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Article

Systematic selection of international markets using a hybrid multi-criteria approach: A study in the paper and paperboard industry

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MARKETING | RESEARCH ARTICLE

Systematic selection of international markets using a hybrid multi-criteria approach: A study in the paper and paperboard industry

Diego Alejandro López-Cadavid^{1*}, Juan Gabriel Vanegas-López¹, Jorge Anibal Restrepo-Morales¹ and Mayerlín Roldán-Sepúlveda¹

Abstract: Internationalization makes possible the competitive development of firms. This study proposes a methodology for the selection of international markets that identifies the most favourable international destinations for the paper and paperboard export industry in Colombia. For this purpose, a set of 23 factors divided into 5 categories are defined through literature: costs, trade barriers, logistics, environment and culture, and economy. This comprehensive model is applied to a set of 15 exporting firms and a combination of the multi-criteria models Analytic Hierarchy Process (AHP), and Evaluation Based on Distance from Average Solution (EDAS) is used for its development. The results indicate that the priority factors when choosing an international market are import costs (0.1974), transit time (0.1392), transport frequency (0.1174) and international transport costs (0.0971). Also, considering these priorities, the most viable markets for companies in this sector are Netherlands (0.9894), the United Kingdom (0.9740), Belgium (0.9409) and Germany (0.9351). The results obtained represent the identification of new possible alternative markets for Colombian companies in the paper sector to expand their international reach and develop in significantly more attractive and convenient markets according to their priorities. Also, this article contributes significantly to the development of methodologies for international markets exploration.

Subjects: Business, Management and Accounting; International Marketing; International Business

Keywords: international market selection; multicriteria models; internationalization; paper and paperboard industry; strategic choices

1. Introduction

Current economic dynamics have led to internationalization being perceived as one of the most common business purposes, understanding the economic and competitive benefits that come with reaching and remaining in international markets (Baena-Rojas et al., 2021; Brewer, 2001; Marchi et al., 2014). However, internationalization cannot be considered as a single activity to be carried out; on the contrary, this is an integral process composed of different interdependent stages (Azab et al., 2017; Gaston-Breton et al., 2011), whose proper functioning leads to positioning in international markets and is the result of prior strategic planning that is in line with the analysis of the

environment and organizations' capabilities (Vahlne, 2020; Welch & Welch, 1996; Wernerfelt, 1984). Thus, one of the phases that has the greatest impact on the success or failure of firms correspond to international market selection (IMS), understood as the stage that carries out the evaluation of markets (countries) according to the priorities and objectives of an organization to determine the most favourable international destination for it (Andersen & Strandskov, 1998; Gaston-Breton et al., 2011; Mersland et al., 2020). Likewise, given the importance of the IMS process, different authors warn that an inadequate execution and wrong selection of an international market can represent a high risk for the company's investment abroad and the expected levels of acceptance in the target market (Brouthers et al., 2009; Chen et al., 2016).

Following the above setup, given the importance of IMS within internationalization processes, this topic has been explored from different perspectives and approaches such as the first concepts influenced by the theory and the resource based view of the firm (Penrose, 1959), the development of studies related to the key factors to be analyzed during IMS (Papadopoulos, 1983), approaches based on technological advantage and the product life cycle (Vernon, 1966; Kindleberger, 1969), theories based on transaction costs (Williamson, 1975), sequential internationalization models focused on culturally proximate markets (Johanson & Vahlne, 1977), internationalization paradigms (Dunning, 1982), new approaches to born global firms (Knight & Cavusgil, 1996) and theoretical approaches that integrate multiple elements from different schools of thought (Whitelock, 2002). It is also important to note that these internationalization views have in common the emphasis on the processes of selection and entry into international markets. This has directed the attention of academics towards the exploration and improvement of these processes from different methodological approaches (Alexander et al., 2007; Kumar et al., 1994; Wind & Douglas, 1972).

Specifically, the field of study of IMS has been developing through two main methodological approaches identified as non-systematic and systematic methodologies (Papadopoulos & Denis, 1988). Thus, the former corresponds to informal methods that have a more descriptive approach and whose decision-making is based on knowledge and previous experiences in the international environment or on the subjective perception of proximity to a given market (Andersen & Buvik, 2002; Grimstad et al., 2021; Martín et al., 2022; Papadopoulos et al., 2011). Meanwhile, systematic methodologies refer to sequentially and formally structured IMS processes that involve the use of certain analysis tools and rules: 1) problem definition; 2) formation of measurement criteria; 3) weighting of criteria; 4) postulation of alternatives; 5) qualification of alternatives and 6) choice of the optimal market (Ahi et al., 2019; Andersen & Buvik, 2002; Grimstad et al., 2021). Complementing this, different studies have concluded that firms employing systematic methodologies have the potential to develop more comprehensive and extensive assessments for better results (Brouthers & Nakos, 2005; Cavusgil et al., 2004; Douglas et al., 2011; Marchi et al., 2014).

Considering the arguments expressed above, research on systematic IMS methodologies has had the opportunity to develop more broadly through the exploration of different methods and tools to support decision making. Within the group of techniques, the following stand out: regression modeling, factor and cluster analysis, longitudinal analysis, multivariate techniques, and fuzzy and multicriteria approaches (Dow, 2000; Górecka & Szałucka, 2013; He & Wei, 2011; Isa et al., 2014; Marchi et al., 2014; Rahman, 2000; Wang & Le, 2018). However, despite the growth of systematic empirical strategies, different review studies conclude that they are not enough and that the research field lacks uniformity in the topics explored, finding IMS studies mainly in industries in developed countries such as USA, UK and Australia as well as applications mainly in multinational cases, which denotes the need for this type of research in developing countries and the exploration of IMS from other methodological lenses (Malhotra & Papadopoulos, 2007; Ozturk et al., 2015; Ragland et al., 2015). Likewise, according to the review developed by Papadopoulos et al. (2011), the gaps around IMS are accentuated, warning of the need for empirical IMS studies that compare with existing methodologies in other contexts, consider cultural, logistic and risk variables, which promote the development of new IMS approaches by combining different tools

based on both primary and secondary information. Finally, the most recent reviews indicate the gaps, adding the importance of developing macro segmentation methodologies that include variables particular to industries and the experience of entrepreneurs to improve their accuracy and customization to their specific needs (Deaza et al., 2020).

Considering the persistent gaps in this field, models and applications for decision-making optimization have received special attention from scholars in the field of IMS in recent years (Oey et al., 2018; Ortiz-Barrios & López-Meza, 2016; Sukoroto et al., 2020; Vanegas-López et al., 2021). Specifically, multicriteria decision-making (MCDM) methods stand out given their usefulness in solving problems where uncertainty prevails with multiple intervening criteria and various alternatives, a similar context-driven situation faced by entrepreneurs who want to choose a new market for the export of their products (Aghdaie et al., 2013; Baena-Rojas et al., 2021; Mobin et al., 2014). Thus, when analyzing the literature concerning this type of models in IMS problems, hybrid applications such as AHP-TOPSIS and AHP-VIKOR stand out to a greater extent, while, to a lesser extent, methods such as AHP-GP, PROMETHEE-GAIA and AHP-SAW are found (Christian et al., 2016a; Oey et al., 2020; Yildiz & Özbek, 2020; Zolfani et al., 2021). However, although there are systematic applications of MCDM models in IMS problems, it is necessary to recognize that it is still a very small number of such studies, not all hybrid applications of MCDM models have been widely explored and the applications have been developed mainly through case studies, proposals, or simulations.

The contributions of the studies presented so far highlight that there is a constant need to explore new systematic empirical proposals for IMS that contemplate robust sets of variables and analyze other business contexts. Meanwhile, the approaches made so far show that, despite the outstanding effectiveness of hybrid MCDM models to solve problems related to decision making, their exploration in IMS problems has been limited, and they have been mainly used in case studies or proposals. Considering these identified gaps, the objective of this study is to develop a systematic IMS methodology using hybrid MCDM models to identify the most favorable international destinations for Colombian paper and paperboard export products. The development of this study is expected to contribute to the field of IMS research by exploring new empirical systematic methodologies, considering more robust sets of measurement variables, and exploring the priorities of Latin American industrial entrepreneurs during the IMS process. It is also expected that the development of this study will contribute to the methodological investigation of IMS problems using hybrid multi-criteria models, understanding that their application in this field has been limited so far.

