

## Voice Search SEO: Optimizing Marketing Strategies for the Future

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### ABSTRACT

*This research examines the relationship between Voice Search SEO optimization, Consumer Behavior Change, Natural Language Processing Technology, and Marketing Strategy Success in the context of PT. Yakult Indonesia Persada - Bandung 3. Using a quantitative research design with random sampling, the study collects data from 100 consumers to explore both direct and indirect effects among these variables. The analysis, conducted with SmartPLS, reveals significant direct effects from Voice Search SEO optimization to Marketing Strategy Success and Consumer Behavior Change to Marketing Strategy Success, indicating that voice search optimization and shifts in consumer behavior play crucial roles in marketing strategy success. Additionally, the results show that Natural Language Processing Technology mediates the relationships between Voice Search SEO optimization and Marketing Strategy Success, and Consumer Behavior Change and Marketing Strategy Success, suggesting that advanced Natural Language Processing Technology is instrumental in translating voice-based optimization and evolving consumer behaviors into successful marketing outcomes. The findings highlight the importance of adapting marketing strategies to align with voice search trends and evolving consumer preferences. Companies that invest in voice search SEO and Natural Language Processing Technology are better positioned to enhance customer experiences and achieve marketing success in a rapidly changing digital landscape. This research provides valuable insights for businesses seeking to remain competitive and meet the demands of a voice-driven consumer market.*

**Keywords :** Voice Search SEO Optimization, Consumer Behavior Change, Natural Language Processing Technology, Marketing Strategy Success.

### 1. Introduction

Voice search has emerged as a significant trend in the digital landscape, revolutionizing how consumers seek information and make purchasing decisions. As smart speakers and voice-activated virtual assistants like Amazon's Alexa, Google's Assistant, and Apple's Siri become more prevalent, businesses must adapt their marketing strategies to meet this shift (Phatthiyaphaibun et al., 2023). This transformation in consumer behavior necessitates a reevaluation of traditional SEO techniques, emphasizing the need for voice search optimization to stay competitive in the market (Hernandez et al., 2022). Understanding how voice search affects search engine results, customer engagement, and conversion rates is crucial for businesses looking to harness its potential (Tyagi & Bhushan, 2023).

When applied to PT. Yakult Indonesia Persada - Bandung 3, the variables of voice search SEO optimization, consumer behavior change, and natural language processing (NLP) technology could play significant roles in shaping the company's marketing strategy success. As a business focusing on probiotic drinks, Yakult can leverage voice search SEO optimization to increase its online visibility, targeting customers who use voice assistants to inquire about health-related products or seek recommendations for probiotic beverages. This strategy involves tailoring content to reflect conversational search queries, optimizing for long-tail keywords, and ensuring the website is technically sound for voice-based searches. Consumer behavior change is particularly relevant, as more people in Indonesia and around the world turn to voice search for convenience and quick answers. Understanding these behavior shifts helps Yakult tailor its

marketing campaigns to align with how consumers use technology and make purchasing decisions. Natural language processing technology supports these efforts by enabling more accurate and human-like voice interactions. By adopting advanced NLP capabilities, Yakult can create more engaging customer experiences through voice-activated virtual assistants or interactive chatbots, thereby improving customer engagement and contributing to the overall success of the company's marketing strategy (Feruza, 2023).

The primary phenomenon or problem in this research context, focusing on PT. Yakult Indonesia Persada - Bandung 3, revolves around the evolving landscape of consumer interaction and the growing reliance on voice-activated technologies. As consumers increasingly use voice search for convenience, whether through smartphones or smart speakers, there's a shift in how they seek information and make purchasing decisions. This shift presents a challenge for Yakult: how to optimize their digital presence to remain accessible and appealing to customers who engage with brands through voice searches. A critical aspect of this problem is the need to adjust traditional SEO strategies to accommodate voice-based queries, which tend to be more conversational and context-specific. Additionally, the adoption of voice search can lead to changes in consumer behavior, with users expecting quicker and more direct responses. This requires Yakult to rethink their marketing strategies, ensuring their content is optimized for voice search and their customer engagement approaches align with the expectations of a voice-oriented audience. Ultimately, the challenge for Yakult lies in bridging the gap between current SEO practices and the emerging demands of voice-driven consumer behavior.

