



EVALUATION OF MARKETING INDICATORS USING THE IMF SWARA METHOD

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Abstract: Outdated utility vehicles represent a particular challenge for transitional countries in performing daily business operations. The lack of financial resources for purchasing new vehicles, along with the absence of spare parts, is an additional challenge. This paper examines the optimization of marketing and business indicators in the CNC (Computer Numerical Control) metal processing sector for the purpose of repairing worn parts and components of trucks powered by internal combustion engines. The aim of the research was to define and rank 13 key criteria that link operational efficiency and financial performance with the impact of marketing. By reviewing relevant literature and previous studies, as well as engaging seven key experts in the field addressed by the research, the evaluation of marketing indicators was carried out. The IMF SWARA (Improved Fuzzy Stepwise Weight Assessment Ratio Analysis) method, integrated with the Fuzzy Bonferroni operator, was used in this paper to determine the weighting coefficients of the criteria. The research results show that experts assign primary importance to criterion C8 - net profit, followed by C5 - revenue and C7 - capacity utilization, while marketing is viewed as a generator of long-term business success in the regional market.

Keywords: Marketing indicators, IMF SWARA, Bonferroni operator, CNC machine.

1. INTRODUCTION

Contemporary business is characterized by the continuous improvement of business activities, which is reflected in performance enhancement and resource optimization. Particular focus is on sectors with long-term used and technically outdated equipment. Transitional

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countries are faced with machinery whose useful service life should have been replaced long ago by modern and more advanced vehicle fleets. Utility companies in developing countries (such as Bosnia and Herzegovina) use machinery that is over 20 years old for daily work tasks (Novarlić & Stević, 2024). These companies are caught in a gap between the transition to environmentally friendly vehicle alternatives and the improvement of the operational performance of existing vehicles due to a lack of financial support. Continuous breakdowns of trucks powered by internal combustion engines put companies in a situation where they are unable to repair failures because of a lack of spare parts.

The application of CNC metal cutting machines, with a particular focus on the repair of truck components that are no longer manufactured for older trucks, contributes to extending the service life of trucks (Zhang et al., 2021). The specialization of operations and focus on this business segment, along with appropriate marketing activities, supports the development of long-term trust in relationships with end users. The B2B (Business-to-Business) concept is particularly significant, where, in addition to service quality, reliability also represents a key factor. In order for company management to make rational decisions, marketing indicators such as service quality, revenue, number of new customers, marketing costs per new customer, and others are of particular importance. The problem of evaluating these indicators arises as a consequence of their interdependence and the subjectivity resulting from expert assessments. This paper uses a multi-criteria decision-making method, which is an improved version of IMF SWARA, and enables a more precise determination of weighting coefficients as well as greater model reliability (Vrtagić et al., 2021; Stević et al., 2022).

The case study considered in this paper includes the evaluation of marketing indicators applying the IMF SWARA method, based on the example of a CNC metal cutting machine primarily used for repairing components of waste collection trucks, as well as for the needs of other users upon request. A particular contribution of this paper is reflected in the fact that the utility company Progres JSC Doboj, with a tradition dating back to 1947, has recently acquired a CNC machine and employed experts to operate it, enabling it to meet the requirements of all other utility companies in Bosnia and Herzegovina that use technologically outdated trucks.

2. LITERATURE REVIEW

Performance measurement in the field of marketing is one of the key issues in contemporary management. A set of indicators that reflect an organization's success in achieving financial and market goals represents marketing performance (Morgan et al., 2002). According to Morgan et al. (2009), marketing performance includes financial indicators, market performance and customer relationships. This approach indicates the need for the application of methods that can be integrated into different types of criteria. On the other hand, research conducted by Ambler (2008) shows that companies often make the mistake of focusing only on tangible (financial) indicators, while omitting intangible value, such as brand strength or the development of long-term relationships with customers. The importance of the intangible component is, in the long term, particularly significant for the industrial, i.e., B2B sector, where building long-term relationships with customers is a priority (Mařík et al., 2022).

