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# MULTI-CRITERIA DECISION AIDING FOR MARKET AND ENTRY MODE SELECTION IN THE PROCESS OF FOREIGN EXPANSION

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**Purpose:** The paper aims to explore and simulate the complex decision-making process related to the selection of a foreign market and the appropriate mode of entry in the context of international expansion. It addresses the challenges companies face when expanding abroad, emphasizing the need for structured decision support in selecting a foreign market and an appropriate entry mode, especially in the high-tech sector.
**Design/methodology/approach**: The research employs multi-criteria decision aiding (MCDA) methods (EVAMIX, TOPSIS, and PROMETHEE II) to evaluate potential foreign markets and entry modes. The methodology integrates both internal firm-specific factors and external market conditions. The approach is demonstrated through a case study of IDENTT – a Polish-Swiss technology company specializing in biometric identity verification. Several potential markets (e.g., Kazakhstan, Thailand, Brazil, the UK, and Saudi Arabia) and entry strategies (e.g., via agent, direct export, or establishing a branch) were assessed based on a set of qualitative and quantitative criteria.
**Findings:** The results indicate that the application of MCDA methods provides a comprehensive and rational framework for supporting strategic internationalization decisions. The case study confirms that such an approach enables decision-makers to consider numerous, often conflicting, criteria in a structured and transparent way, leading to more justifiable and objective conclusions.
**Research limitations/implications**: The research is based on a simulation model and a single case study, which may limit its generalizability. Future studies should apply the proposed MCDA framework to a broader range of industries and internationalization contexts to verify its robustness and adaptability. Further refinement of criteria weighting and scenario analysis could enhance decision accuracy.
**Practical implications:** The paper provides practical guidance for enterprises, especially SMEs and technology startups, on how to navigate foreign expansion decisions systematically. By applying MCDA methods, managers can better align strategic choices with company capabilities and external opportunities, reducing uncertainty and enhancing the probability of successful market entry.

**Social implications:** The research supports the development of innovative, data-informed approaches to internationalization, contributing to more resilient and globally connected enterprises. This could indirectly influence employment, technology transfer, and international cooperation, particularly in the startup and digital identity verification sectors.
**Originality/value:** This paper contributes to the literature by integrating multi-criteria decision aiding into the international market and entry mode selection process – an area traditionally dominated by heuristic or qualitative methods. It offers a structured, replicable approach tailored to high-tech startups and is particularly relevant in the context of increasingly complex and uncertain global business environments.
**Keywords:** international market selection, entry mode choice, multi-criteria decision aiding (MCDA), international expansion, technology startups.
**Category of the paper:** research paper; case study.

## 1. Introduction

Foreign market entry (FME) is a strategic and complex decision that has a significant and lasting impact on the success of a firm's operations, both domestically and internationally (Anderson, Gatignon, 1986; Anderson, Coughlan, 1987; Kogut, Singh, 1988; Hill, Hwang, Kim, 1990; Agarwal, Ramaswami, 1992). As it has been a central research topic in international business, it has attracted significant scholarly attention (Brouthers, 2007; Delios, Henisz, 2003; Hitt, Hoskisson, Kim, 1997; Hoskisson, Wright, Filatotchev, Peng, 2013; Madhok, 1997; Meyer, Estrin, Bhaumik, Peng, 2009; Surdu, Mellahi, 2016).

The large number and diversity of foreign markets, different natures of entry modes, in combination with the firm's resources and capabilities as well as its limitations and goals, make the internalization process challenging and multifaceted. It poses several interrelated questions that a company must answer before taking the first step abroad. Among the questions, the company must make a decision regarding the choice of product, market, or entry mode it wants to explore the market. These represent some of the most critical strategic choices a firm must make, requiring careful consideration of numerous factors that influence the success of internationalization. These factors arise from both external conditions – primarily the environment of the foreign market (though partially also the domestic market) – and internal characteristics of the company itself, including its resources, competencies, and the nature of its products and services. A company's main challenge is the appropriate selection of the target country and the optimal entry strategy, considering a broad range of factors influencing this decision. As the international market becomes increasingly complex and uncertain, quantitative decision support methods, particularly multi-criteria decision analysis (MCDA), are gaining prominence. Techniques such as AHP, TOPSIS and PROMETHEE provide a systematic framework for selecting attractive markets and determining optimal entry strategies, while accounting for a wide range of external and internal factors such as economic, cultural, political or firm and product factors (Christian, Zhang, Salifou, 2016; López-Cadavid, Vanegas-López,

Restrepo-Morales, Roldán-Sepúlveda, 2023; Vanegas-López, Baena-Rojas, López-Cadavid, Mathew, 2020; Baena-Rojas, López-Cadavid, Mackenzie-Torres, Muñoz-Parra, 2022; Baena-Rojas, Vanegas-López, López-Cadavid, 2021; Oey, Noviyanti, Lim, 2018; Mendoza-Tello, Córdoba, 2016; Górecka, Szałucka, 2013, 2014, 2016).

The objective of this article is to develop a comprehensive model for target market selection and entry strategy formulation through the application of multi-criteria decision-aiding (MCDA) methods. The present study introduces a novel methodological framework designed to assist firms in systematically identifying the most suitable foreign markets and corresponding modes of entry during international expansion. The following methodological research questions will be explored by this:

*MRQ1: How should markets and entry modes be assessed in the process of international expansion, applying multi-criteria decision-aiding methods?*

*MRQ2: Do different outcomes in terms of a firm's internationalization strategy result from conceptualizing market selection and entry mode choice as a unified strategic decision rather than as two distinct and sequential steps?*

The analysis is conducted from the perspective of a dynamic and rapidly expanding Polish-Swiss technology startup specializing in biometric user authentication and identity document verification. By comparing the final results associated with specific target markets and entry modes, the study aims to generate insights that address the following discovery-oriented research question:

DRQ1: Which combinations of foreign markets and entry strategies are the most favorable and which are the least favorable for the focal company within the context of its internationalization efforts?

The structure of the article is as follows. Section 2 provides a review of the theoretical foundations related to target market selection and entry mode decisions. Section 3 outlines the methodological framework employed in the research. Section 4 presents the case study used to illustrate the application of the proposed approach. Section 5 discusses the results obtained from the analysis. Finally, Section 6 offers a summary of the key findings and outlines the main conclusions.

## 2. A theoretical framework

The internationalization of a company’s operations is a fundamental process in the dynamically evolving landscape of the global economy. It relates to the international activities of the company and includes, among other things, the selection of a product or service for internationalization, the choice of a foreign market, the entry mode, the timing of entry, and the internationalization objectives to be achieved. These facets are closely interrelated, mutually

influencing one another, and collectively form part of the broader concept of foreign market entry (FME).

The academic literature presents a range of approaches to the FME strategy, commonly conceptualized as an international strategy, reflecting differing degrees of strategic rigor and managerial intentionality (Root, 1994; Johanson, Vahlne, 1977; Koch, 2001). It is widely viewed in the literature as a staged decision-making process reflecting the logical progression inherent in strategic planning. Root (1994) outlines a five-stage model comprising: (1) the selection of a target product/market, (2) the establishment of objectives and goals in the target country, (3) the choice of entry mode, (4) the development of a marketing plan, and (5) the design of a control system. Although the elements follow a logical sequence, Root's model acknowledges the presence of feedback loops, rendering the strategy a dynamic and iterative process, particularly in the short term. Kotler (2005) similarly presents a five-step framework but with slightly different components: (1) the decision to expand internationally, (2) market selection, (3) entry mode selection, (4) marketing plan development, and (5) the establishment of a marketing organization. Stonehouse et al. (2001) propose a four-stage model consisting of: (1) the decision to enter international markets, (2) the overview of the international environment in search of opportunities and threats, (3) the market selection, and (4) the entry mode selection. Across these frameworks, it is evident that each strategic decision - whether concerning market choice, entry mode, or marketing implementation - is critical to the success of international expansion. Collectively, these models underscore the complexity of the foreign market entry process and highlight the breadth of decisions firms must navigate when entering international markets. However, regardless of the number of stages identified in the process, the selection of foreign markets and entry modes remains central to any international strategy (Koch, 2001; Goodnow, Hansz, 1972; Kobrin, 1976; Root, 1994; Sarkar, Cavusgil, 1996; Simpson, Kujawa, 1974; Wind et al., 1973; Wind, Perlmutter, 1977).