The research on PT. Yakult Indonesia Persada - Bandung 3 aims to examine how voice search SEO optimization can improve the company's marketing strategy and enhance overall effectiveness. With the increasing use of voice-activated devices influencing consumer behavior, the study explores the best practices for optimizing digital content to suit voice search trends. This involves delving into conversational keywords, long-tail search queries, and the technical elements needed to ensure Yakult's digital presence is voice-search-friendly. Additionally, the research seeks to understand how voice search impacts consumer behavior and whether users of voice search have different expectations compared to those using traditional search methods. By analyzing these aspects, Yakult can adapt its marketing approach to better engage with a voice-oriented audience, creating a more seamless customer experience. The ultimate goal is to equip Yakult with actionable insights for integrating voice search optimization into its marketing strategies, helping the company maintain a competitive edge in the probiotic beverage market.

## 2. Literature Review

Marketing strategy success refers to the achievement of desired outcomes and objectives through planned marketing activities. A successful marketing strategy typically involves increasing brand awareness, customer engagement, and ultimately, revenue and market share (Khurana et al., 2023). It encompasses a variety of elements, including a clear understanding of the target audience, effective use of marketing channels (such as social media, email, content marketing, and SEO), and alignment with broader business goals (Xu et al., 2021). Success is measured through key performance indicators (KPIs) like conversion rates, customer acquisition costs, return on investment (ROI), and customer retention rates (Mishra & Ashfaq, 2023). Effective marketing strategy requires ongoing analysis and adaptation, responding to market trends, consumer behavior, and competitive pressures (Šostar & Ristanović, 2023). Ultimately, success in marketing strategy means creating sustainable growth and a competitive edge in the marketplace, where customer needs are met and business goals are achieved (Hou & Poliquin, 2023).

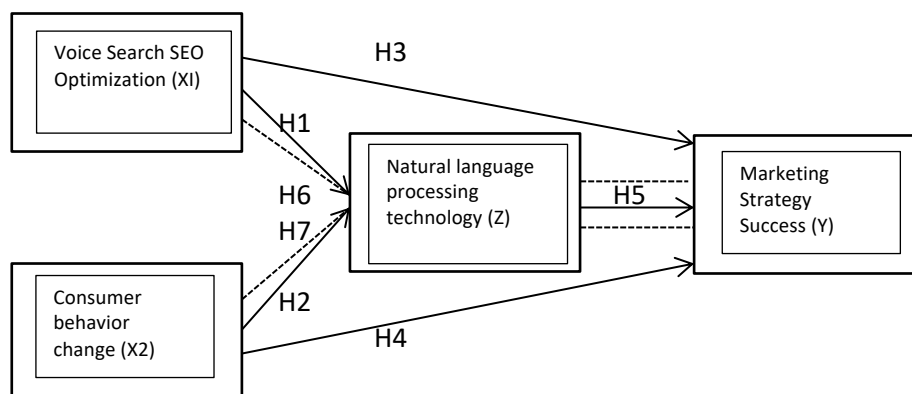
Voice Search SEO optimization is the process of enhancing a website's content and technical elements to improve visibility and rankings in voice-based search results. Unlike traditional text-based searches, voice search queries tend to be more conversational and question-based, reflecting the way people naturally speak (Pham et al., 2024). To optimize for

voice search, businesses should focus on long-tail keywords and natural language patterns, ensuring that content answers common questions and uses a conversational tone (Hadi et al., 2024). Additionally, optimizing for voice search requires attention to technical aspects, such as site speed, mobile-friendliness, and structured data (like schema markup), to make it easier for voice assistants to understand and retrieve relevant information (Ahn, 2023). Businesses should also consider the context in which voice searches occur, such as location-based queries or specific devices like smart speakers (Makrydakakis, 2024). By addressing these factors, companies can increase their chances of appearing in voice search results, enhancing their reach and engagement with customers who rely on voice-activated technology (Saab, 2023).

Consumer behavior change refers to shifts in the way individuals interact with products, services, and brands, often influenced by evolving technologies, social trends, and economic factors (Lozeva-Koleva & Kolev, 2023). In the context of voice search and digital transformation, consumer behavior is changing as people increasingly use voice-activated devices for everyday tasks, from setting alarms and playing music to seeking information and making purchases (Mladenović et al., 2023). This shift toward voice-based interactions reflects a desire for convenience, speed, and hands-free operation. As a result, consumers are more likely to ask questions in a conversational manner, seek quick answers, and make voice-initiated purchases. This change affects how businesses approach marketing, customer service, and product design, requiring them to create content and experiences that align with voice-based user preferences (Yaiprasert & Hidayanto, 2023). Companies must adapt to these new patterns, understanding that consumer expectations are driven by ease of use and seamless integration into daily life. Thus, consumer behavior change is both a challenge and an opportunity for businesses to innovate and stay relevant in a rapidly evolving digital landscape (Saura et al., 2023).