It is worth mentioning that in order to demonstrate the applicability of this proposed IMS methodology, this study focuses on the specific case of the Colombian paper and cardboard export sector, taking advantage of the growth it has had in recent years (ANDI, 2018; DIAN, 2021). Thus, this methodology does not arise from the specific needs of the paper industry, but rather uses it as an example to show how to improve decision-making in the SMI process of a given sector. Likewise, it is expected that through this sectoral application, the applicability and extrapolation capacity of the proposed IMS systematic methodology will be demonstrated. Regarding the novelty factor, the methodology is proposed using AHP-EDAS hybrid MCDM models (Saaty, 1994; Ghorabae et al., 2015), which is an unprecedented approach so far in the field of IMS. Likewise, the methodology is proposed to be developed through the robust factor construct previously established by Vanegas-López et al. (2021) in the textile industry.

Finally, this article is divided into six sections. The first section refers to the introduction of the research problem to be addressed. The second section consists of the literature review that supports the thematic axes of the research problem. Subsequently, the third section contains the section on materials and methods, where the steps applied for the development of the proposed methodology are described in detail. Then, in the fourth section, the results obtained from the methodology are described and discussed in relation to what is presented in the

literature on the subject. Finally, in the fifth section, the main conclusions drawn from the research, the perceived limitations, and lines of future research on the subject are mentioned.

2. Literature review

2.1. Paper and paperboard sector in Colombia

Firms that emphasize environmental and social performance exhibit higher market value and engage in socially responsible behavior (Ioannou & Serafeim, 2010). Despite mixed evidence, corporate social responsibility activities generate positive externalities, foster better stakeholder relations and signal product value (Claessens & Yurtoglu, 2012). Enhanced by better corporate governance and adherence to international standards, these initiatives highlight the multifaceted impact of environmental and social practices on both market value and corporate behavior. Amid evolving global economic dynamics, sectors such as paper, board and derivatives production are increasingly exploring innovative operating models. These strategies aim to balance industry demands, environmental sustainability, and social responsibility, and leverage the benefits of waste reuse for competitiveness and economic viability (Nguen & Karpus, 2020; Rivera-Godoy et al., 2018). This shift reflects a broader trend within industries, highlighting the central role of environmental and social initiatives in shaping market value and corporate behavior.

In this sense, the paper and paperboard sector in Colombia has sought to structure its production chain by obtaining raw materials from sustainable sources such as paper recycling, reforestation activities and agricultural waste materials, allowing the process of making paper pulp and transformation into higher value-added products such as: toilet papers, napkins, household papers, bags, books, notebooks, and other applications (Departamento Nacional de Planeación-DNP, 2018). As a result of the sector's activities, the paper and paperboard industry currently contributes 4.6% of the country's industrial GDP, generating more than 9,000 direct jobs and is responsible for 6% of the paper and paperboard products produced in Latin America (ANDI, 2018; Departamento Nacional de Planeación-DNP, 2020). Likewise, the National Association of Colombian Businessmen-ANDI (2018) indicates that the paper and paperboard industry in recent years has presented increases in production and exports corresponding to 3.3% and 24.3%, respectively. Thus, during 2020 the exports for this sector indicated that a total of \$243,754,145 USD, having as main destinations Ecuador (21%), the United States (12%), Mexico (12%), Peru (9%) and Chile (7%) and as main export products self-adhesive paper and paperboard rolls, toilet paper, paper towels, household paper, bags, and notebooks (DIAN, 2021), as detailed in Table 1.

The data highlighted above demonstrates the capacity of the Colombian paper and paperboard sector to be a reference supplier in Latin America and other international markets. Likewise, this is in synergy with the sector's efforts to be more competitive internationally, develop new products and reach a greater number of countries with this type of products (Mincomercio, Industria y Turismo-MinCIT, 2017; Procolombia, 2021). Thus, identifying new international markets for paper and paperboard exports would help promote the growth of this industry and the development of the Colombian manufacturing sector in general.

2.2. Application of MCDM methods to IMS problems

MCDM methods are commonly used tools to identify the optimal solution in problems with multiple alternatives and specific evaluation criteria. Thus, over time, these tools have been developed and applied in the solution of multiple real-life cases (Oey et al., 2018). Within such multidisciplinary applications, internationalization processes, export plans and, more precisely, IMS processes, have not been the exception (Aghdaie et al., 2013; Sener, 2014; Christian et al., 2016). Thus, the first multi-criteria applications in IMS problems date from the 1990s with the study of Kumar et al. (1994) to the present day with recent studies focused on the exploration of new techniques, sectors, and methodological approaches (Aliyev, 2020; Baena-Rojas et al., 2021; Cano et al., 2017; Vanegas-López et al., 2021; Zolfani et al., 2021). Considering the importance of IMS within

Table 1. Trade data for Colombian paper sector (2020)

| Tariff code | Product description | FOB value | % |
|-------------|---|---------------|--------|
| 4811411000 | Self-adhesive paper and cardboard, in reels (rolls) | \$ 45.313.891 | 18,59% |
| 4818900000 | Other toilet paper, cleansing wipes and handkerchiefs | \$ 18.459.734 | 7,57% |
| 4802559000 | Other paper and paperboard | \$ 17.684.453 | 7,26% |
| 4818100000 | Toilet paper | \$ 15.625.761 | 6,41% |
| 4802569000 | Other paper and paperboard, not containing fibers | \$ 15.227.794 | 6,25% |
| 4818200000 | Tissues, makeup remover wipes, and paper towels | \$ 14.439.817 | 5,92% |
| 4804210000 | Raw kraft paper | \$ 12.198.130 | 5,00% |
| 4823909000 | Other paper and paperboard made of cellulose fibers | \$ 10.647.141 | 4,37% |
| 4819400000 | Other paper sacks and bags | \$ 9.824.554 | 4,03% |
| 4820200000 | Paper notebooks | \$ 9.671.599 | 3,97% |

Source: Own elaboration using data from DIAN (2021).

internationalization processes and the usefulness of MCDM models in problem solving, Table 2 below compiles several of the studies developed so far in this field using such models.

Another pervasive pattern is the recognition of the limitations of traditional MCDM techniques, in particular their susceptibility to subjective bias and the challenges of effectively integrating qualitative variables. Consequently, there is a resounding call across the studies for the development of innovative modelling approaches. Fuzzy logic, machine learning and hybrid models, such as the combination of AHP with DEMATEL (Aghdaie et al., 2013) or TOPSIS (Vanegas-López et al., 2021), or fuzzy logic with Monte Carlo simulation (Cano et al., 2017), emerge as promising ways to address these limitations. These approaches not only improve the accuracy and efficiency of decision making, but also pave the way for more comprehensive, nuanced and adaptive market selection strategies. Moreover, studies emphasize the multidimensional nature of market selection, urging researchers and practitioners alike to go beyond quantitative metrics and incorporate qualitative aspects such as cultural differences, political stability, and social factors (Baena-Rojas et al., 2021; Cano et al., 2017; Sener, 2014; Christian et al., 2016a; Vanegas-López et al., 2021). This multi-disciplinary approach is in line with the current research trend, highlighting the need for a holistic perspective in international market selection processes.

Thus, this review makes it possible to identify that this is a current research topic whose applications have increased in recent years, mainly using AHP, AHP-TOPSIS and AHP-VIKOR techniques and developing applications mainly in cases of the manufacturing and food industry. In addition, this shows that no studies of this type have been applied in the paper and paperboard industry so far. Additionally, it is shown that few studies employ broad sets of measurement criteria as recommended by the seminal works in this field (Malhotra & Papadopoulos, 2007; Ozturk et al., 2015; Papadopoulos et al., 2011) and that the studies developed so far correspond mainly to case studies, simulations and proposals, making evident the need for approaches involving a greater number of companies and sectors that allow the applicability, replicability and functionality of the proposed approaches.