Research has shown that marketing metrics (Mintz, 2023) have a direct impact on a company's financial performance, such as customer value, retention rate, etc. Similarly, marketing experts use metrics to establish a diagnosis that involves monitoring customer relationships and marketing efforts through which optimal results are achieved. Measuring marketing performance provides organizations with feedback on the outcomes of marketing activities (Clark et al., 2006). Metrics are highly important as they show how companies are progressing. They represent key success factors that measure marketing campaigns and return

on investment. According to Melović et al. (2021), properly selected marketing indicators can significantly improve strategic decision-making in a company. Therefore, they indicate the impact of marketing activities on long-term goals and profitability of a company. On the other hand, organizations are increasingly using analytical tools to improve marketing strategies. It is well known that marketing analytics ensures higher-quality decision-making, which is based on timely and accurate data (Ijomah et al., 2024). Success in B2B marketing lies in the fact that creating value for the customer results from both technical and economic benefits. Customer commitment and loyalty affect profitability, which is particularly manifested in industrial systems, both through repeated orders and the renewal of long-term contracts (Liang & Gao, 2020).

Traditional approaches to managerial decision-making are no longer sufficient today, given the increasingly challenging business environment and rapid global changes (Sulich et al., 2021). Business digitalization and changes in decision-making habits in marketing decision processes are a great challenge, but also a necessity. Important tools for solving complex problems in contemporary business, particularly in industrial systems, are multi-criteria decision-making (MCDM) methods. These methods include solving complex problems in which decision-making depends on a large number of interrelated criteria (Pacheco-Velázquez et al., 2023). One of the well-known methods for determining the weights of criteria is SWARA (Step-wise Weight Assessment Ratio Analysis). This method (Kersulienė et al., 2010) is based on the ranking of criteria through expert assessments and their comparison, which contributes to determining their importance.

However, in conditions of increasing business uncertainty and the growing amount of imprecise or incomplete information, more advanced fuzzy methods that use triangular fuzzy numbers have been developed to model expert assessments (Vrtačić et al., 2021). The application of IMF SWARA (Song et al., 2026), as an MCDM method, contributes to the evaluation of marketing indicators and their transformation into quantitative weights. It represents a modern approach to efficient decision-making, with a particular focus on advanced CNC technologies. Research has shown a significant application of MCDM approaches in selecting optimal solutions in production processes, with specific emphasis on companies engaged in service-based metal cutting (Avramova et al., 2025). According to Das and Chakraborty (2022), the integration of SWARA (Step-wise Weight Assessment Ratio Analysis) and other MCDM approaches in the industrial sector, with a focus on metal processing, has proven to be a highly reliable method, analyzing criteria such as productivity, processing costs, the share of marketing in total costs, and others. Research results (Song et al., 2026) confirm that the IMF SWARA method contributes to the reliable determination of the relative importance of criteria, representing a methodologically justified approach, particularly in complex production systems focused on CNC technologies.

3. METHODS

For the purpose of data processing in this paper, the IMF SWARA method and the Bonferroni operator were applied, and their steps are described in Sections 3.1 and 3.2.

3.1. IMF SWARA

The following steps of IMF SWARA are (Vrtačić et al., 2021):

- Define the fuzzy coefficient $\overline{s_j}$:

$$\bar{\mathfrak{S}}_j = \begin{cases} \bar{1} & j=1 \\ \bar{\emptyset}_j \oplus \bar{1} & j>1 \end{cases} \quad (1)$$

- Define the obtained weights $\bar{\mathfrak{S}}_j$:

$$\bar{\mathfrak{S}}_j = \begin{cases} \bar{1} & j=1 \\ \frac{\bar{\mathfrak{S}}_{j-1}}{\bar{\mathfrak{S}}_j} & j>1 \end{cases} \quad (2)$$

where $\bar{\mathfrak{S}}_j$ denotes the fuzzy coefficient given in the previous step.

- Compute the fuzzy weight coefficients:

$$\bar{w}_j = \frac{\bar{\mathfrak{S}}_j}{\sum_{j=1}^n \bar{\mathfrak{S}}_j} \quad (3)$$

where the fuzzy relative weight of the criteria j is denoted by $\bar{w}_j$, and the number of criteria is denoted by n .