Traditionally, these two decisions have been treated as distinct but sequential processes - first selecting the target market, followed by the choice of an appropriate entry mode. Some of the scholars challenge this conceptual division by proposing an integrated approach, encapsulated in the market and entry mode selection (MEMS) model, which views both decisions as interdependent and inseparable elements of a single strategic decision-making process (Koch, 2001). Regardless of whether these two decisions (market selection and entry mode choice) are viewed as linear and sequential or as an integrated process, an international strategy decision-making process is a rational and stepwise progression, with defined inputs and expected outcomes at each stage and consequently is influenced by a complex interplay of external (market-specific) and internal (firm-specific) factors which should be consider while making decision (Root, 1994; Koch, 2001; Francioni, Martín Martín, 2024). Together, these factors define how companies perceive opportunities and threats in foreign markets and determine the feasibility and attractiveness of different market-entry combinations.

Given the complexity and strategic importance of the international market and entry mode selection, the decision-making process is particularly challenging for managers. The literature identifies two main decision-making approaches employed by decision-makers in this context: the orthodox approach and the cognitive approach (Deza et al., 2020; Aghdaie, Alimardani, 2015). While these approaches were initially developed in the context of market selection, they can also be applied to entry mode choice, as both decisions involve comparable levels of strategic complexity, uncertainty, and the need for judgment. The orthodox approach is rooted in rational analysis and relies heavily on quantitative methods, such as mathematical models, statistical tools, and country-level indices. It emphasizes objective evaluation of alternatives based on measurable criteria, enabling structured comparisons of market and entry mode options. In contrast, the cognitive approach is shaped by the individual experience, intuition, and subjective judgment of decision-makers. It draws on informal knowledge sources, such as personal networks, familiarity with specific markets, and contextual understanding of entry strategies. This path acknowledges that, in practice, decision-making is often influenced by cognitive biases and the selective interpretation of available information (Deza et al., 2020).

Meanwhile, Papadopoulos and Martín Martín (2011) as well as Francioni and Martín Martín (2024) distinguish between systematic and non-systematic behaviors in the international market selection (IMS) process, which complement the previously described orthodox and cognitive approaches. Systematic IMS behavior is characterized by a deliberate search for and analysis of information, following a structured set of rules, procedures, and evaluation criteria (Papadopoulos, Martín Martín, 2011). This approach aligns closely with the orthodox perspective, emphasizing rational planning and formal decision-making tools. Conversely, non-systematic behavior implies that no formalized methods or structured procedures are applied at any stage of the decision-making process. Instead, decisions may be based on intuition, ad hoc judgments, or opportunistic considerations, reflecting the principles of the cognitive approach.

As mentioned above, the international market selection and market entry choice are viewed as distinct but sequential processes. International market selection (IMS) is considered the process by which companies determine the most suitable foreign markets for expansion. However, there is no established definition of IMS (Francioni, Martín Martín, 2024). This strategic decision involves the systematic evaluation of potential markets based on factors such as market potential, competitive environment, entry barriers, and alignment with the company's overall objectives. It is situated within the broader, interdependent framework of foreign market entry decisions (Markman et al., 2019).

Various models have been developed to guide the international market selection process, typically distinguishing between screening and identification or preliminary screening and in-depth screening (Cavusgil, 1985; Kumar, Stam, Joachimsthaler, 1994; Root, 1994; Koch, 2001). Screening or preliminary screening involves the initial evaluation of countries based on general indicators such as economic development, political stability, population size, legal

environment, and trade openness. This phase aims to eliminate unsuitable markets and narrow down the list of potential countries. Once a shortlist is established, identification or in-depth screening focuses on more specific, firm-related factors such as industry structure, customer preferences, competitive intensity, distribution channels, and potential partners. Scholars such as Cavusgil (1985), Root (1994), and Koch (2001) emphasize a systematic, criteria-based approach, often using scoring models or decision matrices to compare markets. The literature also highlights the importance of aligning market selection criteria with firm-specific strategic goals, risk tolerance, and resource availability, recognizing that both quantitative and qualitative judgments play a role in the final decision.

After or simultaneously with choosing the foreign market, the company must also select an entry mode – "an institutional arrangement that makes possible the entry of a company's products, technology, human skills, management, or other resources into a foreign market" (Root, 1994). Entry modes define the governance structure of foreign operations and are thus directly linked with transaction cost considerations, resource commitments, strategic goals, and institutional pressures.

When entering a foreign market, a firm can choose from a variety of entry modes to structure and manage its business operations abroad. These entry modes are typically classified into three broad categories: export modes, contractual modes, and investment modes (Root, 1994). Entry modes vary significantly across multiple dimensions. Among the commonly discussed attributes in the literature are the degree of control (Anderson, Gatignon, 1986; Root, 1994; Kotler, 1994), level of risk (Root, 1994; Kotler, 1994), and resource commitment (Hill, Hwang, Kim, 1990; Kotler, 1994). Additional characteristics include the level of management involvement, dissemination risk (Hill, Hwang, Kim, 1990), skill requirements (Gronhaug, Kvitastein, 1993), level of integration (Zorska, 2002), or profit potential (Kotler, 1994).

The degree of control, level of risk, and resource commitment are highly correlated. The alignment of control, commitment, and risk considerations is central to achieving a fit between the firm's strategic objectives and host market conditions (Meyer, Estrin, Bhaumik, Peng 2009). Modes that offer greater control, such as wholly owned subsidiaries, generally require a higher level of resource commitment (Anderson, Gatignon, 1986). This increase in resource commitment, in turn, is associated with greater risk (Hill, Hwang, Kim, 1990; Root, 1994).

Among the various entry modes, wholly owned subsidiaries require the highest resource investment and entail the greatest risk. However, they also offer the firm full control over operations and governance, minimize dissemination risk, and allow for the greatest potential returns (Hill, Hwang, Kim, 1990; Root, 1994; Brouthers, Brouthers, 2003; Brouthers, Hennart, 2007; Hennart, Slangen, 2015; Benito, Petersen, Welch, 2019).

In contrast, joint ventures involve shared ownership and management responsibilities with a local partner, typically resulting in lower levels of control and profit potential compared to wholly owned subsidiaries. Although this form reduces the firm's exposure to financial risk and

resource commitment, it increases the possibility of knowledge spillovers and dissemination risk (Anderson, Gatignon, 1986; Pan, Tse, 2000; Beamish, Lupton, 2009; Puck, Holtbrügge, Mohr, 2009). Wholly owned subsidiaries and joint ventures are both classified as investment-based entry modes.

Licensing and franchising represent non-equity contractual modes where the licensee undertakes the investment and operational risk. These modes require relatively low resource commitment from the licensor and limit financial exposure. However, the firm also gives up a significant degree of control and may face challenges in protecting proprietary assets, including know-how and brand integrity (Contractor, Kundu, 1998; Hill, Hwang, Kim, 1990; Li, Jiang, Tan, Zhou, 2010).

Exporting, particularly in its indirect form, is generally associated with the lowest levels of resource commitment, control, and risk. While it allows firms to test foreign markets with minimal investment, it also offers limited returns and weak control over marketing and distribution channels (Root, 1994; Casillas, Moreno-Menéndez, 2014; Paul, Rosado-Serrano, 2019).

