualifications, work context, and functional area.

To investigate the relationships between dimensions, multiple linear regression analyses were conducted. The first model tested whether informal and formal information creation predicted information dissemination. The second model examined the effects of both information dissemination and informal information creation on organizational responsiveness.

Finally, a cluster analysis was performed to identify staff profiles based on their responses to the IMO items. These clusters were interpreted as representing distinct perceptions of the university's internal marketing practices and subsequently used to develop targeted strategic recommendations.

4. Results

4.1 Sample Characterization

The final sample comprised 67 valid responses from staff members of a Portuguese public university. Participants were diverse in their roles, organizational affiliation, and academic background. In terms of professional function, the sample included teaching staff (faculty), non-teaching technical and administrative staff (TAG), and researchers. Most respondents were affiliated with academic departments, while others worked in research laboratories or support services.

Regarding gender distribution, the sample was predominantly female, and most participants were aged between 35 and 54 years. Academic qualifications varied, with a significant proportion holding doctoral degrees, followed by master's degrees and bachelor's or equivalent. Tenure at the university also ranged broadly, with most participants having between 10 and 29 years of service.

This heterogeneity provides a comprehensive perspective on the internal marketing orientation perceived across different staff profiles and organizational contexts within the university.

4.2 Reliability Analysis

To assess the internal consistency of the instrument used to measure internal marketing orientation, Cronbach's alpha coefficients were calculated for each of the four dimensions included in the model. The results indicate a high level of reliability across all dimensions, exceeding the conventional threshold of $\alpha = 0.70$ (Nunnally, 1978), and thereby confirming the robustness of the measurement scales.

- OMII - Informal Information Creation (7 items): $\alpha = 0.85$
- OMIF - Formal Face-to-Face Information Creation (3 items): $\alpha = 0.89$
- OMID - Information Dissemination (3 items): $\alpha = 0.94$
- OMIR - Responsiveness (3 items): $\alpha = 0.97$

4.3 Linear Regression Analysis

To examine the interrelationships between the core dimensions of internal marketing orientation, two multiple linear regression models were estimated. The first model explored the joint effects of informal and formal information creation on information dissemination. The second examined how dissemination and informal creation influence responsiveness.

A multiple regression model (see Table 1) was tested to evaluate the contribution of both informal (OMII) and formal face-to-face (OMIF) information creation to information dissemination (OMID). The model explained 54,8% of the variance in dissemination ($R^2 = 0.548$).

However, only **formal face-to-face information creation** emerges as a statistically significant predictor, with a strong positive effect. In contrast, informal information creation did not contribute significantly to the model when both predictors were included. The Durbin-Watson statistic was 1.507, indicating no concerning level of residual autocorrelation.

Table 1 – Regression Model Summary, ANOVA and Coefficients: Dependent Variable OMID

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.740[a]	.548	.534	1.04321	.548	38.768	2	64	<.001	1.507

a. Predictors: (Constant), OMIF, OMII

b. Dependent Variable: OMID

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	84.382	2	42.191	38.768	<.001[b]
	Residual	69.651	64	1.088		
	Total	154.033	66			

a. Dependent Variable: OMID

b. Predictors: (Constant), OMIF, OMII

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.186	.331		3.587	<.001
	OMII	.136	.140	.119	.975	.333
	OMIF	.625	.118	.649	5.298	<.001

a. Dependent Variable: OMID

Source: Own elaboration

A second model (see Table 2) assessed whether both information dissemination (OMID), formal information creation (OMIR) and informal information creation (OMII) predicted responsiveness (OMIR). The model accounted for 69% of the variance ($R^2 = 0.69$)

Table 2 – Regression Model Summary, ANOVA and Coefficients: Dependent Variable OMIR

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.831[a]	.690	.676	.81082	.690	46.824	3	63	<.001	1.524

a. Predictors: (Constant), OMID, OMII, OMIF

b. Dependent Variable: OMIR

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	92.350	3	30.783	46.824	<.001[b]
	Residual	41.418	63	.657		
	Total	133.768	66			

a. Dependent Variable: OMIR

b. Predictors: (Constant), OMID, OMII, OMIF

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.037	.282		.131	.896
	OMII	.376	.109	.354	3.443	.001
	OMIF	.182	.110	.203	1.658	.102
	OMID	.355	.097	.381	3.657	<.001

a. Dependent Variable: OMIR

Source: Own elaboration

Two predictors were statistically significant, **informal information creation** and **information dissemination**, with a positive effect, with a Durbin-Watson value of 1.524, indicating no concerning level of residual autocorrelation.

These results reinforce the role of **formal communication mechanisms** in enhancing internal information flow. They also highlight that both **informal information exchange and effective dissemination** play a central role in shaping employees' perceptions of organizational responsiveness.