3.2. Bonferroni operator

The Fuzzy Bonferroni aggregation (Hadzikadunic et al., 2023; Radovanović et al., 2024) was used.

$$a_{ij} = (a_{ij}^l, a_{ij}^m, a_{ij}^u) = \begin{cases} a_{ij}^l = \left(\frac{1}{e(e-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^e a_i^{lp} \otimes a_j^{lq} \right)^{\frac{1}{p+q}} \\ a_{ij}^m = \left(\frac{1}{e(e-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^e a_i^{mp} \otimes a_j^{mq} \right)^{\frac{1}{p+q}} \\ a_{ij}^u = \left(\frac{1}{e(e-1)} \sum_{\substack{i,j=1 \\ i \neq j}}^e a_i^{up} \otimes a_j^{uq} \right)^{\frac{1}{p+q}} \end{cases} \quad (4)$$

e is the number of experts, while $p, q \geq 0$ are non-negative numbers.

4. RESULTS AND DISCUSSION

Data collection was carried out through a questionnaire and expert assessment, which required up to 15 minutes, and was conducted during the period from February 5 to March 16, 2026. The questionnaire consisted of 13 criteria, which included the following: C1 - Number of qualified inquiries; C2 - Number of completed orders; C3 - Marketing costs (BAM); C4 - Number of new customers; C5 - Revenue (BAM); C6 - Operating costs (BAM); C7 - Capacity

utilization (%); C8 - Net profit (BAM); C9 - Conversion rate (%); C10 - Cost of new customers (BAM); C11 - Average order value (BAM); C12 - Profit margin (%); and C13 - Share of marketing costs in revenue (%). Experts were tasked with ranking the criteria according to importance, from the most to the least important (two criteria could, but did not have to, be of equal importance), and then comparing how much less important the second-ranked criterion was relative to the first-ranked criterion, and so on, using a TFN scale for comparing criteria within the IMF SWARA method. The criteria were defined for the purposes of this paper based on a detailed review of previous research and in consultation with experts.

The case study presented in this paper aimed to examine the attitudes and opinions of seven key stakeholders in the field of marketing management and CNC experts in the field of service-based metal cutting, as an integral part of the operation of older municipal waste collection trucks in Bosnia and Herzegovina. The first expert was a full professor with a PhD in economics and 29 years of professional experience, whose primary fields of interest are digital marketing and marketing management. The next expert was a graduate mechanical engineer with 25 years of professional experience and experience in leading some of the most significant projects in Bosnia and Herzegovina. The third expert, whose opinion was highly significant for the analysis conducted in this paper, was a CNC operator with 20 years of experience in metal cutting and supervision. The next expert was a leading specialist in CNC machine operations, holding a master's degree in mechanical engineering, with 18 years of experience in the relevant field. The fifth expert was a graduate economist with 28 years of professional experience, with a particular focus on marketing management and theoretical economics. The penultimate expert was a mechanical engineer with 30 years of professional experience, who transfers his extensive knowledge to younger generations through practical training and theoretical education. The seventh and final expert was a marketing specialist with 22 years of professional experience, whose primary field of interest is market analysis. The selection of these experts was well-founded, as they represent some of the most prominent individuals in Bosnia and Herzegovina whose primary focus aligns with the requirements of the analysis conducted in this paper.

The laser for service-based metal cutting, model Bodor P3-6kw, was procured brand new by the utility company Progres JSC Doboj in July 2024. It is a highly powerful CNC machine for industrial purposes. The laser system enables the cutting of aluminum alloys and stainless steel up to a thickness of 20 mm, while the maximum cutting capacity for structural steel is 25 mm. The training of employees conducted by the authorized distributor was carried out in December 2024, while official operations and service-based metal cutting began in early January 2025. The main specialization of the operation was the production of missing components for trucks, i.e., utility vehicles, ensuring their uninterrupted operation. For this reason, the period selected for the analysis and purposes of this paper was from January 1 to December 31, 2025. Within the company Progres, a separate operational unit for service-based metal cutting was established, employing five workers with years of experience in the field. There were no operational interruptions during the period of operation of this unit, except for regular maintenance, which was carried out during weekends when the unit was not in operation. Following a semi-structured interview with the company director and the head of the service-based metal cutting unit, held on March 6, 2026, at the company's premises, it was concluded that management seeks better positioning in the market, particularly in the segment of repairing components for utility trucks aged 20 years and older. This actually means that certain truck components can be cut using a laser, thereby temporarily replacing the damaged part until a new, original component is procured. In other words, the defined linkage represents an extension of the truck's lifespan in cases where spare parts are no longer manufactured for these older machines. In this segment, the preconditions are made for a clear positioning of the

observed service-based metal cutting unit, as evidenced by the cutting capacity, which meets the requirements for the repair of older components. Moreover, the continuity of orders will contribute to the full utilization of machine capacity, i.e., the procurement of an additional machine, thereby enhancing the company's competitiveness in the observed market, as concluded from the conducted interview.