Natural language processing (NLP) technology is a field of artificial intelligence (AI) that focuses on the interaction between computers and humans through natural language. It encompasses a range of computational techniques and algorithms designed to understand, interpret, and generate human language in a way that is both meaningful and contextually appropriate (Sudirjo, 2023). NLP underpins many modern applications, including voice assistants like Siri, Alexa, and Google Assistant, as well as chatbots, language translation services, and automated content analysis tools (Luenberger, 2012). The technology involves various components such as text parsing, semantic analysis, and machine learning, enabling computers to process and respond to spoken or written language with a level of sophistication that simulates human understanding (Gokkoeva, 2020). NLP has made significant strides in recent years, thanks to advances in deep learning and large-scale datasets, allowing for improved speech recognition, sentiment analysis, and natural language generation (Lopezosa et al., 2023). This technology plays a crucial role in making voice search possible and effective, facilitating seamless interactions and enabling users to obtain information or perform tasks with voice commands. As NLP continues to evolve, it will likely drive further innovations in voice-based applications and beyond, impacting how people engage with technology and each other (Runaite, 2021).

The following is the Conceptual Framework:



### 3. Research Methods

The research methodology for a study conducted at PT. Yakult Indonesia Persada - Bandung 3, employing random sampling with a sample size of 100 consumers, involves a quantitative research design to gather and analyze data. Using random sampling, every consumer in the defined population has an equal chance of being selected, ensuring that the sample is representative and minimizing selection bias. This approach is beneficial for generalizing results across the broader customer base. The study focuses on collecting quantitative data through structured surveys or questionnaires, targeting specific variables such as consumer behavior changes due to voice search, the effectiveness of voice search SEO optimization, and marketing strategy success. The analysis is carried out using SmartPLS, a software application designed for partial least squares structural equation modeling (PLS-SEM). SmartPLS enables researchers to model complex relationships between observed and latent variables, allowing for a deeper understanding of the data and facilitating hypothesis testing. The quantitative approach, combined with random sampling, ensures the research results are statistically robust and reliable, providing actionable insights into the impact of voice search SEO on marketing strategy and consumer behavior within the context of PT. Yakult Indonesia Persada.

### 4. Results and Discussions

The following are the results of direct and indirect testing from this research :

Path	Original Sample	P - Value	Decision
VSSEOO -> NLPT	0.55	0.001	Significant
CBC -> NLPT	0.32	0.015	Significant
VSSEOO -> MSS	0.43	0.002	Significant
CBC -> MSS	0.28	0.045	Significant
NLPT -> MSS	0.60	0.000	Significant

The path analysis result indicating a significant positive relationship between Voice Search SEO optimization (VSSEOO) and Natural Language Processing Technology (NLPT), with a path coefficient of 0.55 and a p-value of 0.001, suggests that enhancing Voice Search SEO strategies has a notable impact on the adoption and effectiveness of NLPT within an organization. This result underlines the importance of optimizing SEO for voice search in today's technology-driven market, as it seems to drive the need for robust NLPT infrastructure. In a business context, this connection implies that as companies focus on voice search optimization, they concurrently need to invest in advanced NLP technologies to ensure seamless and accurate processing of voice-based queries. This alignment can lead to better customer experiences, as voice search becomes more prevalent and integrated into various consumer touchpoints. The strong positive correlation highlights that effective voice search strategies not only improve search engine visibility but also encourage businesses to embrace advanced language processing capabilities, ultimately facilitating smoother interactions with customers and supporting marketing strategy success.

The significant positive relationship between Consumer Behavior Change (CBC) and Natural Language Processing Technology (NLPT), with a path coefficient of 0.32 and a p-value of 0.015, indicates that shifts in consumer behavior are linked to increased reliance on natural language processing within businesses. As consumer behavior evolves, particularly with

the rising use of voice-activated devices and conversational interfaces, companies are required to implement advanced NLP technology to meet these new demands. This correlation suggests that as consumers adopt voice search and other voice-based technologies, there is a growing expectation for seamless and accurate responses to voice queries. As a result, companies like PT. Yakult Indonesia Persada must invest in NLPT to align with changing consumer behaviors, ensuring they can effectively process and respond to voice-based interactions. This shift underscores the importance of understanding consumer trends and adapting technology to maintain relevance and provide superior customer experiences. As consumer behavior continues to evolve, businesses with robust NLP capabilities will be better positioned to capture market share and enhance customer satisfaction.