Table 2. Review of previous IMS studies using MCDM methods

| Industry/ product | MCDM method used | Number of analyzed factors | Type of study | Authors |
|--|--|-------------------------------|-------------------------|-------------------------------------|
| Prefabricated building components | FAHP-MONTE CARLO | 7 | Case study | Aghajani (2021) |
| Palm Oil | AHP-TOPSIS | 12 | Case study | Oey et al. (2020) |
| Textile | AHP-TOPSIS | 23 | Judgement sampling | Vanegas-López et al. (2021) |
| Food | DEA | 19 | Case study | Shabani and Farzipoor Saen (2014) |
| Socks | TOPSIS-GRA-ANP | 8 | Judgement sampling | Yildiz and Özbek (2020) |
| Synthetic fiber packaging | TOPSIS | 13 | Case study | Christian et al. (2016a) |
| Aquaculture products | FAHP-TOPSIS | 7 | Focus group | Celik and Akmermer (2022) |
| Metal products | AHP-GP | 12 | Case study | Oey et al. (2018) |
| Jute bags | PROMETHEE-GAIA | 15 | Case study | Christian et al. (2016b) |
| Chemical products | AHP | 23 | Judgement sampling | Baena-Rojas et al. (2021) |
| Automotive | AHP-TOPSIS | 16 | Case study | Dourado (2018) |
| Plastic | AHP | 7 | Case study | Facco (2019) |
| Electronic devices | AHP-VIKOR | 5 | Case study | Ortiz-Barrios and López-Meza (2016) |
| Meat products | FUZZY MONTE CARLO | 10 | Case study | Cano et al. (2017) |
| Food | MABA-EDAS | 10 | Case study | Zolfani et al. (2021) |
| Food | AHP-SAW-TOPSIS- VIKOR | 7 | Methodological proposal | Mobin et al. (2014) |
| Rolling stock | AHP | 5 | Case study | Sukoroto et al. (2020) |
| Sanitary articles, comestics and medical devices | EXPROM II- PROMETHEE II- ELECTRE III | 15 | Case study | Górecka and Szałucka (2013) |

Source: Own elaboration.

The integration of MCDM techniques has undoubtedly enriched the field of international market selection, providing companies with a structured framework for navigating the complexities of global expansion. These methods, such as AHP, TOPSIS, DEMATEL and fuzzy, have enabled decision makers to consider a variety of factors simultaneously. For example, Oey et al. (2018) demonstrated the utility of MCDM in sustainable supplier selection, highlighting its ability to systematically handle diverse criteria and sub-criteria. Aghdaie et al. (2013) advocated for hybrid models that integrate different MCDM techniques, emphasizing their role in unravelling complex relationships between market selection variables. Such methodologies have provided decision makers with a comprehensive understanding of market dynamics, a critical asset in the global business landscape.

Nevertheless, these approaches are not without limitations. Sensitivity to criteria weights, resource intensity and potential bias are challenges outlined by Sener (2014) and Baena-Rojas et al. (2021). These limitations require the development of methodologies. New approaches, such as those proposed by Aliyev (2020) and Vanegas-López et al. (2021), are crucial to address these limitations. By combining MCDM methods with machine learning, fuzzy logic or Z-number

modelling, these innovative techniques aim to reduce uncertainties, automate processes, and improve decision accuracy. For example, Oey et al. (2018) propose to integrate MCDM with machine learning techniques to streamline the evaluation process, making it both efficient and accurate. Similarly, Aghdaie et al. (2013) suggest to combine AHP with fuzzy logic and grey relational analysis provides a more nuanced, robust framework for market selection that accounts for complexity and uncertainty.

Summarizing the above, the evolution of MCDM methodologies is key to addressing the multiple challenges of international market selection. By acknowledging the limitations of previous approaches and integrating innovative techniques, decision makers can ensure more reliable, efficient, and insightful decisions in the global marketplace. The proposed new methodological approaches bridge existing gaps and provide a promising path for the future of international business decision making.

2.3. Determinant criteria for IMS process

When talking about the factors frequently used as evaluation criteria to determine an international market for export, it is important to mention the benchmark study developed by Kumar et al. (1994), who characterize and define the three stages of the evaluation of potential foreign markets with application in international marketing: screening, identification, and selection. For this purpose, they use different criteria and determine how market potential plays an important role in IMS. This criterion is subsequently recognized as a key factor in the assessment of foreign markets and appears repeatedly in different studies (Andersen & Strandskov, 1998; Malhotra & Papadopoulos, 2007; Robertson & Wood, 2001; Sakarya et al., 2007). For their part, Andersen and Strandskov (1998), state that adopting a more industry-focused approach, using indicators such as country responsiveness, industry growth rate and industry-relevant macroeconomic measures, provide a more refined view for firms than country-level macroeconomic models.

Other significant aspects addressed in the literature show how Godley and Fletcher (2000) argue that economic factors on managerial discretion are the most relevant factor in market selection. Meanwhile, for Papadopoulos et al. (2002), demand potential and trade barriers are determinants. For Dow et al. (2014), a key factor is the psychic distance; aspects such as language and, therefore, culture are also highlighted (Escandón-Barbosa, 2015; Hadjichristidis et al., 2017; Schu & Morschett, 2017; Welch et al., 2001). In this line, Alexander et al. (2007) warn that culture assumed as the linguistic relationships between markets is especially important for the selection of international markets. Similarly, for Li et al. (2022) culture, institutions (usually representing formal institutions), cultural distance and institutional distance are the most studied factors, followed by legal entry restrictions or entry barriers. Similarly, other factors such as country risk, political risk, political culture, the existence of stringent quality requirements, the relationship between the host and home country, colonial ties, the attitude of the host government and the endowment of property, assets and political support of the firm, trade and consumption indicators, and ecological factors are also highlighted (Berbel-Pineda et al., 2012; Escandón-Barbosa et al., 2016, Clark et al., 2018; Gaston-Breton et al., 2011; Hashemkhani et al., 2021).

From another shore, authors such as Robertson and Wood (2001) highlight the importance of market potential measured by the buyers' ability to pay and the nature of competition in export markets, and the legal environment nuanced by non-tariff and tariff barriers. This approach is then joined by Wang and Le (2018), who highlight the importance of consumer value and indicate that the selection of international markets for developing countries must comply with low tariff rates, low exchange rates, and greater ease of doing business. Similarly, Xue et al. (2013) find differences between service and manufacturing firms in terms of resource requirements and exploitation of expertise. In this line, Yu (1990), Clarke et al. (2013) and Jones and Casulli (2014), consider the influence of international experience in the decision-making process for the selection of foreign markets.

In brief, to perform a comprehensive IMS, specific variables around logistic and marketing costs, tariffs, sales prices, geographical distance, cultural affinity, economic, political and social stability of a potential market, foreign competitors, local competitors, non-tariff barriers, levels of protectionism to certain industries, unemployment rates, corruption levels, potential sales growth, quality and documentation requirements in the potential market, among others, should be considered (Banomyong et al., 2011; Bernard et al., 2011; Ghemawat, 2001; He et al., 2016; Ozturk et al., 2015; Rahman, 2003; Robertson & Wood, 2001; Shabani et al., 2013). Such factors reflect the heterogeneity of aspects that influence IMS and the complexity of decision making during international expansion.

3. Materials and methods

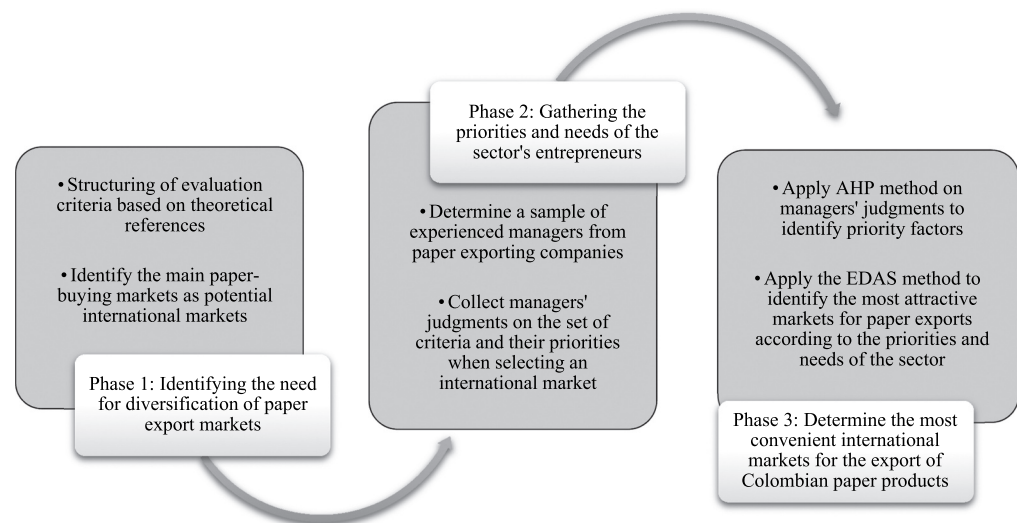
The methodological development of this study is divided into 5 sections that describe the phases that make up the proposed IMS method. Thus, the first section describes how the structure of variables was determined, the sources of data support and the main referents for their selection. The second section describes how the main purchasing markets for paper and paperboard products were determined as an alternative for the firm exporters. Then, in the third section, the conformation of the data collection tool and the sampling of the companies under study are detailed. Subsequently, in the fourth section, the methodological application of the Analytic Hierarchy Process (AHP) technique to determine the preferences of the entrepreneurs is detailed step by step. Finally, in the fifth section, the application of the method Evaluation based on the Distance to the Average Solution (EDAS) is described in order to obtain the most attractive markets. The application of the methodological process carried out is shown in Figure 1.