On the other hand, a particularly important aspect was investment in marketing, namely digital and other forms of promotion, aimed at creating regional recognition of the company. Investment in marketing also contributed to the acquisition of new customers, as well as to an increase in the number of orders and greater utilization of machine capacity. Cost reduction is not the path to success, but rather the optimization of revenue through more intensive investment in promotional activities. Financial benefits were particularly evident in the period from October to December 2025. In addition to marketing indicators, particular importance in the analysis was given to the cost of new customers, as well as the machine's capacity utilization, which reached 92.6% in 2025 (an increase in the number of orders, overtime work, and a significant increase in the number of new customers influenced the result).

In Table 1, using the IMF SWARA method for DM1 (Decision Maker 1), the obtained fuzzy weights of the criteria show a clear differentiation of their importance in the decision-making process. Based on the results for DM1, criteria C8 and C5 stand out as the most influential, with identical values of weighting coefficients, while criteria C12, C7, and C9 have a moderate contribution. At the bottom of the table, criteria C1, C2, C3, and C6 are positioned with significantly lower weight values, indicating their limited influence.

Table 1. Example of criterion weight calculation based on DM1 preferences

	s_j	k_j	q_i	w_j
C8		(1,1,1)	(1,1,1)	(0.178,0.192,0.21)
C5	(0,0,0)	(1,1,1)	(1,1,1)	(0.178,0.192,0.21)
C12	(0.25,0.286,0.333)	(1.25,1.286,1.333)	(0.75,0.778,0.8)	(0.134,0.149,0.168)
C7	(0.333,0.4,0.5)	(1.333,1.4,1.5)	(0.5,0.556,0.6)	(0.089,0.107,0.126)
C9	(0.222,0.25,0.286)	(1.222,1.25,1.286)	(0.389,0.444,0.491)	(0.069,0.085,0.103)
C13	(0.25,0.286,0.333)	(1.25,1.286,1.333)	(0.292,0.346,0.393)	(0.052,0.066,0.083)
C10	(0.25,0.286,0.333)	(1.25,1.286,1.333)	(0.219,0.269,0.314)	(0.039,0.052,0.066)
C11	(0.222,0.25,0.286)	(1.222,1.25,1.286)	(0.17,0.215,0.257)	(0.03,0.041,0.054)
C4	(0.25,0.286,0.333)	(1.25,1.286,1.333)	(0.128,0.167,0.206)	(0.023,0.032,0.043)
C1	(0.222,0.25,0.286)	(1.222,1.25,1.286)	(0.099,0.134,0.168)	(0.018,0.026,0.035)
C2	(0.222,0.25,0.286)	(1.222,1.25,1.286)	(0.077,0.107,0.138)	(0.014,0.021,0.029)
C3	(0,0,0)	(1,1,1)	(0.077,0.107,0.138)	(0.014,0.021,0.029)
C6	(0.25,0.286,0.333)	(1.25,1.286,1.333)	(0.058,0.083,0.11)	(0.01,0.016,0.023)
			(4.759,5.206,5.614)	

In the same way, the weights of all criteria were calculated for the remaining six decision-makers (DM2–DM7), and their values, arranged according to the previously defined order of criteria, are shown in Table 2.

Table 2. Weighting coefficients for each expert using the IMF SWARA method and the final averaged values with the fuzzy Bonferroni operator