Selecting the most appropriate entry mode for a target foreign market requires the company to take into account a wide range of factors. The diversity and complexity of the information involved can be overwhelming for decision-makers. The literature identifies numerous variables that researchers consider significant in shaping entry mode decisions (Hill, Hwang, Kim,1990; Brouthers, Hennart, 2007; Canabal, White, 2008).

Given the wide range of variables influencing entry mode choice, many scholars advocate for organizing them into structured sets to facilitate analysis and decision-making. Several frameworks have been proposed in the literature to categorize these variables in a systematic way (Root, 1994; Hill, Hwang, Kim, 1990; Gannon, 1993; Luo, 1999; Agarwal, Ramaswami, 1992; Malhotra, Agarwal, Ulgado, 2003). Root (1994) distinguishes between external and internal factors, identifying seven sets of variables: target country market factors, environmental factors, and production factors, as well as home country factors (all under external factors), alongside company product factors and company resource/commitment factors (as internal factors). Similarly, Hill, Hwang, and Kim (1990) propose a decision-making framework based on three broad categories: strategic variables, environmental variables, and transaction-specific variables. Gannon (1993) suggests four main groups: marketing strategy variables, organization-specific variables, target country variables, and industry-specific variables. Luo (1999) develops an integrated framework comprising country-specific, industry-specific, firm-specific, and project-specific variables. Agarwal and Ramaswami (1992) propose a contingency-based framework that groups the determinants of entry mode choice into four main categories: firm-specific factors (such as size, multinational experience, and resource availability), product-specific factors (including product differentiation and technological intensity), country-specific factors (such as market potential and political risk), and interaction effects between firm and country characteristics, which influence the perceived

attractiveness and feasibility of each entry mode. Likewise, Malhotra, Agarwal, and Ulgado (2003) suggest a multidimensional framework grounded in multiple theoretical perspectives. They identify five sets of variables that jointly shape entry mode decisions: firm-related factors (e.g., international experience, strategic intent), industry-specific factors (e.g., competitive intensity, globalization), host country institutional environment (e.g., regulatory quality, legal systems), cultural distance, and investment risk. This integrative model emphasizes the interplay of internal capabilities and external uncertainties in shaping the strategic choice of entry mode.

In this study, we adopt the framework proposed by Root (1994) as the most suitable for our analytical purposes. Accordingly, we group the variables into four main categories: target country environmental factors, target country industry factors, company-specific factors, and company product factors. While we acknowledge that home country factors may be critical in certain contexts, in our case, they do not appear to play a significant role in the entry mode decision.

Faced with the numerous factors that must be considered when selecting a target market and entry mode, multi-criteria decision-aiding (MCDA) has become an interesting tool in the FME strategy (see Table 1). These methods offer a systematic approach to solving decision problems that involve multiple, often conflicting, criteria. In the context of international strategy decision-making, the main advantages of MCDA include its ability to structure complex evaluation tasks, enabling well-justified decisions. MCDA methods allow for the use of both quantitative and qualitative criteria in the analysis process, providing a comprehensive assessment and transparency.

**Table 1.**
*MCDA Methods in Foreign Market Entry (FME) Strategy*

| Authors | Research objective | MCDA method | Business sector | Factors considered | Home country |
|---|---|---|---|---|---|
| Górecka, D., Szałucka, M. (2013) | International market selection (IMS) | EXPROM II with veto threshold, PROMETHEE II with veto threshold, modified ELECTRE III | Hygiene, cosmetic, and medical products | External factors | Poland |
| Marchi, G., Maria, S., Micelli, S. (2014) | International market selection (IMS) | Fuzzy Expert System (FES) | Stationery | External and internal factors | Italy |
| Mobin, M., Dehghanimohammadabadi, M., Salmon, C. (2014) | International market selection (IMS) | SAW, TOPSIS, VIKOR, and Shannon's Entropy Method for determining the relative importance of each criterion | Food | External factors | Iran |

Cont. table 1.

| | | | | | |
|---|---|---|---|---|---|
| Górecka, D., Szałucka, M. (2014) | Entry mode selection (EMS) | PROMETHEE II with SD rules and veto thresholds, and EXPROM II with SD rules and veto thresholds | Hygiene, cosmetic, and medical products | External and internal factors | Poland |
| Şener, H.Y. (2014) | International market selection (IMS) | AHP | Ceramic | External and internal factors | Turkey |
| Özekenci, E. K. (2024) | International market selection (IMS) | FUCOM, LOPCOW, SPOTIS, RSMVC, CoCoSo, Borda Count | Iron and steel | External factors | Turkey |
| Gokmenoglu, K., Alaghemand, S. (2015) | International market selection (IMS) | AHP, TOPSIS and MP-MADM | - | External factors | United States |
| Aghdaie, M.H., Alimardani, M. (2015) | International market selection (IMS) | AHP and TOPSIS | Furniture (chairs) | External and internal factors | Iran |
| Górecka, D., Szałucka, M. (2016) | Entry mode selection (EMS) | PROMETHEE II with SD rules and veto thresholds, EXPROM II with SD rules and veto thresholds, the MAMCA approach with PROMETHEE IIv and EXPROM IIv | Hygiene, cosmetic, and medical products | External and internal factors | Poland |
| Christian, A., Zhang, Y., Salifou, C. (2016) | Entry mode selection (EMS) | PROMETHEE-GAIA | Packaging (jute bags) | External and internal factors | Ivory Coast |
| Lee, K.W., Jung, W., Han, S.H. (2017) | International market selection (IMS) | Fuzzy LinPreRa-based AHP | Construction | External factors | South Korea |
| Cano, J.A., Campo, E.A., Baena, J.J. (2017) | International market selection (IMS) | DEA | Food | External factors | Colombia |
| Schühly, A., Tenzer, H. (2017) | International market selection (IMS) | AHP | Pharma and FMCG | External factors | Germany and Switzerland |
| Cano, J., Campo, E., Gómez-Montoya, R. (2017) | International market selection (IMS) | FUZZY, MONTE CARLO | Food | External factors | Colombia |
| Oey, E., Noviyanti, N.A., Sanny, L. (2018) | International market selection (IMS) | AHP-GP<br><br>AHP and GP3 | Metal | External factors | Indonesia |
| Cano, J.A., Baena Rojas, J.J., Campo, E.A. (2019) | International market selection (IMS) | AHP | Food | External factors | |
| Vanegas-López, J.G., Baena-Rojas, J.J., López-Cadavid, D.A., Mathew, M. (2021) | International market selection (IMS) | AHP-TOPSIS | Textile | External factors | Colombia |

Cont. table 1.

| | | | | | |
|---|---|---|---|---|---|
| Hashemkhani Zolfani, S., Ebadi Torkayesh, A., Ecer, F., Turskis, Z., Šaparauskas, J. (2021) | International market selection (IMS) | EDAS | Food | External and internal factors | Iran |
| Baena-Rojas, J.J., Vanegas-López, J.G., López-Cadavid, D.A. (2021) | International market selection (IMS) | AHP | Chemical | External factors | Colombia |
| Baena-Rojas, J.J., López-Cadavid, D.A., Mackenzie-Torres, T.M., Muñoz-Parra, C.L. (2022). | International market selection (IMS) | AHP | Confection | External factors | Colombia |
| Baena-Rojas, J., Mackenzie-Torres. T., Cuesta-Giraldo, G., Tabares, A. (2023) | International market selection (IMS) | SAW | Coffee | External factors | Colombia |
| López-Cadavid, D.A., Vanegas-López, J.G., Restrepo-Morales, J.A., Roldán-Sepúlveda, M. (2023) | International market selection (IMS) | AHP and Evaluation Based on Distance from Average Solution (EDAS) | Paper and paperboard | External factors | Colombia |

Source: own elaboration.