4. Determination of criteria and sub-criteria

In order to make the proposed methodology applicable and to understand the environment faced by firms during the process of selecting a new export destination with the greatest possible degree of accuracy, we sought to establish a robust set of variables that had already been tested in other IMS empirical studies. Thus, the main reference was the research developed by Vanegas-López et al. (2021) that proposed five general categories catalogued in cost factors, cultural environment, economy, trade barriers and logistics, which contain a global set of 23 variables associated with each criteria. The selection of categories and variables has garnered endorsement from specialized literature. This approach encompasses a wide array of pertinent variables

Figure 1. Methodological process proposed for the study.

Source: Own elaboration.



and has demonstrated its validity in diverse countries and contexts, implying its robustness and applicability in the field of IMS research (Alexander et al., 2011; Ozturk et al., 2015; Papadopoulos et al., 2011; Sakarya et al., 2007). It addresses fundamental aspects including market characteristics, business opportunities, existing relationships, cost and risk reduction, market accessibility, market attractiveness, market size, and market growth, among others. Furthermore, the significance of considering economic and cultural factors in international market selection decisions has been emphasized (Cleveland et al., 2011; Eldrede, 2018; Hutchinson et al., 2007; İlayda, 2018). In summary, the set of categories and variables stands as a robust and validated tool for decision-making in international markets, encompassing a wide range of critical variables in diverse environments and geographies. Equally, the information corresponding to these variables is supported by official sources such as the OECD, WTO, WEF and the World Bank, as shown in Figure 2.

5. Determination of the main buyers of paper products

Once the set of categories and variables to be measured had been defined, a set of buyer markets was established as possible destinations for the exports of Colombian paper and paperboard producers. For this purpose, the United Nations Comtrade database (2021) was used to identify the global dynamics of international trade in this sector and to take the 18 main paper importing markets/countries in the world, which would be the alternatives to diversify the paper export supply, as shown in Table 3. Likewise, the 23 variables previously established in Figure 2 were used to form a specific profile for each destination and to enable comparisons between countries to subsequently define the most convenient for local exporters.

5.1. Sampling process and survey application

Understanding that the proposed IMS methodology should be close to the specific needs of paper and paperboard exporters in Colombia, the official database of the National Tax and Customs Directorate (DIAN in spanish) for the year 2020 was used to identify international trade flows

Figure 2. Scheme of evaluation criteria of the study.

Source: Own elaboration adapted from Vanegas-López et al. (2021).

Notes: * The market reference price corresponds to the average export price per KG of the main products produced in Colombia in the international markets.

** The cultural distance corresponds to the cultural difference between Colombia and the 18 buyer countries.

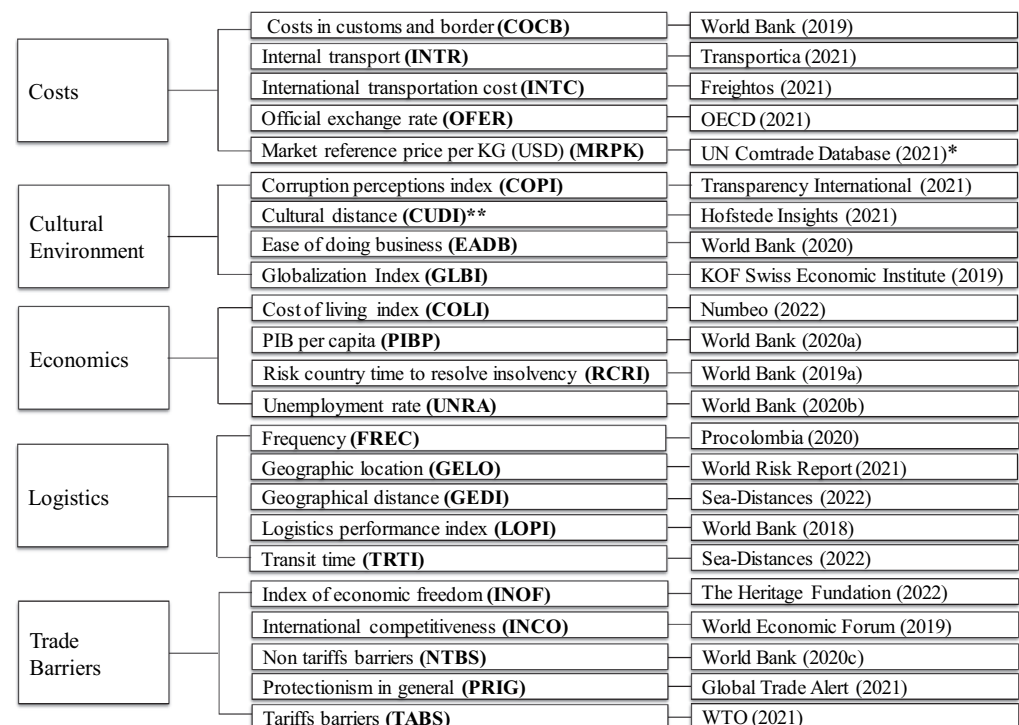


Table 3. Alternative paper and paperboard purchasing markets

| Country | Paper imports value (USD) |
|-----------------------|---------------------------|
| USA | \$15.686.858.747 |
| Germany | \$12.736.001.438 |
| France | \$8.403.023.730 |
| China | \$7.288.755.019 |
| United Kingdom | \$6.903.670.564 |
| Canada | \$5.403.428.976 |
| Netherlands | \$5.149.688.668 |
| Italy | \$4.991.570.483 |
| Poland | \$4.954.179.528 |
| Belgium | \$3.246.732.391 |
| Austria | \$2.220.061.792 |
| Czechia | \$2.092.563.286 |
| Switzerland | \$2.034.553.122 |
| Australia | \$2.019.700.387 |
| Sweden | \$1.481.023.407 |
| Denmark | \$1.399.591.036 |
| Ireland | \$1.066.744.212 |
| Norway | \$889.020.612 |
| HS Commodity code: 48 | |

Source: Own elaboration with data from UN Comtrade (2020).

specifically for the sector under study. In this way, the data was filtered from the tariff classification chapter 48 corresponding to paper and paperboard, cellulose pulp manufactures and applications of paper and paperboard, obtaining a total of 741 companies exported paper products during the 2020 period. From there, the companies were filtered according to their FOB value (USD), keeping only those with annual exports of at least \$200,000, obtaining a total of 96 companies. Subsequently, the data were classified into three categories based on the annual FOB value exported of each one, being labeled as low (from \$200,000), medium (from \$800,000) and high export (from \$2'000,000) companies. After this, a non-probabilistic purposive sampling was performed on the 96 categorized companies (according to Otzen & Manterola, 2017) of 15 firms in the sector divided into 5 (low export), 5 (medium export) and 5 (high export) focused directly on collecting the perceptions and judgments that directors, managers and experienced analysts had against the set of variables established, as described in Table 4.

