

A FORECAST INTEGRATED AHP FRAMEWORK FOR INTERNATIONAL MARKET EVALUATION*

Selen Nihan Taşçı, Buse Hoşgören, Elif Günenç
Istanbul Technical University, Faculty of Management, Türkiye

Abstract

Identifying attractive foreign markets is an important challenge for firms wanting to grow internationally. Selecting a suitable market requires considering not only current conditions but also future opportunities and many strategic factors. This study proposes a decision-support framework that combines sales forecasting with the Analytic Hierarchy Process (AHP) to improve market evaluation. Forecasted demand values, which are generated using macroeconomic indicators, are included in the AHP model as a decision criterion, allowing future market expectations to be taken into account along with other important factors. The framework is applied to the European bus market, where France, Germany, and Spain are evaluated based on criteria related to market attractiveness, sustainability, geographical centrality, existing dealership networks, and competitor density. By integrating forecasting results into a multi-criteria decision analysis, the study provides a more comprehensive and forward-looking approach to market selection. The findings offer practical insights for organizations looking to support international expansion decisions through data-driven decision-making methods.

Keywords: multi-criteria decision analysis, demand forecasting, Analytic Hierarchy Process, international market selection

1. INTRODUCTION

In today's global business environment, companies looking to expand internationally face increasing difficulty in selecting the right markets. Market selection is no longer something that can be based on intuition or a single factor. Instead, it needs a more structured approach that considers a range of economic, operational, and strategic factors. This challenge is especially visible in industries such as automotive, where demand is closely linked to macroeconomic conditions, regulatory changes, and ongoing technological developments. Recent studies show that firms increasingly rely on data-based frameworks to improve the quality of international market selection decisions (López-Cadavid et al., 2023; Paul & Benito, 2018).

As a result, data-driven decision-making has become an important part of strategic planning. Forecasting models are commonly used to predict future demand and identify potential growth opportunities across different markets. By using macroeconomic indicators such as GDP, inflation, and employment levels, these models can provide useful information on how markets may perform. However, relying only on forecasting has its limitations. While it offers

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quantitative projections, it does not fully capture qualitative aspects, nor does it provide a structured way to compare multiple options at the same time.

To address these limitations, multi-criteria decision-making (MCDM) methods are frequently used in strategic contexts. Among these methods, the Analytic Hierarchy Process (AHP) is one of the most widely applied tools for handling complex decision problems. AHP allows decision-makers to break down a problem into smaller components and evaluate alternatives based on multiple factors. It combines both numerical data and expert judgments within a consistent framework. Still, in many applications related to market selection, the input data used in AHP tends to focus on present or past conditions, which may not fully show how markets will change in the future. Recent studies review how international market selection models increasingly combine qualitative and quantitative approaches, especially in bigger sized companies (Deaza et al., 2020).

This study addresses this gap by using a hybrid approach that integrates forecasting results into the AHP framework for market selection. Instead of looking at forecasting and decision-making as separate steps, this method connects them in a single structure. Forecasted demand factors are used as direct inputs in the evaluation process, allowing future expectations to play a role in how alternatives are reviewed and prioritized.

The practical part of the study focuses on selected European countries within the bus market. Based on forecasted sales data based on macroeconomic indicators, the countries are evaluated using several criteria, including market potential, sustainability, and business needs. By combining these elements, the study aims to provide a more comprehensive and forward-looking framework for decision-making.

The contribution of the paper can be summarized in two main points. First, it presents a hybrid methodology that connects forecasting results with AHP, adding on to current research on data-driven strategic decisions. Second, it demonstrates how this approach can be applied in a practical context, offering insights for companies looking to improve their market expansion strategies.

The rest of the paper is structured as follows. The next section reviews the relevant literature on market selection and multi-criteria decision-making methods. This is followed by the methodology section, where the suggested approach is explained. The results and discussion section presents the outcome of the analysis, and the final section concludes with key takeaways and suggestions for future research.

2. LITERATURE REVIEW

Market selection is widely recognized as a vital part of a company's international expansion plans. Companies entering new markets need to look at a variety of economic, demographic, and competitive factors to identify the best opportunities. Given the wide variation across countries in terms of their economies, infrastructure, culture, and market characteristics, evaluating international market opportunities becomes a difficult and complex task (Cavusgil et al., 2004). As a result, systematic screening and comparison of countries are needed to reduce the number of alternatives and find the most promising markets for further analysis (Cavusgil et al., 2004). In this context, market attractiveness is formed not only by economic conditions but also by broader institutional and strategic factors that affect international investment decisions (Dunning, 1988).