From the results of the literature review presented above, it appears that most previous studies in the field of foreign market entry (FME) apply various multi-criteria decision analysis (MCDA) methods primarily to the choice of a foreign market (international market selection – IMS). Applications of these methods to the selection of the mode of entry remain largely incidental, which limits the ability to capture the full complexity of international investment decisions (see Górecka, Szałucka, 2014, 2016; Christian, Zhang, Salifou, 2016). This study contributes to the literature by simultaneously addressing two interrelated strategic choices – market selection and entry mode choice. Additionally, prior research and theoretical models of FME have predominantly adopted a sequential perspective, treating market and entry mode decisions as separate stages in a two-step process and, in doing so, neglecting the complementarities between country attributes and possible modes of operating on foreign markets. The model proposed below allows the decision process to be examined both sequentially and simultaneously, thereby capturing the interdependencies between market determinants and entry strategies. Furthermore, in contrast to traditional frameworks that assume rational, optimization-based choices relying on extensive statistical datasets, the proposed approach explicitly incorporates the investor's perspective, including motives, aspirations, and risk attitudes. Intuition and subjective evaluations, which extend beyond purely quantitative indicators, are also considered an integral part of the decision process. Consequently, the model presented in this paper accounts for the investor's holistic assessment of both market and entry mode, offering a more context-sensitive and accurate representation of internationalization decisions.

## 3. Methods

To support companies in optimizing the selection of target markets and entry modes while balancing diverse managerial objectives, an approach based on multi-criteria decision-aiding (MCDA) methods has been proposed. This procedure is grounded in the MAMIMCA methodology (Multiple Assessment Multiple Importance Multiple Criteria Analysis) developed by Górecka (2020), which involves the simultaneous application of various MCDA techniques to obtain a more comprehensive and robust evaluation. In its original formulation, MAMIMCA incorporates differentiated weighting coefficients assigned to each evaluation criterion; however, in the present study, the use of such various weights has been deliberately omitted. Consequently, the approach employed will be designated MASIMCA (Multiple Assessment Single Importance Multiple Criteria Analysis).

In the procedure proposed two well-established and widely utilized multi-criteria decision aiding (MCDA) techniques are employed: the PROMETHEE II method (Brans, Vincke, 1985; Brans, Vincke, Mareschal, 1986) and the TOPSIS method (Hwang, Yoon, 1981). Following a thorough evaluation of the advantages and disadvantages of various multi-criteria methods (see Górecka, 2011, 2012), these two techniques were selected due to their reputation for being user-friendly, characterized by their comprehensibility and mathematical simplicity. Moreover, this approach enables the generation of a complete pre-order of the alternatives – namely, markets and entry modes (MEMs) – with corresponding point allocations in the final outcome. It is important to underscore that alternative formats of the output, such as partial pre-orders or graph-based representations, may appear less persuasive or intuitive to prospective users of the procedure.

The third, less commonly used method employed in the proposed procedure is the EVAMIX technique, introduced by Voogd (1982, 1983). This method was selected due to its capacity to accommodate heterogeneous types of evaluation data. Specifically, EVAMIX distinguishes between qualitative and quantitative criteria, and the final appraisal score for a given alternative is derived from a synthesis of evaluations calculated separately for each type of criteria. The subsequent sections will provide a concise description of the aforementioned MCDA methods.

Let us assume that $A = \{a_1, a_2, \dots, a_m\}$ is a finite set of $m$ alternatives (MEMs), $X = \{x_1, x_2, \dots, x_n\}$ is a set of $n$ evaluation criteria, $W = [w_1, w_2, \dots, w_n]$ is a vector of weights for $n$ evaluation criteria, where $\sum_{k=1}^{n} w_k = 1$, and $x_k(a_i)$ is the assessment of alternative $a_i$ according to criterion $x_k$.

### 3.1. The PROMETHEE II method

The PROMETHEE II method consists of the following steps (Brans, Mareschal, 2005):

1. Defining a *generalized criterion* $\{x_k, P_k(a_i, a_j)\}$ for each criterion $k$ (for the sake of simplicity, it is here assumed that all criteria are maximized; $x_k$ is a criterion $k$ and $P_k(a_i, a_j)$ represents the preference function showing the strength of preference for alternative $a_i$ over alternative $a_j$ according to criterion $k$: $P_k(a_i, a_j) = X_k[d_k(a_i, a_j)]$ $\forall a_i, a_j$ where $d_k = x_k(a_i) - x_k(a_j)$ and for which $P_k(a_i, a_j) \in [0; 1]$. The developers of the PROMETHEE methodology have identified six types of generalized preference functions, as outlined in Table 2.

**Table 2.**
*Types of generalized criteria*

| Generalized criterion | Preference function | Parameters |
|---|---|---|
| **Type 1:** usual criterion | $P_k(d_k) = \begin{cases} 0, & if \quad d_k \le 0 \\ 1, & if \quad d_k > 0 \end{cases}$ | none |
| **Type 2:** quasi-criterion (U-shape criterion) | $P_k(d_k) = \begin{cases} 0, & if \quad d_k \le q_k \\ 1, & if \quad d_k > q_k \end{cases}$ | indifference threshold $q_k$ |
| **Type 3:** V-shape criterion | $P_k(d_k) = \begin{cases} 0, & if \quad d_k \le 0 \\ \frac{d_k}{p_k}, & if \quad 0 < d_k \le p_k \\ 1, & if \quad d_k > p_k \end{cases}$ | preference threshold $p_k$ |
| **Type 4:** level criterion | $P_k(d_k) = \begin{cases} 0, & if \quad d_k \le q_k \\ \frac{1}{2}, & if \quad q_k < d_k \le p_k \\ 1, & if \quad d_k > p_k \end{cases}$ | indifference threshold $q_k$ preference threshold $p_k$ |
| **Type 5:** pseudo-criterion (V-shape with the indifference criterion) | $P_k(d_k) = \begin{cases} 0, & if \quad d_k \le q_k \\ \frac{d_k - q_k}{p_k - q_k}, & if \quad q_k < d_k \le p_k \\ 1, & if \quad d_k > p_k \end{cases}$ | indifference threshold $q_k$ preference threshold $p_k$ |
| **Type 6:** Gaussian criterion | $P_k(d_k) = \begin{cases} 0, & if \quad d_k \le 0 \\ 1 - \exp(\frac{-d_k^2}{2s^2}), & if \quad d_k > 0 \end{cases}$ | $s_k$ (defines the inflection point of the preference function) |

Source: Brans, Vincke, Mareschal (1986).

In the evaluation procedure applied to the assessment of MEMs, different types of generalized criteria were employed depending on the variant under consideration:

a) the first type of generalized criterion (the usual criterion) was applied uniformly across all criteria,
b) the third type (the V-shape criterion) was implemented for all evaluated criteria,
c) the fifth type (the V-shape criterion with an indifference threshold) was consistently used across all criteria.

Each configuration represents a distinct approach to modelling preference structures within the decision-making process.

2. Calculation of the aggregated preference indices $\pi(a_i, a_j)$ for each pair of alternatives $(a_i, a_j)$: $\pi(a_i, a_j) = \sum_{k=1}^{n} w_k P_k(a_i, a_j)$, (1)
   where $\pi(a_i, a_j)$ shows the degree to which alternative $a_i$ is preferred to alternative $a_j$ over all the criteria.
3. Defining two outranking flows for each alternative $a_i$:
   - the positive outranking flow: $\varphi^+(a_i) = \frac{1}{m-1}\sum_{j=1}^{m} \pi(a_i, a_j)$, (2)
   - the negative outranking flow: $\varphi^-(a_i) = \frac{1}{m-1}\sum_{j=1}^{m} \pi(a_j, a_i)$. (3)
4. Calculation of the net outranking flow $\varphi(a_i)$ for each alternative $a_i$:
$$\varphi(a_i) = \varphi^+(a_i) - \varphi^-(a_i). \quad (4)$$
5. Construction of the final complete ranking of the alternatives according to the net flows $\varphi(a_i)$ in descending order.