	W ₁	W ₂	W ₃	W ₄	W ₅	W ₆	W ₇
E ₁	(0.018,0.026,0.035)	(0.014,0.021,0.029)	(0.014,0.021,0.029)	(0.023,0.032,0.043)	(0.178,0.192,0.21)	(0.01,0.016,0.023)	(0.089,0.107,0.126)
E ₂	(0.084,0.096,0.108)	(0.065,0.077,0.089)	(0.007,0.011,0.016)	(0.051,0.061,0.072)	(0.151,0.16,0.17)	(0.118,0.128,0.139)	(0.151,0.16,0.17)
E ₃	(0.048,0.06,0.074)	(0.036,0.047,0.059)	(0.062,0.075,0.091)	(0.036,0.047,0.059)	(0.102,0.118,0.135)	(0.08,0.094,0.111)	(0.132,0.147,0.165)
E ₄	(0.027,0.035,0.045)	(0.046,0.057,0.069)	(0.021,0.028,0.037)	(0.167,0.178,0.191)	(0.13,0.142,0.156)	(0.101,0.114,0.128)	(0.167,0.178,0.191)
E ₅	(0.009,0.015,0.023)	(0.056,0.071,0.087)	(0.044,0.057,0.071)	(0.073,0.088,0.106)	(0.183,0.197,0.214)	(0.142,0.157,0.175)	(0.026,0.038,0.051)
E ₆	(0.04,0.053,0.067)	(0.04,0.053,0.067)	(0.03,0.041,0.054)	(0.196,0.213,0.234)	(0.069,0.085,0.102)	(0.054,0.068,0.084)	(0.153,0.17,0.191)
E ₇	(0.011,0.018,0.025)	(0.017,0.025,0.034)	(0.041,0.053,0.067)	(0.024,0.033,0.044)	(0.177,0.19,0.206)	(0.138,0.152,0.168)	(0.074,0.089,0.105)
final	(0.027,0.037,0.048)	(0.033,0.044,0.056)	(0.031,0.041,0.053)	(0.067,0.08,0.096)	(0.128,0.143,0.16)	(0.087,0.1,0.116)	(0.108,0.123,0.14)
crisp	0.037	0.044	0.041	0.081	0.143	0.101	0.123
rank	10	8	9	6	2	4	3
E ₁	w ₈	w ₉	w ₁₀	w ₁₁	w ₁₂	w ₁₃	
E ₂	(0.178,0.192,0.21)	(0.069,0.085,0.103)	(0.039,0.052,0.066)	(0.03,0.041,0.054)	(0.134,0.149,0.168)	(0.052,0.066,0.083)	
E ₃	(0.151,0.16,0.17)	(0.014,0.02,0.028)	(0.04,0.049,0.059)	(0.028,0.037,0.046)	(0.021,0.029,0.037)	(0.008,0.014,0.02)	
E ₄	(0.102,0.118,0.135)	(0.015,0.022,0.03)	(0.028,0.037,0.049)	(0.176,0.189,0.207)	(0.011,0.016,0.023)	(0.021,0.029,0.039)	
E ₅	(0.079,0.091,0.105)	(0.008,0.013,0.02)	(0.059,0.071,0.084)	(0.034,0.044,0.055)	(0.014,0.02,0.028)	(0.021,0.028,0.037)	
E ₆	(0.183,0.197,0.214)	(0.002,0.005,0.008)	(0.102,0.118,0.136)	(0.012,0.02,0.029)	(0.02,0.029,0.04)	(0.004,0.009,0.015)	
E ₇	(0.119,0.136,0.156)	(0.006,0.01,0.017)	(0.089,0.106,0.125)	(0.02,0.029,0.04)	(0.01,0.016,0.023)	(0.013,0.021,0.03)	
final	(0.177,0.19,0.206)	(0.005,0.01,0.015)	(0.104,0.118,0.135)	(0.053,0.067,0.081)	(0.008,0.013,0.02)	(0.032,0.043,0.055)	
crisp	(0.141,0.155,0.172)	(0.01,0.016,0.023)	(0.071,0.085,0.1)	(0.039,0.051,0.064)	(0.017,0.025,0.034)	(0.02,0.029,0.039)	
rank	0.156	0.016	0.085	0.051	0.025	0.029	
	1	13	5	7	12	11	

Based on the results obtained using the IMF SWARA method and the Fuzzy Bonferroni operator, the most significant criteria, with equal values, are the eighth criterion (net profit),

and the fifth criterion (revenue), followed by the highly ranked C7 (capacity utilization) and C6 (operating costs), which demonstrate the critical importance of production efficiency in the CNC sector. Further analysis shows that experts assign particular importance to criterion C10 (cost of new customers), while the sixth most significant criterion is C4 (number of new customers). The average order value (C11) represents the seventh most important criterion, while the number of completed orders (C2) is in eighth position. In the context of this research, marketing costs (C3) also hold a significant position, ranking ninth. Slightly less significant criteria, ranked from 10th to 13th place, respectively, are: C1 - number of qualified inquiries, C13 - share of marketing costs in revenue (%), C12 - profit margin, while the least significant is C9 - conversion rate (%). These results indicate an orientation toward market expansion under strict control of operational performance.