To address the multi-dimensional nature of these decisions, MCDM methods have become more popular both in academic research and practical applications. These methods allow decision-makers to evaluate alternatives by looking at multiple criteria that often clash, in a systematic way (Greco et al., 2016). Among MCDM techniques, the AHP, developed by Thomas L. Saaty, is a method that structures complex decision problems using pairwise comparisons and allows both quantitative data and subjective judgments to be incorporated into the analysis (Saaty, 1987). In practice, decision-making problems often include both quantitative and qualitative factors, making them a good fit for decision-making tools like AHP (Büyüközkan & Çifçi, 2012). This shows the importance of using decision-making methods when assessing a problem with multiple criteria.

Recent studies have also applied AHP in evaluating business opportunities under economic and strategic considerations. For example, Al Shamsi and Shannaq (2023) developed an AHP-based model to check the profitability of various business areas by incorporating expert opinions and comparing multiple criteria. The study demonstrates how AHP can be used to structure complex decision problems and generate a prioritized ranking of alternatives based on qualitative judgments.

In another study, Ekici et al. (2026) used a combines AHP and TOPSIS method to evaluate logistics center locations by considering criteria such as cargo traffic, population, and economic development. Their results point out both established logistics hubs and previously overlooked regions with high potential, providing useful ideas for better infrastructure planning. This shows the suitability of AHP for complex decision-making problems that involve multiple economic and strategic criteria.

At the same time, forecasting models also play a crucial role in projecting future market demand and finding growth opportunities. Forecasting is widely used in both business and government planning contexts, as many decisions heavily depend on expectations about uncertain future outcomes. As Armstrong (2001) explains, forecasting helps organizations plan investments, evaluate different scenarios, and make more informed decisions in uncertain environments. This makes forecasting a key tool in strategic decision-making processes, especially in dynamic and competitive markets.

Recent research highlights the increasing importance of data-driven approaches in economic forecasting. For example, Lin & Wei (2024) show that the use of big data has greatly improved how economic forecasts are generated by incorporating large and varied datasets into prediction models. This leads to a more detailed understanding of economic patterns and improves the ability to capture complex relationships that traditional models may miss. As a result, forecasting methods have become more flexible and better at analyzing fast-changing market environments.

Even though both forecasting and MCDM methods are useful on their own, they are usually used separately in the literature. Because of this, decision-making processes may not fully take future expectations into consideration when comparing different alternatives. To deal with this issue, this study proposes a hybrid approach that combines forecasting results with the AHP method. By bringing these two approaches together, the goal is to create a more practical and comprehensive way to support market selection decisions.

3. DATA AND METHODOLOGY

3.1. Data description

The dataset used in the forecasting part of the study consists of historical bus sales data, and macroeconomic indicators for selected European countries. The dataset combines historical sales figures from the European Automobile Manufacturers' Association (ACEA) with supplementary internal market data provided by an industry manufacturer. To keep the study accurate while protecting the company's privacy, this private data was anonymized and cross-referenced against public records for consistency. This allowed for a more detailed analysis of market changes that publicly available datasets alone could not provide.

Macroeconomic variables considered in the study include indicators such as Gross Domestic Product (GDP), inflation, population, employment levels, and other relevant economic factors that are commonly associated with transportation demand. These variables were chosen based on their relevance to market trends and their impact on vehicle sales.

To support a forward-looking analysis, forecasted values of bus sales were generated using a data-based approach based on past patterns between sales and macroeconomic indicators. The forecasting results serve as key inputs for the next step.

For the purpose of this study, three European countries were selected as alternative markets, which are France, Spain and Germany. These countries were picked based on their strategic relevance and availability of reliable data, enabling a comparative evaluation within the suggested framework.

For the data used in the AHP analysis, both quantitative and qualitative inputs were included. Quantitative data for the criteria were obtained from publicly available sources and used directly in the evaluation. However, for certain criteria that could not be measured with clear numerical data, qualitative assessments were needed.

These qualitative evaluations were based on expert opinions, where the relative importance of criteria was compared using a rating scale. This process allowed both measurable data and expert judgment to be considered together within the AHP framework.