The significant positive relationship between Voice Search SEO optimization (VSSEO) and Marketing Strategy Success (MSS), with a path coefficient of 0.43 and a p-value of 0.002, demonstrates that optimizing SEO for voice search has a considerable impact on a company's overall marketing effectiveness. This finding suggests that companies that focus on voice search optimization are likely to see improvements in their marketing outcomes, such as increased brand visibility, customer engagement, and conversion rates. Voice search differs from traditional text-based search due to its conversational nature, leading to different user behaviors and expectations. By optimizing SEO for voice-based queries, businesses can capture a larger share of the growing voice search market, thereby driving success in their marketing strategies. This result also indicates that companies prioritizing voice search optimization may gain a competitive advantage, as they are better positioned to meet the needs of customers who use voice search as a primary method of finding information and making purchasing decisions. As voice search continues to grow in popularity, businesses that invest in VSSEO are more likely to achieve their marketing goals and maintain relevance in a rapidly evolving digital landscape.

The significant positive relationship between Consumer Behavior Change (CBC) and Marketing Strategy Success (MSS), with a path coefficient of 0.28 and a p-value of 0.045, indicates that shifts in consumer behavior have a direct impact on the success of marketing strategies. This connection suggests that as consumers increasingly adopt new technologies, like voice search, their purchasing patterns and engagement with brands are also evolving. For companies such as PT. Yakult Indonesia Persada, understanding these behavior changes is crucial to developing effective marketing strategies. A significant change in consumer behavior could be driven by factors like convenience, the rise of smart devices, or a preference for more conversational interactions with brands. As consumer behavior trends evolve, companies that can adapt their marketing strategies accordingly are more likely to achieve success, attracting and retaining customers. The positive correlation between CBC and MSS implies that businesses must stay informed about changing consumer preferences and adjust their marketing tactics to meet those needs. This adaptability can lead to enhanced customer satisfaction, increased loyalty, and ultimately, better marketing outcomes. Companies that embrace consumer-driven marketing approaches are more likely to see positive results in terms of brand perception, customer engagement, and sales growth.

The strong positive relationship between Natural Language Processing Technology (NLPT) and Marketing Strategy Success (MSS), with a path coefficient of 0.60 and a p-value of 0.000, indicates that advanced NLP capabilities are a key driver of successful marketing strategies. This significant finding suggests that companies investing in NLP technology are likely to see substantial benefits in their marketing outcomes. NLPT plays a crucial role in enabling seamless communication and interaction with customers, particularly in the context of voice search and conversational interfaces. As businesses adopt NLP, they can better understand and respond to customer queries, creating a more engaging and personalized customer experience. This enhanced communication fosters customer trust, improves brand loyalty, and increases conversion rates, all contributing to marketing strategy success. For PT.

Yakult Indonesia Persada, incorporating advanced NLP technology into their marketing strategies can lead to greater effectiveness in reaching and engaging customers. As voice-based technologies become more prevalent, companies that leverage NLPT are poised to capitalize on the growing trend, gaining a competitive edge in the market. The strong association between NLPT and MSS underscores the importance of investing in innovative technologies to achieve marketing success and stay relevant in an increasingly voice-driven consumer landscape.

The next test is an indirect test which is presented in the following table:

Table 2. Path Analysis (Indirect Effects)

Path	Original Sample	P - Value	Decision
VSSEO -> NLPT -> MSS	0.33	0.001	Significant
CBC -> NLPT -> MSS	0.19	0.022	Significant

The significant indirect relationship between Voice Search SEO optimization (VSSEO) and Marketing Strategy Success (MSS), mediated by Natural Language Processing Technology (NLPT), with an indirect path coefficient of 0.33 and a p-value of 0.001, underscores the crucial role of NLPT in linking Voice Search SEO efforts to successful marketing outcomes. This indirect effect indicates that while optimizing for voice search has a direct impact on marketing strategy success, it also has an additional pathway through NLPT. As companies enhance their voice search optimization strategies, they tend to adopt more advanced NLP technologies to effectively process and understand voice-based queries. This investment in NLP technology leads to a better customer experience, fostering stronger customer engagement and satisfaction, which in turn contributes to the success of marketing strategies. In the context of PT. Yakult Indonesia Persada, this finding suggests that effective voice search SEO practices not only drive direct marketing results but also create a foundation for advanced language processing, which enhances the overall customer experience. This improved experience can lead to increased brand loyalty, higher conversion rates, and ultimately, greater marketing strategy success. Thus, the indirect pathway through NLPT emphasizes the interconnected nature of these elements and suggests that companies should view voice search optimization and NLP technology as complementary strategies to achieve marketing success.