### 3.2. The TOPSIS method

The TOPSIS method is as follows (Roszkowska, 2011):

1. Construction of the normalized decision matrix:
$$\boldsymbol{Y} = [y_{ik}] \quad (5)$$
where:
$$y_{ik} = \frac{x_k(a_i)}{\sqrt{\sum_{i=1}^{m} x_k(a_i)^2}} \quad (6)$$
for $i = 1, \dots, m$ and $k = 1, \dots, n$.
2. Calculation of the weighted normalized matrix:
$$\boldsymbol{V} = [v_{ik}] = [w_k y_{ik}] \quad (7)$$
where $w_k$ is the weight of criterion $k$.
3. Determination of the positive ideal and negative ideal solutions.
   - The positive ideal solution is as follows:
$$A^+ = \{v_1^+, v_2^+, \dots, v_n^+\} \quad (8)$$
   where: $v_k^+ = \begin{cases} \max v_{ik} \text{ for criteria which are maximized,} \\ \min v_{ik} \text{ for criteria which are minimized,} \end{cases}$ (9)
   for $i = 1, \dots, m$ and $k = 1, \dots, n$.

- The negative ideal solution is as follows:

$$A^- = \{v_1^-, v_2^-, \dots, v_n^-\} \tag{10}$$

where: $v_k^- = \begin{cases} \max v_{ik} \text{ for criteria which are minimized,} \\ \min v_{ik} \text{ for criteria which are maximized,} \end{cases}$ (11)

for $i = 1, \dots, m$ and $k = 1, \dots, n$.

4. Calculation of the separation measures (distances) from the positive ideal solution and negative ideal solution:

$$d_i^+ = (\sum_{k=1}^{n}(v_{ik} - v_k^+)^p)^{1/p}, i = 1, 2, \dots, m, \tag{12}$$

$$d_i^- = (\sum_{k=1}^{n}(v_{ik} - v_k^-)^p)^{1/p}, i = 1, 2, \dots, m \tag{13}$$

where $p \geq 1$.

In the evaluation procedure employed for the assessment of MEMs, it was assumed that $p = 2$.

5. Calculation of the relative closeness to the positive ideal solution:

$$S_i = \frac{d_i^-}{d_i^- + d_i^+}, \tag{14}$$

where $0 \leq S_i \leq 1$ and $i = 1,2, \dots, m$.

6. Construction of the final ranking of the alternatives according to the descending order of $S_i$.

### 3.3. The EVAMIX method

The EVAMIX method consists of the following steps (Martel, Matarazzo, 2005):

1. Determination of the qualitative dominance measures for the ordinal criteria:

$$\alpha_{ij} = \left[ \sum_{k \in O} \left\{ w_k \varphi_k(a_i, a_j) \right\}^c \right]^{\frac{1}{c}}, \quad c = 1,3,5..., \tag{15}$$

where:

$c$ – an arbitrary scaling parameter, for which any positive odd value may be chosen; the higher the value of the parameter is, the weaker the influence of the deviations between the evaluations for the less important criteria,

$O$ – a set of qualitative (ordinal) criteria (it is assumed that all the criteria are maximized);

$$\varphi_k(a_i, a_j) = \begin{cases} 1 \; if \; x_k(a_i) - x_k(a_j) > 0 \\ -1 \; if \; x_k(a_j) - x_k(a_i) > 0 \\ 0 \; otherwise \end{cases} \tag{16}$$

$x_k(a_i)$ – performance of alternative $a_i$ on criterion $x_k$.

2. Calculation of the quantitative dominance measures for the cardinal criteria:

$$\gamma_{ij} = \left\{ \left[ \sum_{k \in Q} \left\{ w_k \left( v_k(a_i) - v_k(a_j) \right) \right\}^c \right]^{\frac{1}{c}}, \quad c = 1,3,5..., \right. \tag{17}$$

where:

$Q$ – a set of quantitative (cardinal) criteria (it is assumed that all the criteria are maximized),

$v_k(a_i)$ – standardised performance of alternative $a_i$ on criterion $x_k$ (expressed on a scale from 0 to 1).

In the evaluation procedure applied to the assessment of MEMs, the calculation of quantitative performance measures was omitted since all criteria considered were of a qualitative nature.

3. Standardization of the dominance measures as follows:

$$\delta_{ij} = \alpha_{ij}\left(\sum_{i=1}^{m}\sum_{j=1}^{m}\left|\alpha_{ij}\right|\right)^{-1}, \tag{18}$$

$$\sigma_{ij} = \gamma_{ij}\left(\sum_{i=1}^{m}\sum_{j=1}^{m}\left|\gamma_{ij}\right|\right)^{-1}. \tag{19}$$

4. Calculation of the overall dominance measure $q_{ij}$ for each pair of alternatives:

$$q_{ij} = w_O\delta_{ij} + w_Q\sigma_{ij}, \tag{20}$$

where:

$w_O$ – the sum of weights of qualitative criteria,

$w_Q$ – the sum of weights of quantitative criteria.

5. Determination of the final appraisal score $u_i$ for each alternative:

$$u_i = \frac{1}{m}\sum_{j=1}^{m} q_{ij}. \tag{21}$$

6. Ranking of the alternatives according to the descending order of the final appraisal scores.

## 4. Case study

To illustrate the practical utility of the proposed decision-making framework, it was applied in a simulated scenario to support the company IDENTT in the process of selecting an optimal target market and corresponding entry mode. This application served to demonstrate the framework's effectiveness in structuring complex strategic decisions, using data and context relevant to a rapidly growing technology firm operating in the fintech sector.

Established in 2017, IDENTT is a Polish-Swiss technology enterprise that specializes in the fields of biometric identity verification and document analysis. Operating within the fintech sector, the company provides artificial intelligence-based solutions that facilitate digital user identification processes. The business model employed by IDENTT is of a B2B nature,

with services directed towards sectors such as banking, electronic payments, e-commerce, telecommunications, insurance, and gaming. The company has developed proprietary AI engines for automated identity document analysis and facial recognition, enabling clients to implement procedures in compliance with AML, KYC, and GDPR regulations. IDENTT's solutions are available in two delivery forms: Software as a Service (SaaS) and On-Premises. This versatility enables customization and scalability to meet the specific requirements of each client. The company's products exhibit a high degree of adaptability to international markets due to their modular architecture and technological readiness. The organization has already established a presence in several countries, including Germany, the United Kingdom, France, Spain, Croatia, as well as across Central and Eastern Europe and South Africa. The growing importance of digital identification services worldwide has the potential to further strengthen the company's expansion prospects (IDENTT, 15.05.2025).

In collaboration with a representative of the company, a decision-making problem was defined, focusing on the selection of an appropriate market and entry mode (MEM). The analysis considered five potential countries (Kazakhstan, Thailand, Brazil, the UK, and Saudi Arabia) and three distinct modes of entry (agent/distributor export, direct export, and branch/subsidiary export), resulting in a total of 15 decision alternatives (MEMs). Each alternative represented a unique combination of a specific country and an entry mode, forming the basis for the multi-criteria evaluation.

A comprehensive review of the extant literature has facilitated the identification of the factors that influence the company's selection of MEM. They were supplemented by the authors' own conceptual contributions. A total of 18 evaluation criteria were taken into consideration, 6 of which pertained to internal, firm-specific factors, while 12 were related to external market conditions. They are presented in Table 3. In the decision-making process, all criteria were accorded equal importance, and this equal importance was reflected in the equal weights allocated to each criterion.