3.2. Methodological framework

This study proposes a hybrid decision-making framework that puts forecasting results into the AHP to support strategic market selection. The methodology consists of two main stages: (i) forecasting of market potential and (ii) multi-criteria evaluation of alternative countries.

In the first step, forecasted sales numbers are generated using a data-driven approach based on past connections between bus sales and macroeconomic indicators. These indicators include variables such as GDP, inflation, and population, which are commonly linked to transportation demand. The forecasting process captures underlying trends and relationships in the data, making the estimation of future market potential for each country possible.

Instead of focusing on methodological complexity, the forecasting step aims to provide a reliable and quantitative foundation for comparing alternative markets based on their future potential. This allows the decision-making process to move beyond fixed past data and include expectations about future performance.

In the second stage, the AHP method is applied to evaluate and prioritize alternative countries based on multiple criteria. AHP enables the decomposition of the decision problem into an organized structure consisting of the main goal, evaluation criteria, and alternative options.

3.3. Application of AHP

The AHP model is structured in three levels. At the top is the main goal, which is to select the optimal country for growing the business into new markets. The next level consists of key decision factors, which are future sales (market potential), sustainability, geographical centrality, existing dealership networks, and competitor density. Finally, the bottom level includes options, which are France, Germany and Spain.

Pairwise comparison matrices are built to determine the relative importance of each criterion. A standard rating scale (the Saaty scale) is used to assign comparison values, and normalized weights are calculated accordingly. Consistency ratios are also evaluated to ensure the reliability of judgments.

A key contribution of this study lies in the combination of forecasting results into the AHP framework. Specifically, forecasted sales values are added directly as a quantitative input under the market potential criterion. This allows expectations about the demand in the future to directly affect the weighting and final ranking of alternatives.

3.4. Evaluation process

After calculating the criteria weights and alternative scores, a final ranking of the selected countries is obtained. The results reflect both quantitative forecasts and qualitative evaluations, providing a thorough foundation for strategic decision-making.

By combining forecasting results with a structured multi-criteria method, the proposed methodology makes the market selection stronger and reduces the limitations of using only one way to analyze data.

4. RESULTS AND DISCUSSION

The suggested hybrid framework was used to evaluate three European countries (Germany, France, and Spain) as potential markets for growth in the bus industry. The analysis combines forecasted sales values with several strategic criteria within the AHP structure, allowing a pairwise comparison of future market potential.

In the first stage, forecast results showed clear differences in expected market performance between the selected countries. Germany showed the highest predicted demand over the analysis period, reflecting its strong economic indicators and stable market conditions. France followed with moderate expectations, while Spain demonstrated relatively lower but still positive demand. These forecast values were added to the AHP model under the market potential criterion.

Table 1. Forecasted Total Sales of the Next Five Years

Country	Sales volume
Germany	32 681
France	21 390
Spain	23 523

In the second stage, pairwise comparisons were performed to determine the relative importance of each evaluation criteria. The results indicated that market potential was assigned the highest weight, followed by sustainability, geographical centrality, existing dealership networks, and competitor density. This weighting shows a focus on future demand while still including strategic and operational factors.

Table 2. Final Criteria Weights

Criteria	Weight
Market Potential (Forecasted Sales)	0.44
Sustainability	0.23
Geographical Centrality	0.14
Existing Dealership Networks	0.11
Competitor Density	0.07

Based on the calculated criteria weights and alternative scores, an overall ranking of the countries is created. The results show that France ranks as the most suitable market for expansion, despite not leading the forecasted sales values. Germany is positioned as the second-best option, offering a balanced combination of each criterion. Spain ranks third, mainly due to comparatively lower projected demand and less advantageous economic indicators.