5. CONCLUSION

Developing countries are characterized by a lack of financial resources, which are a link between regional and global visibility. While developed countries are continuously making efforts to reduce environmental pollution and achieve carbon neutrality, countries in transition lack a clear mechanism to “catch up” with these global trends. Investment in modern, technologically advanced equipment represents a significant challenge for developing countries. On the other hand, technological innovations in processes and services should support the maintenance of existing municipal infrastructure in these countries. This actually implies the repair of components that form an integral part of older utility trucks, through service-based metal cutting using CNC machines in a demanding industrial sector.

In this paper, an integrated Fuzzy MCDM model, consisting of IMF SWARA and the Benferroni operator, was applied to determine the significance of 13 criteria used for evaluating marketing indicators in the CNC metal processing sector. Seven leading experts with decades of professional experience participated in the research, with the ultimate goal of providing the company with guidance for achieving optimal long-term results. The research results show that net profit - C8 and total revenue - C5 represent the key indicators of success, while the high ranking of capacity utilization - C7 and operating costs - C6 indicates the maximum efficiency of production resources, which represents a strategic advantage in this industry.

The methodological contribution of this paper is reflected in the successful application of the Bonferroni operator, which enables objective aggregation of expert opinions while taking into account the interdependence of marketing and operational reality. This approach provides company management with a precise tool for strategic planning and for creating a realistic overview of business activities. In addition, this approach prevents the so-called isolated observation of criteria, thereby further strengthening its contribution. On the other hand, the results show that sustainable business performance, which in this paper refers to the service-based metal cutting of missing components, primarily in the utility sector, does not depend on the intensity of marketing, but rather on its ability to ensure the continuity of the service process. This is supported by customer loyalty and growth in the number of new customers. Future research should focus on a broader industrial framework, which would additionally test the reliability and universality of the obtained weighting coefficients.

REFERENCES

Ambler, T. (2008). Marketing and the Bottom Line: Assessing Marketing Performance. *Performance Management*, 137–148. https://doi.org/10.1057/9780230288942_10.