6. Analytic hierarchy process (AHP)

A digital comparative questionnaires were applied to the managers of the selected firms under the 9-point scheme proposed by Saaty (2008) for both the general categories and the specific variables, where the ratings were 1 (if both variables had the same degree of importance), 3 (if there was a slight preference), 5 (if there was a much more notable preference), 7 (if there was an absolute preference), 9 (if there was an extreme preference) and 2/4/6/8 to assign intermediate ratings. After obtaining the judgments of the group of experts, the AHP model was used to identify the proportions of importance of the general factors as well as the variables within each category and their relative position within the global set, as shown in Figure 3. In this sense, the usefulness of the AHP model lies in its ability to decompose the factors that make up the structure of a problem into successive hierarchical levels according to their degree of incidence or importance within it (Saaty, 1984). Thus, as a result of its usefulness in solving problems where there are multiple intervening aspects and uncertainty prevails, this method has been employed for the solution of problems of various kinds within the business context, such as analysis of financial factors, improvement of the supply chain, evaluation of human

Table 4. Sample of paper and board firms under study

| Firms | FOB value | Current export markets (%) | Profile of experts |
|---------|---------------|--|-------------------------|
| Firm 1 | \$ 32.920.556 | Peru (29%), USA (27%) and Ecuador (20%) | Operational Coordinator |
| Firm 2 | \$ 8.166.017 | Mexico (61%), Ecuador (13%) and Panama (8%) | General Manager |
| Firm 3 | \$ 4.292.626 | Puerto Rico (46%), Panama (25%) and Chile (20%) | Operational Coordinator |
| Firm 4 | \$ 3.905.218 | Mexico (50%) and Puerto Rico (46%) | Operational Coordinator |
| Firm 5 | \$ 3.220.732 | Mexico (71%), Chile (9%) and Brazil (8%) | Operational Coordinator |
| Firm 6 | \$ 1.801.933 | Mexico (59%), Costa Rica (15%) and Ecuador (10%) | General Manager |
| Firm 7 | \$ 1.764.477 | Venezuela (70%) and Ecuador (17%) | Operational Coordinator |
| Firm 8 | \$ 1.616.499 | Ecuador (100%) | General Manager |
| Firm 9 | \$ 1.443.093 | USA (33%), Dominican Republic (14%) and Mexico (11%) | Exports Analyst |
| Firm 10 | \$ 884.597 | Mexico (81%) and Panama (14%) | Operational Coordinator |
| Firm 11 | \$ 758.049 | Venezuela (100%) | General Manager |
| Firm 12 | \$ 735.767 | Panama (40%), USA (34%) and Costa Rica (14%) | Exports Analyst |
| Firm 13 | \$ 651.031 | Haiti (58%) and Dominican Republic (42%) | Operational Coordinator |
| Firm 14 | \$ 623.101 | Venezuela (100%) | Exports Analyst |
| Firm 15 | \$ 609.863 | Mexico (26%), Guatemala (14%) and USA (12%) | Exports Analyst |

Source: Own elaboration using data from DIAN (2021).

resources, measurement of production performance and, of course, selection of international markets (Chou et al., 2019; Chand et al., 2018; İc & Yurdakul, 2021; Mahtani & Garg, 2018; Vanegas-López et al., 2021).

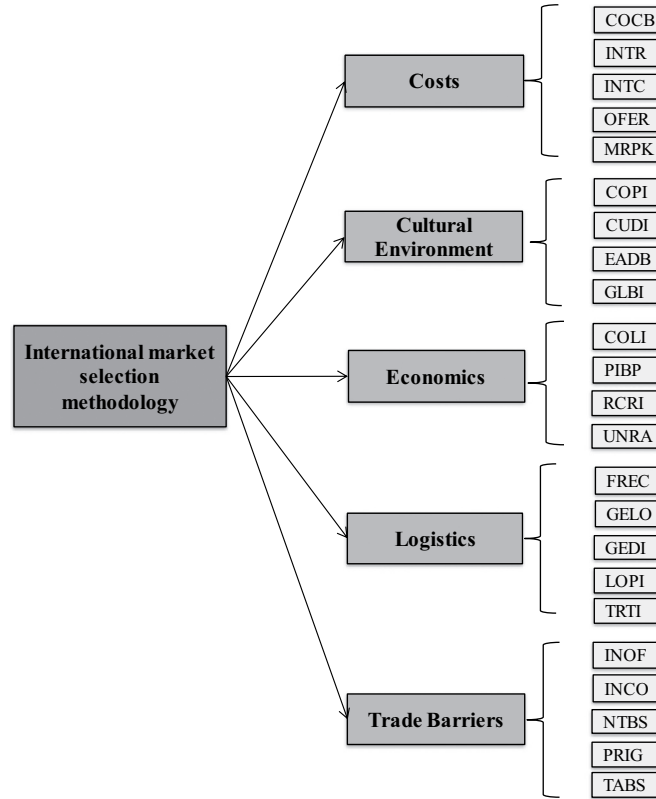
Now, when delving specifically into the methodological application followed in the AHP model, first the judgments given by the experts under the 9-point scale were entered into a system of paired matrices for each of the established categories, as shown in Equation (1).

$$A = [a_{ij}] = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & 1 \end{bmatrix} = W = \begin{bmatrix} \frac{w_1}{w_1} & \frac{w_1}{w_2} & \cdots & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & \frac{w_2}{w_2} & \cdots & \frac{w_2}{w_n} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{w_n}{w_1} & \frac{w_n}{w_2} & \cdots & \frac{w_n}{w_n} \end{bmatrix} \quad (1)$$

Subsequently, with the matrices formed and the judgments entered, the system of matrices and eigenvectors was solved as proposed by Saaty and Kearns (1985) to obtain the proportions of importance of the categories and their variables, as shown in Equation (2).

Figure 3. AHP hierarchical structure of the factors.

Source: Own elaboration based on Vanegas-López et al. (2021).



$$AxK = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{1n2} & 1 \end{bmatrix} \times \begin{bmatrix} W \\ W_2 \\ \vdots \\ W_n \end{bmatrix} = \begin{bmatrix} W'_1 \\ W'_2 \\ \vdots \\ W'_n \end{bmatrix} = \lambda_{max} = (1) \times \left(\frac{W'_1}{W_1} + \frac{W'_2}{W_2} + \cdots + \frac{W'_n}{W_n} \right) \quad (2)$$

Then, the consistency of the individual judgments of the experts is measured using three evaluation indexes. The first one corresponds to the Consistency Index (CI), as expressed in Equation (3). Then, in Equation (4) we find the Randomness Index (RI), which depends on the number of factors that make up each matrix, being [0.00, 0.00, 0.52, 0.89, 1.11, 1.25, 1.35, 1.40, 1.45] the values that it can take according to its size, governed by the scale proposed by Saaty (1977). Finally, we have the Consistency Ratio (CR) as the result of dividing the CI by the RI and as the final value that will indicate whether the judgment is consistent (≤ 0.1) or should be adjusted (> 0.1), as shown in Equation (5).

$$CI = \frac{\lambda_{max} - n}{n - 1} \quad (3)$$

$$RI = \left[\frac{(0.00, 0.00, 0.52, 0.89, 1.11 \dots 1.45)(n - 2)}{n} \right] \quad (4)$$

$$RC = \frac{CI}{RI} \quad (5)$$

As a final step in the application of the AHP model, although all the respondents were people with expertise in the paper and board sector, the judgments given corresponded to their own experiences and, therefore, these may vary greatly from one case to another. Thus, given the heterogeneity of the participants and their perceptions, the geometric mean was used to smooth the judgments and group the results into a single set of proportions, as shown in Equation (6).

$$a_{ij}^{Global} = \prod_{k=1}^m (a_{ij}^k)^{a_k} \quad (6)$$

7. Application of the EDAS method

Once the proportions of importance of the set of experts against the proposed categories and variables were obtained, the last phase of the proposed IMS methodology focused on identifying international markets whose characteristics could satisfy the priorities of exporters in the paper sector. To fulfill this purpose, the Evaluation Based on Distance from Average Solution (EDAS) method was employed, which is a method recently developed by Ghorabae et al. (2015) that allows identifying the most convenient alternatives in problems where there are multiple conflicting criteria and options. Thus, this method is based on the prioritization of alternatives based on their distance from the mean solution, taking as a reference the positive distance from the average (PDA) and the negative distance from the average (NDA) of each alternative (in this case of each country) to identify that alternative that presents the highest degree of PDA and, simultaneously, the lowest degree of NDA. In this way, the steps followed for the application of the EDAS method are described below:

The first step of the EDAS method corresponded to the creation of a matrix (see Equation 7) made up of the specific characteristics of each of the 18 international paper-buying markets previously established in Table 1 to enable comparisons between them.

$$X = [x_{ij}] \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nn} \end{bmatrix} \quad (7)$$

Then, in the second step, the average value (AV_j) that the countries obtained in each of the variables was determined, as shown in Equation (8).

$$AV_j = \frac{\sum_{i=1}^n x_{ij}}{n} \quad (8)$$

As a third step, the PDA of each country was calculated with respect to the average value obtained in each of the variables, depending on whether the criterion was beneficial or non-beneficial, as detailed in Equations (9) and (10).

If j th criterion is beneficial,

$$PDA_{ij} = \frac{\max(0, (x_{ij} - AV_j))}{AV_j} \quad (9)$$

If j th criterion is non-beneficial,

$$PDA_{ij} = \frac{\max(0, (AV_j - x_{ij}))}{AV_j} \quad (10)$$

Similarly, in the fourth step, the NDA was calculated taking as a reference the average value obtained in each of the variables and depending on whether this criterion was beneficial or not beneficial for the IMS, as shown in Equations (11) and (12).