Table 3. Final Scores and Rankings

Country	Score	Ranking
France	0.38	1
Germany	0.35	2
Spain	0.26	3

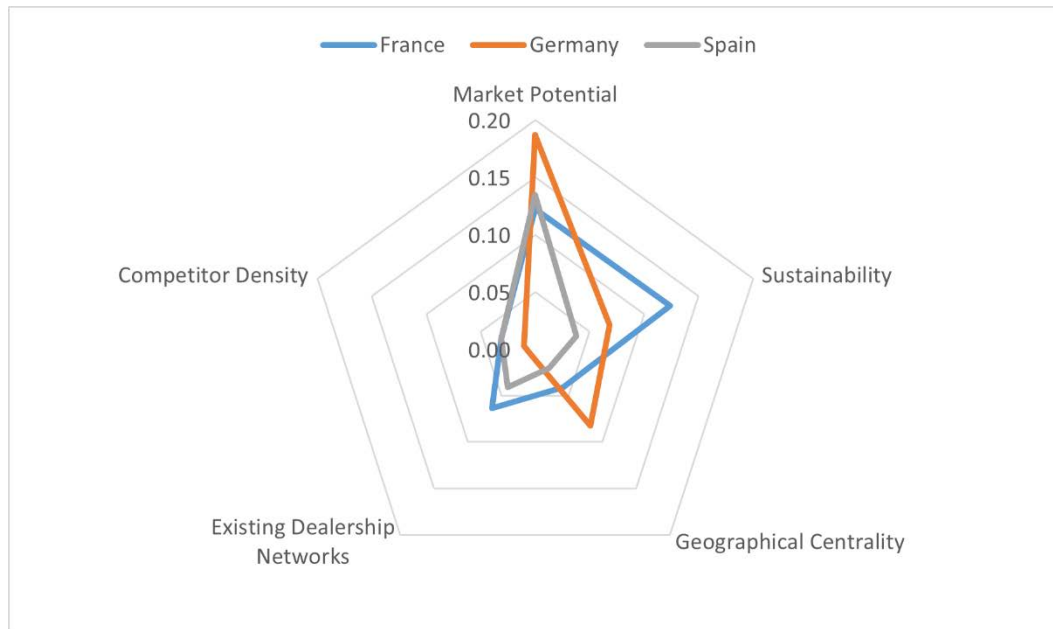


Figure 1. Country performance across evaluation criteria

Figure 1 provides a radar chart of the selected countries across evaluation criteria. Germany demonstrates strong performance in market potential and geographical factors, while France shows balanced results across multiple criteria. Spain exhibits lower values overall.

The results show how important it is to combine future-focused data with organized decision-making systems. While the prediction model found that Germany would have the highest expected sales, the AHP analysis concluded that France is actually the best choice for opening new dealerships. This difference shows that how good a market is doesn't depend on sales numbers alone. This approach allows decision-makers to still incorporate forecasted data to their decision-making systems while not relying solely on forecasts.

Overall, the results show that the integration of forecasting outputs into the AHP framework provides a more comprehensive and stronger foundation for market selection. The hybrid method not only improves the consistency of the evaluation process but also makes it more useful for real-world strategic decisions.

5. CONCLUSION

This study looked at the problem of choosing a market for international expansion by using a hybrid approach that combines forecasting results with the AHP. The aim was to go beyond fixed evaluations and support making more organized decisions.

The results show that integrating forecasted demand into the AHP framework provides a more realistic basis for comparing alternative markets. Instead of relying only on forecasted demand, the approach allows future expectations to directly influence the evaluation process while taking other important factors into consideration. In the application, the selected countries were assessed not only in terms of their current conditions but also their projected market potential, leading to a more dynamic ranking.

In practice, the results suggest that companies can benefit from data-based predictions with organized decision tools when making strategic expansion plans. This is especially relevant

in industries where demand is closely linked to macroeconomic conditions and long-term trends.

At the same time, the study has some limitations. The analysis is based on a limited number of countries and partially relies on internal company data, which might limit how well the results apply to other situations. In addition, the weighting process in AHP includes a level of personal judgement, even though consistency checks were applied.

Future research could expand the model by including a larger set of countries, adding extra criteria, or comparing different decision-making methods. Despite these limitations, the proposed method offers a simple but useful framework for supporting strategic market selection in a data-driven way.