- Avramova, T., Peneva, T., & Ivanov, A. (2025). Overview of Existing Multi-Criteria Decision-Making (MCDM) Methods Used in Industrial Environments. *Technologies*, 13(10), 444. <https://doi.org/10.3390/technologies13100444>.
- Clark, B. H., Abela, A. V., & Ambler, T. (2006). An Information Processing Model of Marketing Performance Measurement. *Journal of Marketing Theory and Practice*, 14(3), 191–208. <https://doi.org/10.2753/mtp1069-6679140302>.
- Das, P. P., & Chakraborty, S. (2022). SWARA-CoCoSo method-based parametric optimization of green dry milling processes. *Journal of Engineering and Applied Science*, 69(1). <https://doi.org/10.1186/s44147-022-00087-3>.
- Hadzikadunic, A., Stevic, Z., Badi, I., & Roso, V. (2023). Evaluating the logistics performance index of European Union Countries: An integrated multi-criteria decision-making approach utilizing the Bonferroni Operator. *Int. J. Knowl. Innov. Stud*, 1(1), 44-59. <https://doi.org/10.56578/ijkis010104>.
- Kersulienė, V., Zavadskas, E. K., & Turskis, Z. (2010). Selection of rational dispute resolution method by applying new step-wise weight assessment ratio analysis (SWARA). *Journal of Business Economics and Management*, 11(2), 243–258. <https://doi.org/10.3846/jbem.2010.12>.
- Liang, X., & Gao, Y. (2020). Marketing performance measurement systems and firm performance. *European Journal of Marketing*, 54(4), 885–907. <https://doi.org/10.1108/ejm-05-2018-0302>.
- Mařík, J., Karlíček, M., & Mochtak, M. (2022). The interplay of marketing performance measurement and market orientation leading to high business performance in manufacturing SMEs. *Journal of Strategic Marketing*, 32(1), 34–48. <https://doi.org/10.1080/0965254x.2022.2129746>.
- Melović, B., Dabić, M., Vukčević, M., Čirović, D., & Backović, T. (2021). Strategic business decision making: the use and relevance of marketing metrics and knowledge management. *Journal of Knowledge Management*, 25(11), 175–202. <https://doi.org/10.1108/jkm-10-2020-0764>.
- Mintz, O. (2023). Metrics for Marketing Decisions: Drivers and Implications for Performance. *NIM Marketing Intelligence Review*, 15(1), 18–23. <https://doi.org/10.2478/nimmir-2023-0003>.
- Morgan, N. A., Clark, B. H., & Gooner, R. (2002). Marketing productivity, marketing audits, and systems for marketing performance assessment: integrating multiple perspectives. *Journal of Business Research*, 55(5), 363–375. [https://doi.org/10.1016/s0148-2963\(00\)00162-4](https://doi.org/10.1016/s0148-2963(00)00162-4).
- Morgan, N. A., Slotegraaf, R. J., & Vorhies, D. W. (2009). Linking marketing capabilities with profit growth. *International Journal of Research in Marketing*, 26(4), 284–293. <https://doi.org/10.1016/j.ijresmar.2009.06.005>.
- Novarlić, B., & Stević, Ž. (2024). Innovative Approaches to Solid Waste Collection in Rural Areas: Advancing Circular Economy Practices Through Sustainable Waste Management. *Journal of Green Economy and Low-Carbon Development*, 3(3), 187–194. <https://doi.org/10.56578/jgelcd030304>.
- Pacheco-Velázquez, E. A., Vázquez-Parra, J. C., Cruz-Sandoval, M., Salinas-Navarro, D. E., & Carlos-Arroyo, M. (2023). Business Decision-Making and Complex Thinking: A Bibliometric Study. *Administrative Sciences*, 13(3), 80. <https://doi.org/10.3390/admsci13030080>.
- Radovanović, M., Crnogorac, M., Jovčić, S., Cirkin, E., & Bouraima, M. B. (2024). Optimization of anti-drone defense: analyzing non-kinetic gun selection using DIBR II-Grey

MARCOS methodology. *J. Eng. Manag. Syst. Eng*, 3(3), 132-148. <https://doi.org/10.56578/jemse030302>.

Song, M., Blagojević, A., Kasalica, S., Stević, Ž., Marinković, D., & Prentkovskis, O. (2026). Evaluation of Transport Chain Performance using the IMF SWARA - Fuzzy ROV Model. *Acta Polytechnica Hungarica*, 23(1), 329–344. <https://doi.org/10.12700/aph.23.1.2026.1.19>.

Stević, Ž., Das, D. K., Tešić, R., Vidas, M., & Vojinović, D. (2022). Objective Criticism and Negative Conclusions on Using the Fuzzy SWARA Method in Multi-Criteria Decision Making. *Mathematics*, 10(4), 635. <https://doi.org/10.3390/math10040635>.

Sulich, A., Sołoducho-Pelc, L., & Ferasso, M. (2021). Management Styles and Decision-Making: Pro-Ecological Strategy Approach. *Sustainability*, 13(4), 1604. <https://doi.org/10.3390/su13041604>.

Tochukwu Ignatius Ijomah, Courage Idemudia, Nsiong Louis Eyo-Udo, & Kikelomo Fadilat Anjorin. (2024). Harnessing marketing analytics for enhanced decision-making and performance in SMEs. *World Journal of Advanced Science and Technology*, 6(1), 001–012. <https://doi.org/10.53346/wjast.2024.6.1.0037>.

Vrtagić, S., Softić, E., Subotić, M., Stević, Ž., Dordevic, M., & Ponjavic, M. (2021). Ranking Road Sections Based on MCDM Model: New Improved Fuzzy SWARA (IMF SWARA). *Axioms*, 10(2), 92. <https://doi.org/10.3390/axioms10020092>.

Zhang, Z., Matsubae, K., & Nakajima, K. (2021). Impact of remanufacturing on the reduction of metal losses through the life cycles of vehicle engines. *Resources, Conservation and Recycling*, 170, 105614. <https://doi.org/10.1016/j.resconrec.2021.105614>.