If j th criterion is beneficial,

$$NDA_{ij} = \frac{\max(0, (AV_j - x_{ij}))}{AV_j} \quad (11)$$

If j th criterion is non-beneficial,

$$NDA_{ij} = \frac{\max(0, (X_{ij} - AV_j))}{AV_j} \quad (12)$$

Then, in the fifth step, the values corresponding to each country are weighted according to the proportions of importance previously established by the AHP model and the results were summed in both the PDA and the NDA, as shown in Equations (13) and (14).

$$SP_i = \sum_{j=1}^m w_j PDA_{ij} \quad (13)$$

$$SN_i = \sum_{j=1}^m w_j NDA_{ij} \quad (14)$$

Subsequently, in the sixth step, the summations of the positive (SP) and negative (SN) distances were normalized, as shown in Equations (15) and (16).

$$NSP_i = \frac{SP_i}{\max_i(SP_i)} \quad (15)$$

$$NSN_i = 1 - \frac{SN_i}{\max_i(SN_i)} \quad (16)$$

Finally, in the seventh step of the EDAS method, from the values of both the normalized positive summation (NSP) and the normalized negative summation (NSN), the final rating score (AS_i) is obtained for each of the countries, as shown in Equation (17).

$$AS_i = \frac{1}{2} (NSP_i + NSN_i) \quad (17)$$

8. Results and discussion

The judgments obtained from the directors and managers of the 15 firms processed using the AHP model, resulted in obtaining the proportions of importance of each factor during the IMS process decision making in the paper and paperboard sector, as shown in Table 5. Thus, the overall results indicated that logistics (0.3917) and costs (0.3904) were the general categories with the highest priority for entrepreneurs, followed by trade barriers (0.1164), economics (0.0674) and cultural environment (0.0341). It is also worth mentioning that the values obtained showed levels of consistency within the limits established by Saaty (1988), all being less than 0.100. Based on the businessmen's judgments, the fundamental role played by logistics and costs in decision-making in the paper sector is identified. Thus, these results coincide with national and international studies that affirm the positive influence generated by the availability of logistics resources during export operations or, for this case, during the prospecting of a new international market (Escandón-Barbosa et al., 2016). Likewise, logistics is perceived as a general dimension that encompasses different determining factors for the competitiveness of companies such as the costs associated with the dispatch of products, the reduction of delivery times and the management of cargo through external agents, being then a key aspect within the evaluation of alternatives abroad (Banomyong et al., 2011; Escandón-Barbosa, 2015; Schu & Morschett, 2017). Similarly, the cost dimension has traditionally been considered as a highly relevant factor during IMS, given that through cost reduction competitive advantages can be obtained over local products in the destination market, leading entrepreneurs to prioritize those markets that represent clear advantages in product price, tariff costs and intermediary costs (Bernard et al., 2011; He et al., 2016; Rahman, 2003).

To complement these results, through the general and specific weights, it was possible to obtain the global weights for each of the 23 specific factors proposed. Thus, the results were clear in determining the COCB factor (0.1974) as the global factor with the highest priority for businessmen during the IMS, followed by TRTI (0.1392), FREC (0.1174), INTC (0.0971) and LOPI (0.0931). Based

Table 5. General and specific weights of the IMS criteria

| General criteria | General weight | Ranking | Consistency ratio | Subfactor | Subfactor weight | Local ranking | Global weight | Global ranking |
|----------------------|----------------|---------|-------------------|-----------|------------------|---------------|---------------|----------------|
| Costs | 0,3904 | 2 | 0,089 | MRPK | 0,0637 | 4 | 0,0249 | 11 |
| | | | | INTC | 0,2487 | 2 | 0,0971 | 4 |
| | | | | COCB | 0,5056 | 1 | 0,1974 | 1 |
| | | | | OFER | 0,1237 | 3 | 0,0483 | 7 |
| | | | | INTR | 0,0584 | 5 | 0,0228 | 12 |
| Trade barriers | 0,1164 | 3 | 0,060 | TABS | 0,1807 | 3 | 0,0210 | 13 |
| | | | | PRIG | 0,2208 | 2 | 0,0257 | 9 |
| | | | | INOF | 0,0555 | 5 | 0,0065 | 20 |
| | | | | NTBS | 0,0682 | 4 | 0,0079 | 19 |
| | | | | INCO | 0,4749 | 1 | 0,0553 | 6 |
| Logistics | 0,3917 | 1 | 0,020 | LOPI | 0,2378 | 3 | 0,0931 | 5 |
| | | | | TRTI | 0,3554 | 1 | 0,1392 | 2 |
| | | | | FREC | 0,2996 | 2 | 0,1174 | 3 |
| | | | | GEDJ | 0,0636 | 4 | 0,0249 | 10 |
| | | | | GELO | 0,0436 | 5 | 0,0171 | 14 |
| Cultural environment | 0,0341 | 5 | 0,007 | EADB | 0,4778 | 1 | 0,0163 | 16 |
| | | | | COPI | 0,1134 | 3 | 0,0039 | 22 |
| | | | | CUDI | 0,0888 | 4 | 0,0030 | 23 |
| | | | | GLBI | 0,3199 | 2 | 0,0109 | 17 |
| Economics | 0,0674 | 4 | 0,080 | PIBP | 0,0945 | 4 | 0,0064 | 21 |
| | | | | UNRA | 0,1430 | 3 | 0,0096 | 18 |
| | | | | COLI | 0,2419 | 2 | 0,0163 | 15 |
| | | | | RCRI | 0,5206 | 1 | 0,0351 | 8 |

Source: Own elaboration.

on these priorities, it can be seen how customs costs and procedures are perceived as a determining criterion for the export operations of Colombian manufacturers. There, both academic studies (Escandón-Barbosa, 2015) and the official performance reports themselves (National Planning Department-DNP, 2018), conclude that the customs clearance process is one of the activities that presents the greatest delays and difficulties for Colombian companies during export, translating into a significant increase in operating costs. In addition to this, customs difficulties not only affect the moment of clearing the cargo from the port of origin, but, on the contrary, the process is replicated at the port of destination in a much more rigorous manner depending on the type of product and its formalities vary from one country to another (Jouili, 2019; Liang et al., 2021; Malau et al., 2022). Thus, these global results reflect the fact that paper exporters are dependent on selecting markets that are located a short distance away and that represent attractive options in terms of customs and transport costs, which shows the low elasticity of paper products to price variations, as has already been seen in recent studies (Malau et al., 2022). Likewise, it can be seen in the results how this behavior focused on the prioritization of costs and logistics shifts the variables related to the economy and the cultural environment to the background during IMS decision-making, as has already occurred in previous studies in developing sectors such as chemicals and frozen meat (Baena-Rojas et al., 2021; Cano et al., 2017). Also, the cultural environment may be perceived as little incident when it comes to close international expansion; however, if looking to explore more distant or culturally different markets, the aspect of culturally would be expected to take on greater value for entrepreneurs during IMS.

After obtaining the sector's priorities, the results were focused on the evaluation of the 18 potential international markets, previously listed, to determine, using the EDAS model, those buyers that best meet the specific needs of the companies. Thus, the results of the positive distances shown in Figure 4 highlight that, within the priority dimensions for the entrepreneurs (logistics and costs), there were notable differences mainly in the MRPK, COCB and INTR criteria in the cost dimension and in TRTI, GEDI and GELO in the logistics dimension, with China, the United Kingdom, the United States, Belgium and the Netherlands being the countries that presented the most positive variations in these dimensions. Similarly, the results of the EDAS model measured the negative distances from the mean of the attributes of each market, as shown in Figure 5. Thus, the results showed latent negative distances between markets mainly in the COCB and OFER criteria in the cost dimension and TABS and PRIG in the trade barriers dimension, with Norway, Australia, Czech Republic, United States and China being the countries with the highest negative distances from the mean. These results identify these markets as the reciprocal (negative) side in

Figure 4. Positive distances from the average (PDA) of international markets.

Source: Own elaboration.