**Table 3.**
*Evaluation criteria - factors influencing the company's choice of MEM*

| External criteria | Internal criteria |
|---|---|
| 1. Market potential<br>2. Level of economic development<br>3. Data protection regulations<br>4. Political and legal stability<br>5. Cultural distance<br>6. Public trust in sharing personal data online<br>7. Shopping habits and attitudes towards online services (level of openness and sophistication of consumers)<br>8. Level of digitization of society and business<br>9. Availability of technical infrastructure<br>10. Presence of local and global competitors<br>11. Preferences and needs of local customers<br>12. Openness to cooperation with foreign technology companies | 1. Company size<br>2. International experience<br>3. Company strategy<br>4. Degree of product adaptation to local preferences<br>5. Nature of company assets<br>6. Product life cycle |

Source: own elaboration.

Finally, a company representative, namely a member of the board of directors, evaluated the 15 decision-making alternatives (MEMs) from the point of view of 18 criteria using a specially constructed questionnaire. The company representative assigned a rating on a scale of 1-5 according to his knowledge and experience. An excerpt from the performance matrix displaying some of the evaluations thus obtained is presented in Table 4.

**Table 4.**
*Evaluation of alternatives (MEMs) – excerpt from the performance matrix*

| **Alternatives** | **Market potential** | **Level of economic development** | **Data protection regulations** | **Political and legal stability** | **Cultural distance** | **…** | **Nature of the company assets** | **Product life cycle** |
|---|---|---|---|---|---|---|---|---|
| Kazakhstan - agent/distributor export | 5 | 5 | 4 | 4 | 4 | … | 4 | 4 |
| Kazakhstan - direct export | 1 | 1 | 1 | 1 | 1 | … | 5 | 5 |
| Kazakhstan - branch/subsidiary export | 3 | 4 | 5 | 5 | 5 | … | 4 | 4 |
| Thailand - agent/distributor export | 4 | 4 | 4 | 4 | 4 | … | 4 | 4 |
| Thailand - direct export | 2 | 1 | 1 | 2 | 2 | … | 5 | 5 |
| Thailand - branch/subsidiary export | 5 | 4 | 5 | 5 | 5 | … | 4 | 4 |
| Brazil - agent/distributor export | 4 | 4 | 4 | 4 | 4 | … | 4 | 4 |
| Brazil - direct export | 2 | 3 | 2 | 2 | 2 | … | 5 | 5 |
| Brazil - branch/subsidiary export | 5 | 5 | 5 | 5 | 5 | … | 4 | 4 |
| United Kingdom - agent/distributor export | 4 | 4 | 4 | 4 | 4 | … | 4 | 4 |
| United Kingdom - direct export | 3 | 5 | 5 | 5 | 5 | … | 5 | 5 |
| United Kingdom - branch/subsidiary export | 5 | 5 | 5 | 5 | 5 | … | 4 | 4 |
| Saudi Arabia - agent/distributor export | 4 | 4 | 4 | 4 | 4 | … | 4 | 4 |
| Saudi Arabia - direct export | 5 | 5 | 5 | 5 | 5 | … | 5 | 5 |
| Saudi Arabia - branch/subsidiary export | 5 | 5 | 5 | 5 | 5 | … | 4 | 4 |

Source: own elaboration.

## 5. Results and discussion

In the empirical component of the study, a set of potential decision alternatives in the form of MEMs is evaluated for the IDENTT company. This case serves as a testbed for assessing the applicability of the proposed integrated decision-making framework, which is grounded in multi-criteria decision analysis (MCDA) methods.

The results obtained through the application of the MASIMCA approach, incorporating the EXAMIX, TOPSIS, and PROMETHEE II methods, are presented in Tables 5 and 6, as well as Figures 1 and 2.

**Table 5.**
*MASIMCA approach – results obtained using EVAMIX, TOPSIS, and PROMETHEE II*

| Alternatives | EVAMIX | TOPSIS | PROMETHEE II (q=1, p=3) | PROMETHEE II (q=0, p=3) | PROMETHEE II (q=0, p=0) |
|---|---|---|---|---|---|
| Kazakhstan - agent/distributor export | -0,00026 | 0,78249 | 0,12698 | 0,07672 | -0,02381 |
| Kazakhstan - direct export | -0,00447 | 0,14482 | -0,56548 | -0,51455 | -0,41270 |
| Kazakhstan - branch/subsidiary export | 0,00159 | 0,79908 | 0,12103 | 0,12963 | 0,14683 |
| Thailand - agent/distributor export | -0,00327 | 0,71296 | 0,10317 | -0,03175 | -0,30159 |
| Thailand - direct export | -0,00344 | 0,23873 | -0,49008 | -0,43254 | -0,31746 |
| Thailand - branch/subsidiary export | 0,00151 | 0,76261 | 0,09722 | 0,11111 | 0,13889 |
| Brazil - agent/distributor export | -0,00327 | 0,71296 | 0,10317 | -0,03175 | -0,30159 |
| Brazil - direct export | -0,00288 | 0,30890 | -0,42063 | -0,36905 | -0,26587 |
| Brazil - branch/subsidiary export | 0,00280 | 0,85518 | 0,14881 | 0,18519 | 0,25794 |
| United Kingdom - agent/distributor export | -0,00327 | 0,71296 | 0,10317 | -0,03175 | -0,30159 |
| United Kingdom - direct export | 0,00598 | 0,86701 | 0,12302 | 0,26587 | 0,55159 |
| United Kingdom - branch/subsidiary export | 0,00280 | 0,85518 | 0,14881 | 0,18519 | 0,25794 |
| Saudi Arabia - agent/distributor export | -0,00327 | 0,71296 | 0,10317 | -0,03175 | -0,30159 |
| Saudi Arabia - direct export | 0,00667 | 1,00000 | 0,14881 | 0,30423 | 0,61508 |
| Saudi Arabia - branch/subsidiary export | 0,00280 | 0,85518 | 0,14881 | 0,18519 | 0,25794 |

Source: own elaboration.

**Table 6.**
*MASIMCA approach – rankings obtained using EVAMIX, TOPSIS, and PROMETHEE II*

| Alternatives | EVAMIX | TOPSIS | PROMETHEE II (q=1, p=3) | PROMETHEE II (q=0, p=3) | PROMETHEE II (q=0, p=0) |
|---|---|---|---|---|---|
| Kazakhstan - agent/distributor export | 8 | 7 | 5 | 8 | 8 |
| Kazakhstan - direct export | 15 | 15 | 15 | 15 | 15 |
| Kazakhstan - branch/subsidiary export | 6 | 6 | 7 | 6 | 6 |
| Thailand - agent/distributor export | 11,5 | 10,5 | 9,5 | 10,5 | 11,5 |
| Thailand - direct export | 14 | 14 | 14 | 14 | 14 |
| Thailand - branch/subsidiary export | 7 | 8 | 12 | 7 | 7 |
| Brazil - agent/distributor export | 11,5 | 10,5 | 9,5 | 10,5 | 11,5 |
| Brazil - direct export | 9 | 13 | 13 | 13 | 9 |
| Brazil - branch/subsidiary export | 4 | 4 | 2,5 | 4 | 4 |
| United Kingdom - agent/distributor export | 11,5 | 10,5 | 9,5 | 10,5 | 11,5 |
| United Kingdom - direct export | 2 | 2 | 6 | 2 | 2 |
| United Kingdom - branch/subsidiary export | 4 | 4 | 2,5 | 4 | 4 |
| Saudi Arabia - agent/distributor export | 11,5 | 10,5 | 9,5 | 10,5 | 11,5 |
| Saudi Arabia - direct export | 1 | 1 | 2,5 | 1 | 1 |
| Saudi Arabia - branch/subsidiary export | 4 | 4 | 2,5 | 4 | 4 |

Source: own elaboration.