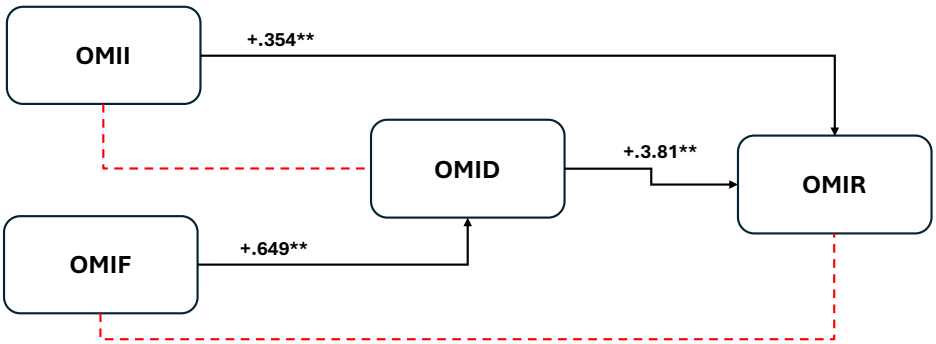

Figure 2 – Empirical Model

Source: Own elaboration

4.4 Cluster Analysis

To identify distinct perception profiles within the organization, a cluster analysis was conducted based on the four core dimensions of internal marketing orientation: informal information creation (OMII), formal face-to-face information creation (OMIF), information dissemination (OMID), and responsiveness (OMIR). A three-cluster solution was identified as the most interpretable and theoretically meaningful configuration. These groups were labelled Disconnected, Ambivalent, and Engaged, reflecting their overall evaluation profiles.

The **Disconnected** group (n = 24) displayed the lowest average scores across all dimensions, particularly in responsiveness (M = 1.58, SD = 0.56) and informal information creation (M = 1.61, SD = 0.57). Most respondents in this group were non-teaching technical and administrative staff (TAG), mainly female, aged 45 and above, and holding master's or doctoral degrees. They were predominantly affiliated with support services and had longer tenures (10 to 29 years) at the university. This cluster reflects a segment of staff who perceive limited access to internal communication and organizational responsiveness, and may feel structurally marginalized or organizationally distant, suggesting a need for more inclusive and informal engagement mechanisms.

The **Ambivalent** group (n = 19) reported moderate scores on all dimensions, especially information dissemination (M = 3.72, SD = 0.95) and responsiveness (M = 3.47, SD = 0.92), suggesting inconsistency in communication practices or mixed personal experiences. The group is mostly composed of TAG staff, with diverse educational backgrounds and mainly female. Members were distributed across support services and academic departments, with a significant proportion having over 30 years of institutional experience. This group appears to reflect uncertainty or inconsistency in communication experiences, with some access to information but a lack of alignment or strategic coherence in internal messaging.

The **Engaged** group (n = 24) showed the highest scores across all dimensions: information dissemination (M = 5.21, SD = 0.83), formal communication (M = 5.18, SD = 0.87), responsiveness (M = 4.40, SD = 0.75), and informal creation (M = 4.26, SD = 0.65). This group is mostly composed of TAG staff, aged mostly between 35 and 54, was predominantly affiliated with academic departments, and had a stronger presence of individuals with doctoral degrees. The results could be explained by integration in units where internal communication is strategically managed and valued. Their positive evaluations position them as potential internal ambassadors for good practices in communication and engagement.

These clusters provide a differentiated view of internal marketing orientation within the university and reinforce the idea that perceptions of internal communication vary significantly depending on professional function, tenure, and organizational context.

4.5 Nonparametric Tests

To assess whether the differences observed between the three staff clusters were statistically significant across the four dimensions of internal marketing orientation, nonparametric tests were conducted using the Kruskal-Wallis H test (see Figure 2). This approach was selected due to the non-normal distribution of the variables and the relatively small sample size within each cluster. The results revealed statistically significant differences among the groups in all four dimensions.