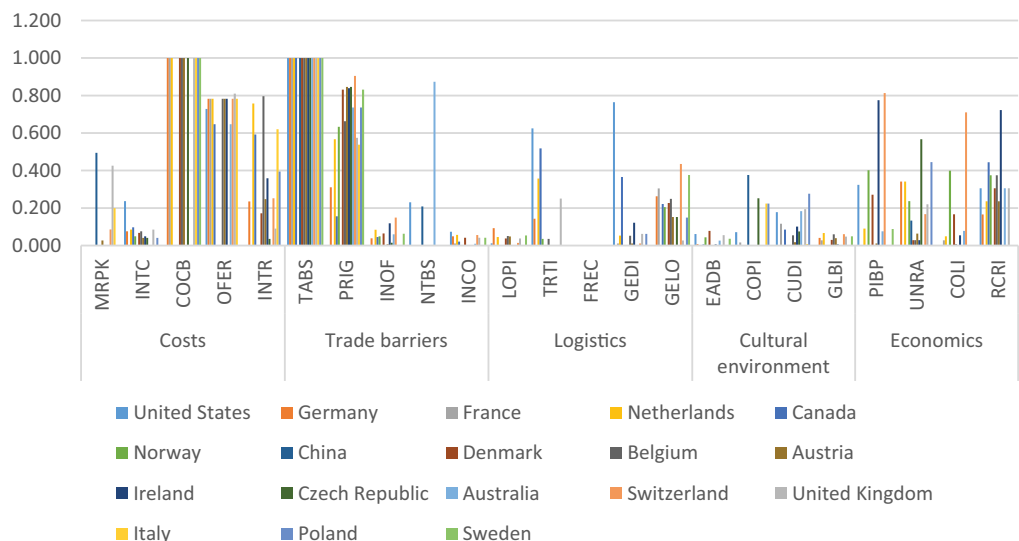
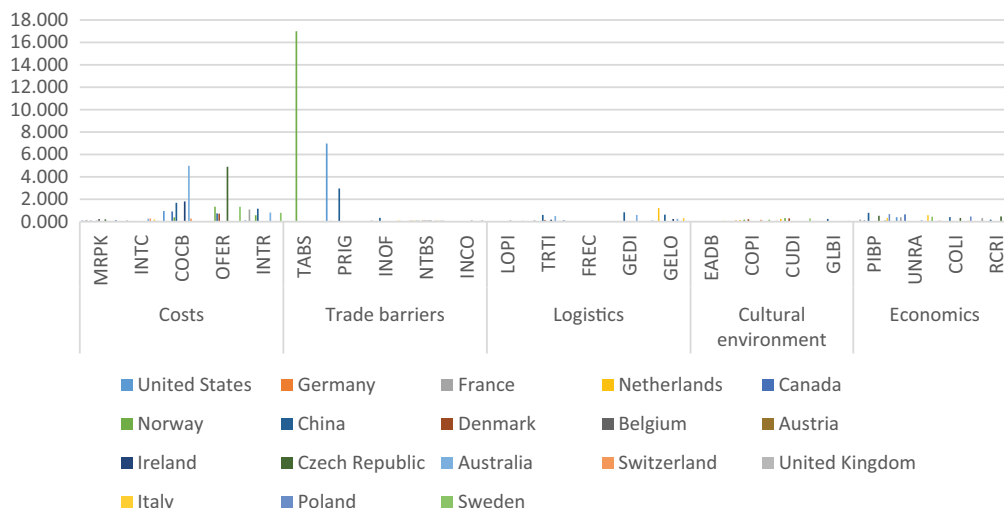


Figure 5. Negative distances from the average of the international markets evaluated.

Source: Own elaboration.



the evaluation of the EDAS method, even though several of them are among the main buyers of the sector at a global level. Specifically, we can highlight the case of Norway as the only country under analysis with tariffs on exports of paper and paperboard products to Colombia, Australia with higher transportation costs and customs processes or the United States and China with high levels of protectionism in general (Global Trade Alert, 2022; World Bank, 2021; World Trade Organization-WTO, 2022).

Finally, the results focused on the identification of markets for the export of Colombian paper and paperboard products. Thus, the EDAS model calculated that the international markets with characteristics more in line with business priorities (costs and logistics) are the Netherlands (0.9894), United Kingdom (0.9740), Belgium (0.9409), Germany (0.9351) and Austria (0.9081), as shown in Table 6 and Figure 6. In addition, it is key to highlight that the top 10 markets in the ranking were purely European countries, demonstrating the attractiveness of this region for the search of commercial opportunities in the paper products industry (Aytaç & Korkmaz, 2022). Similarly, the favorability of these European countries is reflected in the global foreign trade statistics with Germany (7.66%), the United Kingdom (3.83%) and the Netherlands (3.26%) as part of the main importers of paper in the region and the world (UNComtrade, 2020). From the methodological aspect, it is valid to mention that, beyond the fulfillment of attributes related to costs and logistics, the consistency of the trade profiles presented by these markets was a decisive aspect for their selection by the EDAS model, understanding that the functioning of is focused on measuring the average distances of the best and worst ratings in each category (Ghorabae et al., 2015). In contrast, the results also indicated that the markets with lower affinity to the mentioned sector were Australia (0.1253), China (0.2758), Norway (0.3440), Ireland (0.4975) and Switzerland (0.6096), which, had presented profiles with higher negative distance variations, as mentioned above. This shows that, although the best scores were for European countries, the characteristics between one market and another can vary significantly despite their geographic proximity, as countries such as Norway, Ireland and Switzerland obtained very low final scores compared to their more viable neighboring countries, which also confirms the need for IMS tools even in commercially attractive regions.

Another key aspect that stands out is the low score obtained by the United States (0.6123) in the total ranking, indicating that, although it is one of the largest buyers of paper in the world, it is a destination that is not so in tune with the priorities and specific needs of the sector's entrepreneurs in Colombia. This also shows that, considering that the main markets for the Colombian paper sector are Ecuador, the United States, Mexico, Peru, and Chile (DIAN, 2021), exports of paper products are not oriented towards international markets that are more compatible with the priorities expressed by entrepreneurs. Given this, it can be highlighted that the exporting behavior

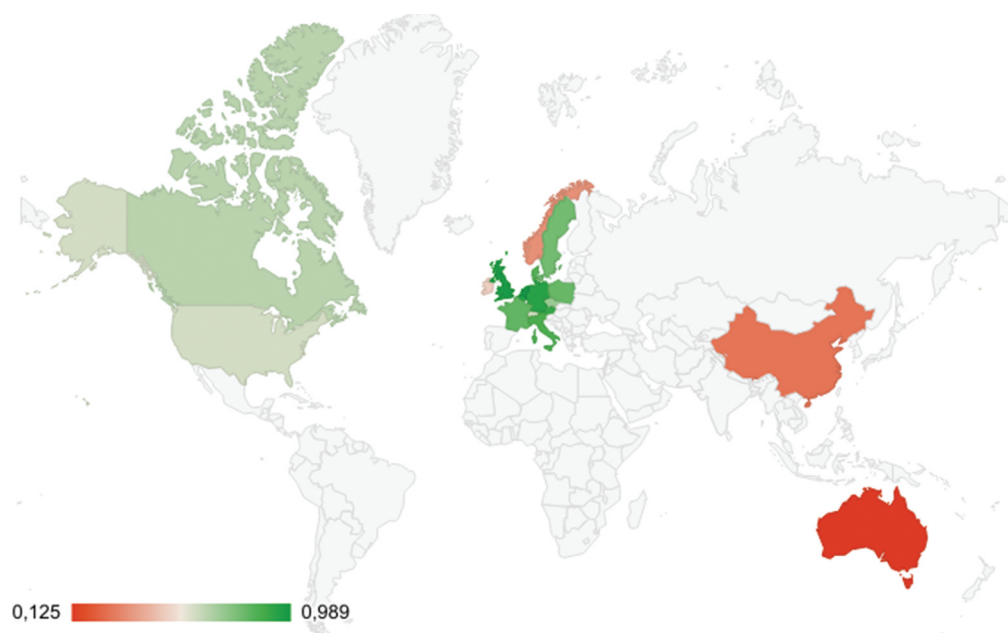
Table 6. Ranking of paper and paperboard market viability