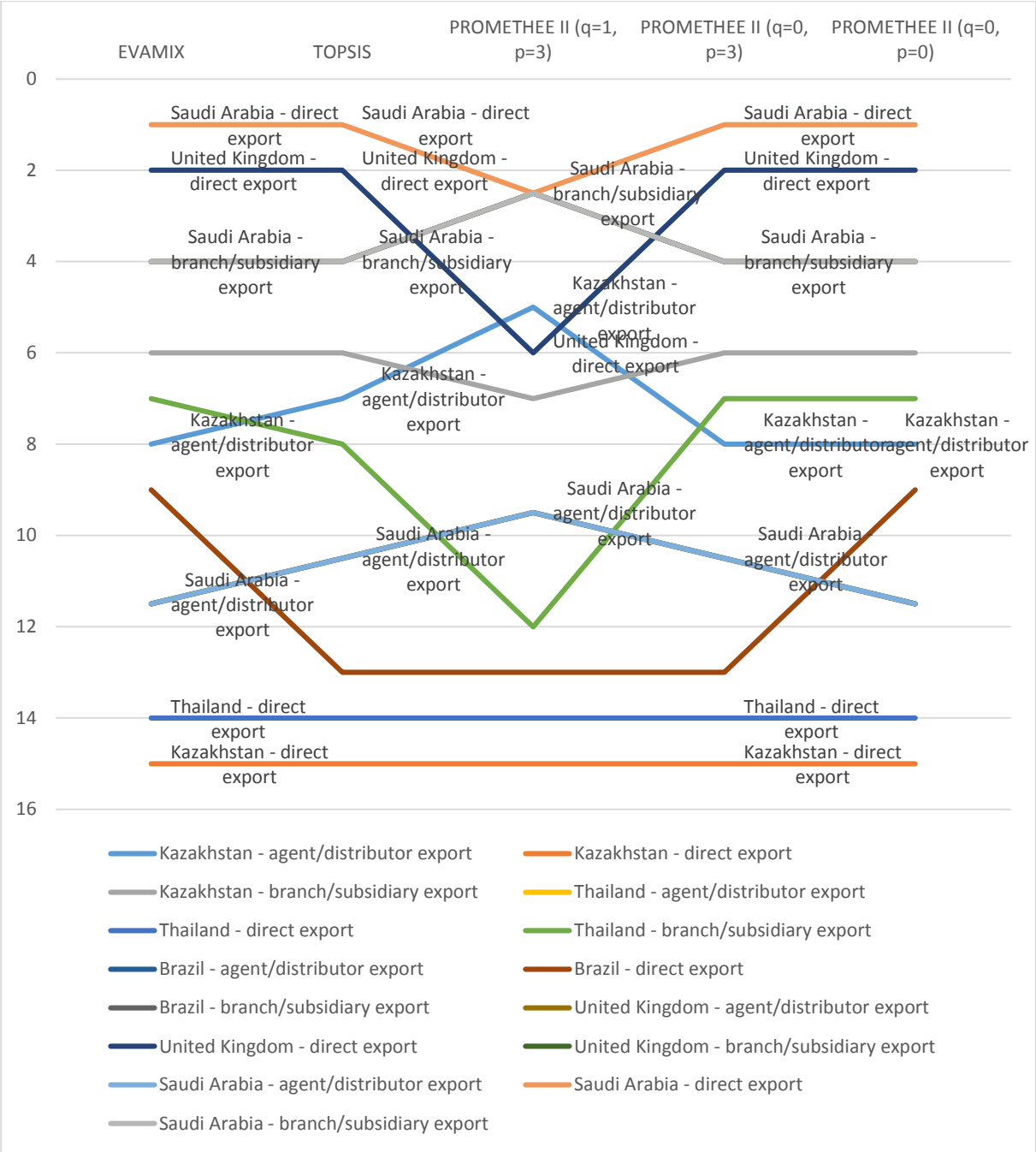


**Figure 1.** Choice of MEM – results of the MASIMCA approach with EVAMIX, TOPSIS, and PROMETHEE II (by methods).

Source: own elaboration.

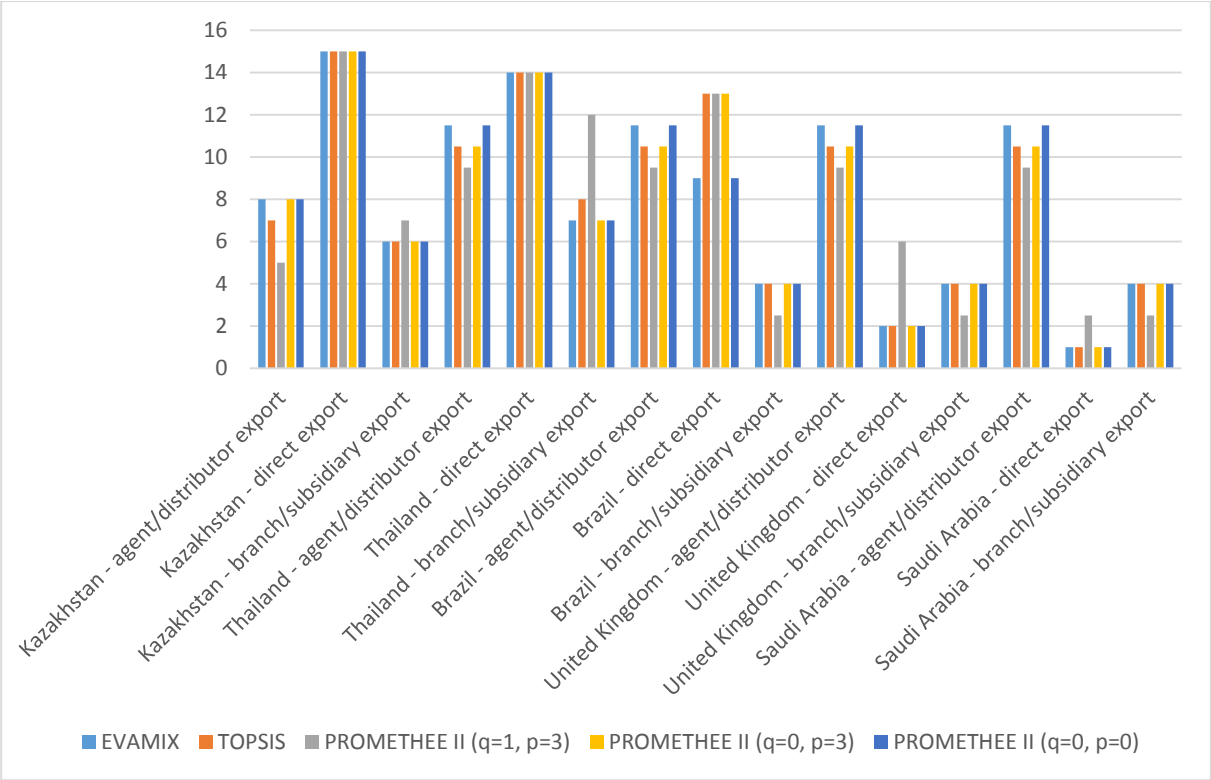


**Figure 2.** Choice of MEM – results of the MASIMCA approach with EVAMIX, TOPSIS, and PROMETHEE II (by alternatives).

Source: own elaboration.

The results of the analysis indicate that the final rankings of market and entry mode (MEM) alternatives exhibit a degree of sensitivity to the choice of multi-criteria decision-aiding method. In an effort to identify a compromise solution across all three applied methods – EVAMIX, PROMETHEE II (with different parameters), and TOPSIS – it was concluded that the most favorable MEM for the IDENTT company is entry into the Saudi Arabian market via direct export. This alternative ranked first in all rankings, with the exception of the PROMETHEE II method with an indifference threshold q = 1 and a preference threshold p = 3. The second most favorable alternative is entry into the United Kingdom through direct export, which consistently ranked second across all methods, again with the exception of the PROMETHEE II configuration mentioned above.