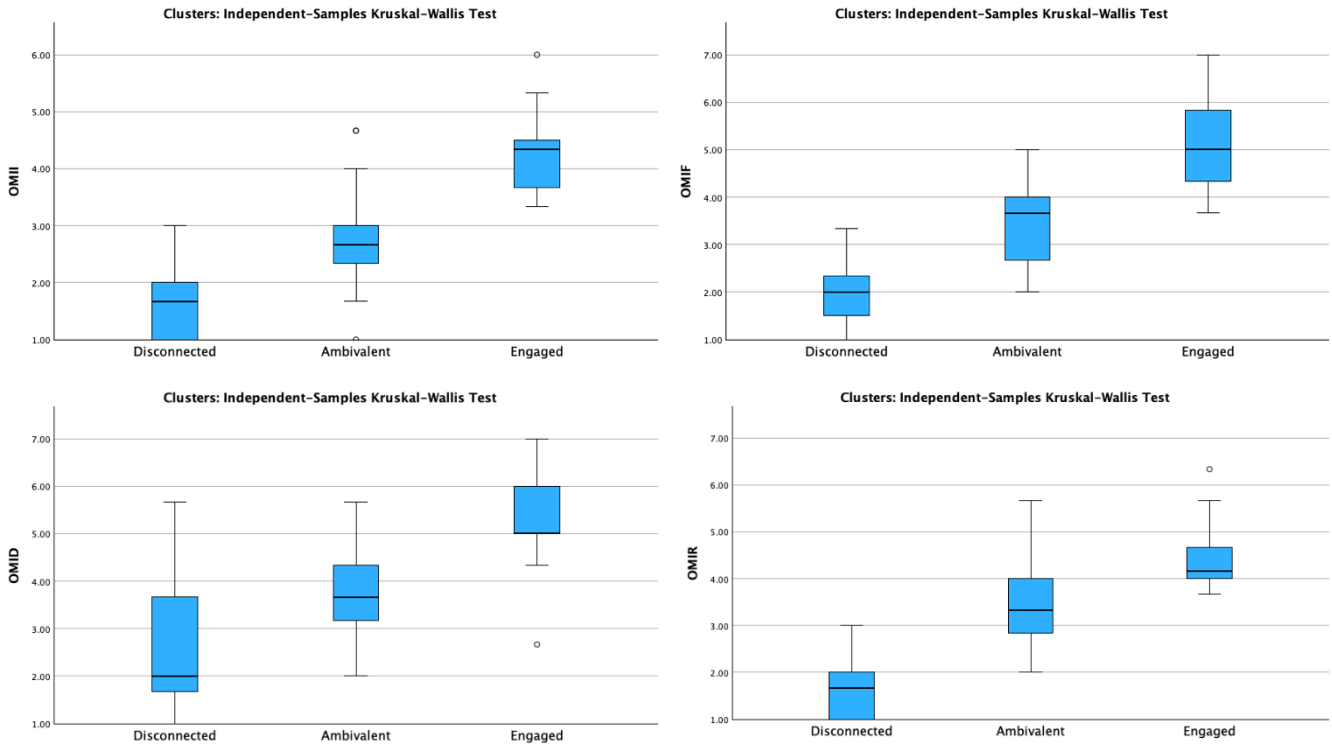

Figure 2 – Non-parametric Tests for the Cluster Groups: OMII, OMIF, OMID and OMIR

These findings confirm that the three clusters (Disconnected, Ambivalent, and Engaged) differ significantly in their perceptions of the university's internal marketing efforts. The consistently high significance across all dimensions reinforces the robustness of the cluster solution and highlights the relevance of adopting differentiated internal communication strategies based on staff segmentation.

4.6 Implications of Cluster-Specific Dynamics

The identification of distinct clusters based on perceptions of internal marketing orientation raised the question of whether the predictive relationships observed in the overall regression models are consistent across all staff segments. To explore this, the regression equations were re-estimated separately for each of the three clusters: Disconnected, Ambivalent, and Engaged.

The results reveal substantial variation in the strength and significance of the relationship across the three groups. In the Engaged group, the relationship between OMIF and OMID remained statistically significant ($\beta = 0.537$, $p = .014$), with a moderate explanatory power ($R^2 = 0.258$). This suggests that in organizational contexts perceived as communicatively mature, staff members recognize a clear link between structured communication and effective dissemination.

For the Disconnected group, the relationship between OMIF and OMID was not statistically significant. Similarly, in the Ambivalent group, the effect was negligible and non-significant. These findings suggest that for staff who are less aligned with the organization, formal communication efforts may not be sufficient (or even noticed) to improve perceived information flow. The relationships between OMIF, OMII, OMID and OMIR were not statistically significant in any of the three groups.

These discrepancies have both theoretical and practical implications. Theoretically, they point to non-invariance of the internal marketing model across organizational subcultures. Practically, they suggest that a one-size-fits-all communication strategy may be ineffective: while structured communication is impactful for some, it may be irrelevant or insufficient for others.

Therefore, future internal marketing strategies should incorporate segmentation and tailoring, recognizing that different groups of employees interpret and respond to communication practices in different ways. The integration of cluster analysis with regression modeling proves to be a valuable approach for identifying differentiated dynamics in internal marketing. It provides

evidence that staff respond to communication strategies in distinct ways, and that segmentation should inform both the design and delivery of internal communication initiatives.

The preceding analyses provide robust evidence of both general patterns and group-specific differences in how staff perceive and respond to internal marketing practices within the university. In the following section, we interpret these findings in light of the theoretical framework and relevant literature, highlighting key implications for organizational communication strategy and employee engagement in higher education institutions.