OKVIR INTEGRISANOG PROGNOZIRANJA I AHP METODE ZA EVALUACIJU MEĐUNARODNIH TRŽIŠTA

Selen Nihan Taşçı, Buse Hoşgören, Elif Günenç

Istanbulski tehnički univerzitet, Fakultet za menadžment, Turska

Izvod

Identifikovanje atraktivnih inostranih tržišta predstavlja značajan izazov za kompanije koje žele međunarodno da se šire. Izbor odgovarajućeg tržišta zahteva razmatranje ne samo trenutnih uslova, već i budućih prilika i brojnih strateških faktora. Ova studija predlaže okvir za podršku odlučivanju koji kombinuje prognoziranje prodaje sa Analitičkim hijerarhijskim procesom (AHP) radi unapređenja evaluacije tržišta. Prognozirane vrednosti tražnje, generisane na osnovu makroekonomskih indikatora, uključene su u AHP model kao kriterijum odlučivanja, čime se omogućava da se buduća očekivanja u vezi sa tržištem uzmu u obzir zajedno sa drugim važnim faktorima. Predloženi okvir primenjen je na evropsko tržište autobusa, gde su Francuska, Nemačka i Španija ocenjene na osnovu kriterijuma koji se odnose na atraktivnost tržišta, održivost, geografsku centralnost, postojeće distributerske mreže i gustinu konkurencije. Integriranjem rezultata prognoziranja u višekriterijumsku analizu odlučivanja, studija pruža sveobuhvatniji i dugoročnije orijentisan pristup izboru tržišta. Rezultati istraživanja nude praktične uvide organizacijama koje žele da podrže odluke o međunarodnoj ekspanziji primenom metoda donošenja odluka zasnovanih na podacima.

Ključne reči: višekriterijumska analiza odlučivanja, prognoziranje tražnje, Analitički hijerarhijski proces (AHP), izbor međunarodnog tržišta.

LITERATURA / REFERENCES

Al Shamsi, I., & Shannaq, B. (2023). Assessing profitability and sustainability: An analytic hierarchy process (AHP) model for future Middle East businesses. *International Journal of Management and Applied Science*, 9(8), 62-69.

Armstrong, J. S. (Ed.). (2001). *Principles of forecasting: A handbook for researchers and practitioners*. Springer. <https://doi.org/10.1007/978-0-306-47630-3>

Büyüközkan, G., & Çifçi, G. (2012). A combined fuzzy AHP and fuzzy TOPSIS based strategic analysis of electronic service quality in healthcare industry. *Expert Systems with Applications*, 39(3), 2341-2354. <https://doi.org/10.1016/j.eswa.2011.08.061>

Cavusgil, S. T., Kiyak, T., & Yeniyurt, S. (2004). Complementary approaches to preliminary foreign market opportunity assessment: Country clustering and country ranking. *Industrial Marketing Management*, 33(7), 607-617. <https://doi.org/10.1016/j.indmarman.2003.10.005>

Deaza, Jose & Díaz, Néstor & Castiblanco Moreno, Suelen & Barbosa-Camargo, María. (2020). International market selection models: a literature review. *Tendencias*. 21. 191-217. [10.22267/rtend.202102.147](https://doi.org/10.22267/rtend.202102.147).

Dunning, J. H. (1988). The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies*, 19(1), 1-31. <https://doi.org/10.1057/palgrave.jibs.8490372>

Ekici, Ü., Akay, M. E., & Moslem, S. (2026). Determination of logistics center locations in Türkiye using AHP-based TOPSIS methods. *Transportation Research Interdisciplinary Perspectives*, 37, 101967. <https://doi.org/10.1016/j.trip.2026.101967>

Greco, S., Ehrgott, M., & Figueira, J. R. (Eds.). (2016). *Multiple criteria decision analysis: State of the art surveys*. Springer. <https://doi.org/10.1007/978-1-4939-3094-4>

Lin, W., & Wei, Y. (2024). Economic forecasting with big data: A literature review. *Journal of Management Science and Engineering*, 9(2), 254-270. <https://doi.org/10.1016/j.jmse.2024.01.003>

López-Cadavid, D. A., Vanegas-López, J. G., Restrepo-Morales, J. A., & Roldán-Sepúlveda, M. (2023). Systematic selection of international markets using a hybrid multi-criteria approach: A study in the paper and paperboard industry. *Cogent Business & Management*, 10(3). <https://doi.org/10.1080/23311975.2023.2277555>

Paul, J., & Benito, G. R. G. (2018). A review of research on outward foreign direct investment from emerging countries, including China: what do we know, how do we know and where should we be heading? *Asia Pacific Business Review*, 24(1), 90-115. <https://doi.org/10.1080/13602381.2017.1357316>

Saaty, R. W. (1987). The analytic hierarchy process - what it is and how it is used. *Mathematical Modelling*, 9(3-5), 161-176. [https://doi.org/10.1016/0270-0255\(87\)90473-8](https://doi.org/10.1016/0270-0255(87)90473-8)