The analysis also revealed a high level of consistency in identifying the least preferred alternatives. Direct export to Kazakhstan was ranked lowest across all methods, followed by Thailand (also via direct export), which consistently occupied the penultimate position. The third least favorable option was Brazil with direct export. These findings underscore the robustness of the framework in identifying both optimal and suboptimal strategic options, while also highlighting the influence of methodological parameters on the final ranking.

Interestingly, if the decisions regarding target market selection and entry mode were made sequentially – first selecting the market and subsequently determining the appropriate mode of entry – the optimal choice for IDENTT would be entry into the United Kingdom

(see Figures 3 and 4). Within this market, direct export would emerge as the most suitable entry mode. Consequently, the outcome of the sequential decision-making process would differ from that of the integrated (simultaneous) approach, in which Saudi Arabia with direct export was identified as the most favorable alternative. This divergence highlights the potential impact of decision-making structure on strategic outcomes and underscores the importance of adopting a comprehensive, integrated approach when evaluating complex internationalization decisions.

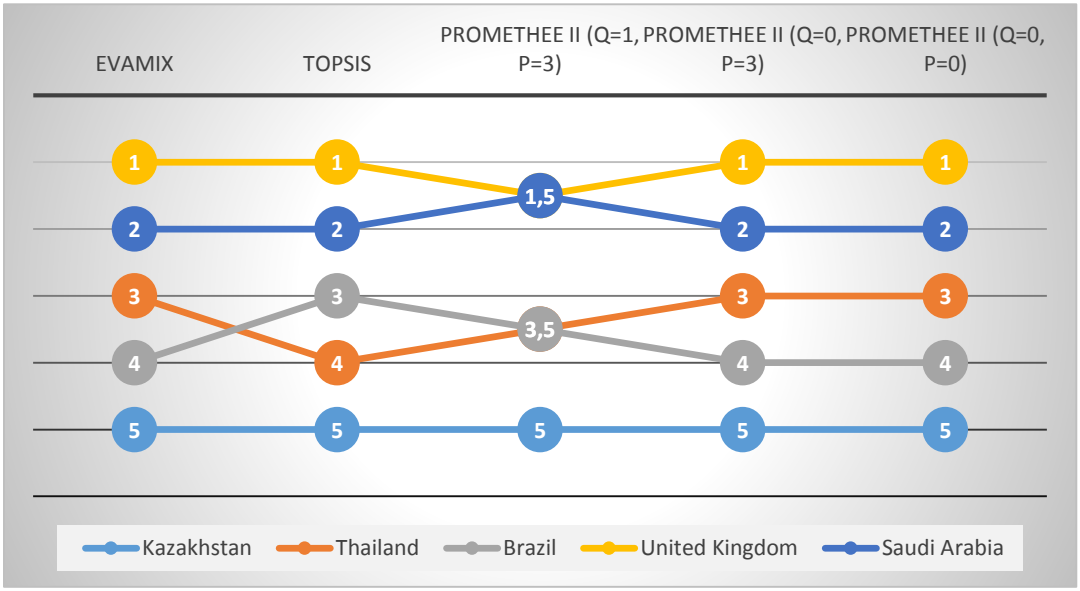


**Figure 3.** Choice of market – results of the MASIMCA approach with EVAMIX, TOPSIS, and PROMETHEE II (by methods).

Source: own elaboration.

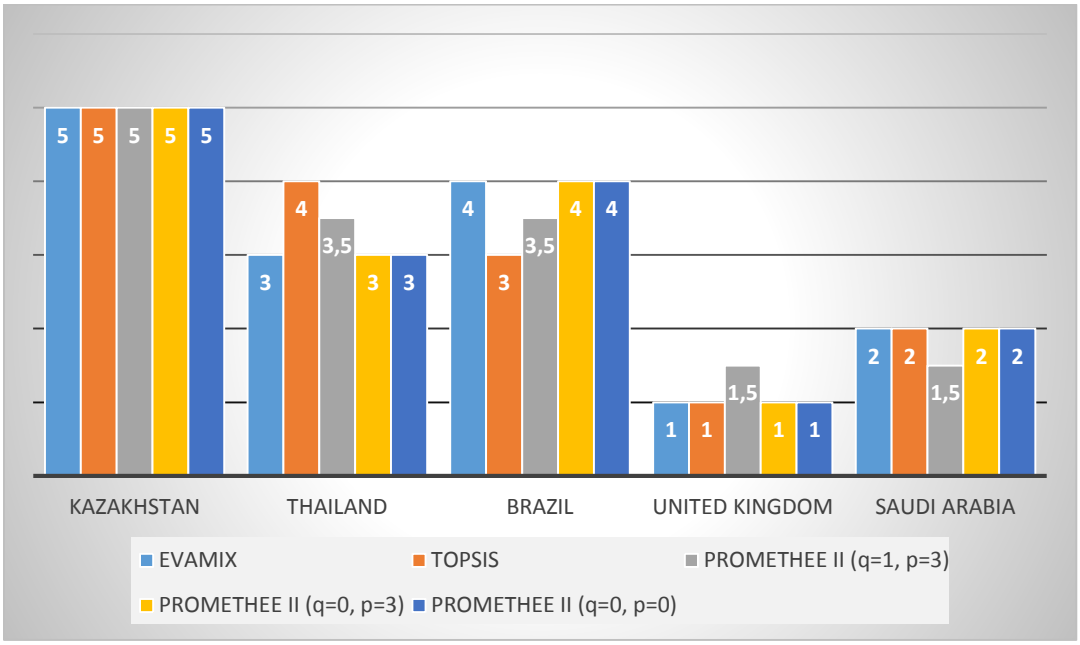


**Figure 4.** Choice of market – results of the MASIMCA approach with EVAMIX, TOPSIS, and PROMETHEE II (by alternatives).

Source: own elaboration.

## 6. Conclusions

This study proposed a structured decision-support framework for selecting foreign markets and entry modes in the context of international expansion, responding to the underrepresentation of entry mode analysis in the MCDA-based FME literature by treating market selection and entry mode choice both as interconnected decisions and as isolated stages. By integrating three multi-criteria decision-aiding (MCDA) methods, namely EVAMIX, PROMETHEE II, and TOPSIS, within the MASIMCA (Multiple Assessment Single Importance Multiple Criteria Analysis) approach, the framework enables a comprehensive evaluation of strategic alternatives based on both internal firm-specific factors and external market conditions. Importantly, it goes beyond a purely rational, data-driven perspective by explicitly incorporating the investor's subjective opinions. In doing so, the study advances a more holistic and context-sensitive model of internationalization decisions.

The empirical application, conducted through a case study of the Polish-Swiss technology company IDENTT, demonstrated the framework's practical utility. The results confirmed that MCDA methods facilitate transparent, rational, and justifiable decision-making in complex internationalization scenarios. Notably, the analysis revealed that the structure of the decision-making process – whether simultaneous or sequential – can significantly influence the final outcome.

While the study is limited by its reliance on a single case and a simulated decision environment, it offers valuable insights for enterprises, especially SMEs and technology startups, seeking to navigate foreign market entry decisions. Future research should explore the framework's applicability across diverse industries and refine its components through scenario analysis and alternative weighting schemes. In addition, subsequent research endeavors may encompass the investigation of alternative multi-criteria decision-aiding (MCDA) techniques, with the objective of integrating these methods within the MAMIMCA framework.

By bridging methodological rigor with practical relevance, this research contributes to the development of data-informed internationalization strategies, particularly for firms operating in dynamic and uncertain global markets.

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