| Countries | SPi | SNi | NSPi | NSNi | Asi | Rank |
|----------------|--------|--------|--------|--------|--------|------|
| United States | 0,2068 | 0,3774 | 0,5606 | 0,6641 | 0,6123 | 13 |
| Germany | 0,3226 | 0,0047 | 0,8744 | 0,9958 | 0,9351 | 4 |
| France | 0,2635 | 0,0775 | 0,7142 | 0,9310 | 0,8226 | 8 |
| Netherlands | 0,3689 | 0,0237 | 1,0000 | 0,9789 | 0,9894 | 1 |
| Canada | 0,1816 | 0,1932 | 0,4922 | 0,8281 | 0,6601 | 12 |
| Norway | 0,0552 | 0,5183 | 0,1495 | 0,5386 | 0,3440 | 16 |
| China | 0,0377 | 0,6186 | 0,1022 | 0,4493 | 0,2758 | 17 |
| Denmark | 0,2773 | 0,0568 | 0,7517 | 0,9495 | 0,8506 | 7 |
| Belgium | 0,3283 | 0,0093 | 0,8900 | 0,9918 | 0,9409 | 3 |
| Austria | 0,3050 | 0,0120 | 0,8268 | 0,9893 | 0,9081 | 5 |
| Ireland | 0,1290 | 0,3984 | 0,3497 | 0,6453 | 0,4975 | 15 |
| Czech Republic | 0,2542 | 0,2872 | 0,6892 | 0,7443 | 0,7167 | 11 |
| Australia | 0,0924 | 1,1234 | 0,2506 | 0,0000 | 0,1253 | 18 |
| Switzerland | 0,1220 | 0,1253 | 0,3308 | 0,8884 | 0,6096 | 14 |
| United Kingdom | 0,3506 | 0,0025 | 0,9503 | 0,9977 | 0,9740 | 2 |
| Italy | 0,2900 | 0,0629 | 0,7861 | 0,9440 | 0,8651 | 6 |
| Poland | 0,2603 | 0,0892 | 0,7057 | 0,9206 | 0,8131 | 9 |
| Sweden | 0,2556 | 0,1204 | 0,6928 | 0,8928 | 0,7928 | 10 |

Source: Own elaboration.

Figure 6. Map of optimal international markets for paper exports.

Source: Own elaboration.



of the entrepreneurs under analysis resembles the internationalization models by cultural and geographic proximity that are used to generate greater security in the decisions of managers and reduce uncertainty in the IMS process, as has already been seen in different cases such as Alexander et al. (2007), Malhotra et al. (2009) and Clark et al. (2018). This may be influenced by the short export trajectory of the paper and board sector, leading entrepreneurs to want to venture

first into the closest markets with more similarities. On the other hand, it is also valid to recognize that the IMS process can be influenced towards nearby destinations when they represent greater alignment with the strategic objectives of the companies, such as the presence of distributors in only certain regions, greater ease for the creation of collaborative networks or marketing of goods at better prices (DiMaria & Ganau, 2017; Handoyo et al., 2023; He et al., 2016; Magnani et al., 2018).

9. Conclusions

Global dynamics, the competitive business context, and the benefits of reaching new markets have made internationalization a recurrent objective within companies. Based on this, research on IMS processes has been developed from multiple perspectives; however, there is still a need to explore new approaches and empirical applications (Deaza et al., 2020; Papadopoulos et al., 2011). Thus, this research set out to develop a novel systematic IMS methodology that identifies the international destinations with greater favorability for the paper and paperboard export industry in Colombia, understanding that this sector has had a dynamic growth in recent years (ANDI, 2018; Departamento Administrativo Nacional de Estadísticas-DANE, 2020). To this end, the methodology focused on the perceptions of the exporting entrepreneurs of this sector and was consolidated from the application of the AHP-EDAS hybrid multicriteria model in order to determine the aspects that entrepreneurs of the paper sector considered fundamental during the IMS and to identify those international markets that presented greater affinity to such preferences.

The results obtained highlighted clear preferences on the part of the entrepreneurs regarding the variables related to logistics (0.3917) and costs (0.3904), showing that the choice of international markets in this sector is influenced to moving between markets that are within a short distance and represent a low cost to reach them, a behavior that is similar, on the one hand, to decision-making based on the analysis of transaction costs as proposed by He et al. (2016) and, on the other hand, with IMS based on physical and cultural distance, as already seen in different cases such as Alexander et al. (2007), Malhotra et al. (2009) and Clark et al. (2018). This allows identifying inelasticity or susceptibility of the sector to unforeseen variations in prices and costs, as has already been seen in other cases such as paper exports in Indonesia (Malau et al., 2022). In particular, the strong preference for COCB, TRTI, FREC and INTC stood out, allowing the timely identification of which factors are of critical importance for the export development of this sector in Colombia. Regarding the results of the most viable markets, this study identified the Netherlands (0.9894), United Kingdom (0.9740), Belgium (0.9409), Germany (0.9351) and Austria (0.9081) as the importers of paper products with the characteristics most in line with the specific priorities of the national producers, being a clear sample of the commercial opportunities in the European region and a call to Colombian businessmen to diversify their export destinations considering the high levels of compatibility that they presented with these markets. Likewise, with the identification of these alternative markets it can be observed that the most importing countries do not necessarily have to be the most convenient, understanding that the United States obtained compatibility scores well below what was expected.

In general terms, it can be seen how this study directly contributes to the development of IMS research and impacts several of the gaps previously mentioned by Malhotra and Papadopoulos (2007), Papadopoulos et al. (2011) and Deaza et al. (2020), given that it proposes an IMS methodology based on a robust factor structure and a hybrid multicriteria model without precedent in this type of application. Similarly, this study contributes to the understanding of the priorities of exporting entrepreneurs in the Latin American region, given that most IMS studies have been done mainly in developed countries such as the United States, the United Kingdom and Australia. It is also worth mentioning that this study acts as the first reference for the use of the AHP-EDAS model in cases of export market selection. It is also expected that this integral methodology can serve as a reference model for future studies due to the broad dimensions it considers and the multiple factors it evaluates.

Regarding the practical implications, this methodological proposal contributes to the improvement of the decision-making process of entrepreneurs in the paper and cardboard sector to stimulate their export growth and improve their performance when choosing a foreign market. Likewise, this methodological tool can be fully extrapolated to different sectors, guilds and companies seeking support during the IMS process. Also, by respecting market characteristics, cost reduction measures and thorough risk assessment, this methodology proves invaluable in mitigating the myriad risks that often accompany forays into international markets. This strategic approach enables a more prudent and secure path for companies looking to expand their global presence. Additionally, by applying this approach, companies can gain a competitive advantage by methodically evaluating factors such as business prospects, pre-existing affiliations, and market attractiveness. This process makes it easier to identify the markets with the highest potential for success. Thus, Holsapple and Jones (2004) assume that knowledge is a central element that gives a company a competitive advantage. This reinforces the idea that systematic assessment of factors such as business opportunities and market attractiveness can pave the way for competitive advantage. Finally, with the contributions of this research, it is expected to contribute to the exploration of new attractive market niches in Europe for national paper producers and that this will stimulate the growth of the sector. However, it is hoped that the exploration of more distant and demanding markets will go hand in hand with processes of adaptation, innovation and diversification of national products that will allow them to be truly competitive in the face of the demands of these new destinations.

Finally, when examining the limitations of our academic study on international market selection for paperboard firms in Colombia, several noteworthy aspects merit consideration. First, our research was limited by the small sample size of exporting firms that participated in the study. The limited number of respondents may not fully represent the diverse range of experiences and perspectives within the paperboard industry in Colombia, potentially affecting the generalizability of our findings. Second, the subjective nature of AHP judgments is an inherent limitation. AHP relies heavily on the qualitative assessments and subjective judgments of experts, which can introduce bias and variability into the scoring process. These subjectivities could influence the prioritization of criteria and sub-criteria, leading to potential inconsistencies in the final market selection recommendations. Thirdly, our study was limited by the exclusion of certain qualitative factors from the analysis. Qualitative aspects such as cultural nuances, political stability, and social factors, which are integral components of international market selection, were not fully integrated into our methodological framework. This exclusion may have oversimplified the market evaluation process, potentially neglecting important dimensions critical to effective market selection strategies. Acknowledging these limitations is imperative, as it highlights the need for future research efforts to comprehensively address these challenges and ensure a more robust and nuanced approach to international market selection in the context of Colombian exporting activities.

It is recommended that future research could improve the present methodology by making use of a greater structure of factors and sub-factors that would allow the evaluation of more aspects and have greater coverage of the priorities of the entrepreneurs. Likewise, methodologies can be developed using only the factors considered especially important for each company so that this methodology can be applied in a personalized manner according to the needs of each organization. Also, contemporary researchers are encouraged to embrace these patterns, exploring novel methodologies that integrate both quantitative and qualitative dimensions, thereby enriching the understanding and practice of international market selection in an increasingly complex global landscape.

On the other hand, it is recommended that future studies explore and compare the priorities identified in the paper industry with those of other representative industries, in order to better understand the export behaviour of Colombian industries. It is also hoped that other studies can apply and compare other multi-criteria analysis models to better understand how these tools work for decision making in international business contexts.

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