5. Discussion

This study set out to examine IMO in a Portuguese higher education institution, drawing on the model of Lings and Greenley (2005) and its validated Portuguese adaptation (Santos & Gonçalves, 2010). By combining a survey-based measurement of four core dimensions - informal information creation, formal face-to-face information creation, information dissemination, and responsiveness -with a cluster-based segmentation of the staff population, the study offers both detailed empirical insight and strategic implications regarding how different groups of staff perceive and respond to internal marketing efforts.

The results confirm the reliability and internal consistency of the IMO dimensions, and linear regression models demonstrate that formal information creation plays a key role in predicting the dissemination of information across the university. Additionally, both information dissemination and informal interaction significantly predict responsiveness, emphasizing that effective internal communication requires not only structured channels but also trust-based, spontaneous exchanges.

However, the identification of three distinct staff profiles challenges the assumption of uniformity in how communication practices are experienced. Staff alignment with the institution appears to moderate the effectiveness of formal communication: while the Engaged group clearly perceives its impact on dissemination, this relationship does not hold for the Ambivalent and Disconnected groups. This observation supports prior research suggesting that internal marketing practices are more effective when embedded in a broader organizational culture of support and mutual trust (Gounaris, 2008; Vieira-dos Santos & Gonçalves, 2018). They also support the view that internal communication is not merely transactional, but depends on relational dynamics and employee identification with the institution.

From a strategic management perspective, these findings have significant practical implications. Structured communication mechanisms may be effective in units where alignment and engagement already exist. However, for less connected groups, communication strategies should go beyond information provision and actively invest in building trust, informal dialogue, and opportunities for authentic feedback. The importance of adapting communication strategies to different internal audiences is also consistent with broader calls for human-centered and adaptive approaches to organizational change in higher education (Zhu & Engels, 2014).

Finally, the integration of cluster analysis with regression modeling contributes methodologically to the field by demonstrating how segmentation can enhance the strategic relevance of internal marketing diagnostics. Rather than relying on aggregate metrics, organizations can gain a more precise understanding of where interventions are most needed and what type of engagement strategy is likely to be effective.

6. Conclusions

This study contributes to a more nuanced understanding of IMO in higher education by combining validated psychometric assessment with cluster-based segmentation. Focusing on a Portuguese public university, we investigated how employees perceive key dimensions of internal marketing: informal and formal information creation, information dissemination, and organizational responsiveness. While formal information creation was shown to be a significant predictor of dissemination, and both dissemination and informal communication predicted responsiveness, these relationships proved not to be homogeneous across the organization.

The identification of three distinct groups (Disconnected, Ambivalent, and Engaged) revealed substantial variation in how staff experience internal marketing practices. These profiles provide a strong case for the design of differentiated and targeted internal communication strategies.

For the Disconnected group, where formal efforts appear to have little impact and overall scores are low, it is essential to invest in trust-building and informal engagement mechanisms. This may include open listening sessions, informal feedback loops, and visible responsiveness to concerns raised by staff, particularly those in long-standing support roles. Enhancing informal communication opportunities may be particularly valuable in reducing perceptions of marginalization and increasing connection with the institution.

In contrast, the Ambivalent group demonstrates moderate but inconsistent perceptions. For these staff members, communication strategies should aim at stabilizing and clarifying internal messaging, through more transparent decision-making, regular structured updates from leadership, and the reinforcement of communication routines that build predictability and reduce

ambiguity. Encouraging feedback and closing the communication loop will also help strengthen the perceived credibility of the institution's internal messaging.

The Engaged group, who already experience communication positively, represents a strategic opportunity. These staff members could be mobilized as internal ambassadors, sharing good practices, mentoring colleagues in less engaged groups, and contributing to collaborative internal initiatives. Maintaining high communication quality in these units is equally crucial to sustaining engagement levels over time.

From a strategic perspective, this study highlights the value of combining cluster analysis with regression modelling to allow identification of areas for improvement in internal marketing orientation. The results provide institutional leaders with a stronger empirical foundation for designing segmented and context-sensitive internal communication strategies, allowing to evolve from a one-size-fits-all model and aligning with the diverse realities and experiences of its internal audiences.

This study is not without limitations. The analysis was conducted in a single institution and based on a relatively small sample, which limits the generalizability of the findings. Moreover, the use of self-report data introduces the risk of response biases, and the cross-sectional nature of the design precludes causal interpretations.

Future research could address these limitations by adopting longitudinal designs to track changes in perceptions over time and assess the impact of targeted interventions. Comparative studies across universities or national contexts would also deepen our understanding of how organizational culture mediates internal marketing practices. In addition, mixed-methods approaches, e.g., combining surveys with interviews or focus groups, could offer richer insight into the mechanisms behind communication perceptions. Finally, multigroup structural equation modeling could formally test the invariance of the internal marketing model across organizational subgroups, providing a more rigorous statistical basis for segmented communication strategies.

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