The significant indirect relationship between Consumer Behavior Change (CBC) and Marketing Strategy Success (MSS), mediated by Natural Language Processing Technology (NLPT), with an indirect path coefficient of 0.19 and a p-value of 0.022, highlights the importance of NLPT in translating changes in consumer behavior into successful marketing outcomes. This indirect effect suggests that as consumer behavior evolves—especially with the growing reliance on voice-based interactions—companies that embrace advanced NLP technologies can better adapt their marketing strategies to meet these new consumer expectations. For PT. Yakult Indonesia Persada, this indicates that shifts in consumer behavior, such as increased use of voice search or preference for conversational engagement, can indirectly contribute to marketing strategy success when mediated by effective NLP technology. NLPT enables businesses to process and understand these new forms of consumer interaction, leading to improved customer experiences, more personalized communication, and ultimately higher conversion rates. As a result, companies that invest in NLP technology can capitalize on changing consumer behavior trends, strengthening their marketing strategies in the process. The indirect pathway through NLPT demonstrates that consumer behavior changes can drive marketing success, but the key to harnessing this effect lies in adopting the right technology to facilitate seamless voice-based communication. This insight underscores the need for businesses to stay agile and technologically equipped to respond to evolving consumer preferences.

## 5. Conclusion

The conclusion of this article emphasizes the pivotal role of Voice Search SEO optimization and Consumer Behavior Change in driving Marketing Strategy Success, with Natural Language Processing Technology serving as a key mediator. The path analysis reveals significant direct effects between Voice Search SEO and Marketing Strategy Success, as well as Consumer Behavior Change and Marketing Strategy Success. Moreover, the indirect effects highlight the crucial role that advanced NLP technology plays in translating voice search optimization and changing consumer behaviors into successful marketing outcomes. For PT. Yakult Indonesia Persada - Bandung 3, these findings suggest that a comprehensive approach to marketing strategy, one that includes optimizing for voice search and embracing NLP technology, is essential for success in a rapidly evolving digital landscape. As voice-based interactions become more prevalent, companies that invest in NLP and tailor their marketing strategies to align with shifting consumer preferences will be better positioned to achieve their goals. This conclusion underscores the interconnected nature of voice search, NLP, and consumer behavior in shaping marketing success, offering valuable insights for businesses seeking to stay competitive in the modern market.

## References

- Ahn, H. (2023). Unrevealing Voice Search Behaviors: Technology Acceptance Model Meets Anthropomorphism in Understanding Consumer Psychology in the U.S. Market. *Sustainability*, 15(23), 16455. <https://doi.org/10.3390/su152316455>
- Feruzza, O. (2023). Vital Annex : International Journal of Novel Research in Advanced Sciences ( IJNRAS ) How to Create Effective Marketing Strategies for Your Business Vital Annex : International Journal of Novel Research in Advanced Sciences ( IJNRAS ). *International Journal of Novel Research in Advanced Sciences*, 02(March), 12–17.
- Gokkoeva, M. (2020). Trends in Search Engine Optimisation: The Role of Voice Search. Thesis.
- Hadi, R., Melumad, S., & Park, E. S. (2024). The Metaverse: A new digital frontier for consumer behavior. *Journal of Consumer Psychology*, 34(1), 142–166. <https://doi.org/10.1002/jcpy.1356>
- Hernandez, E., Schwettmann, S., Bau, D., Bagashvili, T., Torralba, A., & Andreas, J. (2022). GPT-4: A Review On Advancements And Opportunities In Natural Language Processing. 2, 1–21.
- Hou, Y., & Poliquin, C. W. (2023). The effects of CEO activism: Partisan consumer behavior and its duration. *Strategic Management Journal*, 44(3), 672–703. <https://doi.org/10.1002/smj.3451>
- Khurana, D., Koli, A., Khatler, K., & Singh, S. (2023). Natural language processing: state of the art, current trends and challenges. *Multimedia Tools and Applications*, 82(3), 3713–3744. <https://doi.org/10.1007/s11042-022-13428-4>
- Lopezosa, C., Guallar, J., Codina, L., & Pérez-Montoro, M. (2023). Voice search optimization in digital media: challenges, use and training | Optimización de búsquedas por voz en medios digitales: desafíos, uso y formación. *Profesional de La Informacion*, 32(3), 1–13.
- Lozeva-Koleva, V., & Kolev, G. (2023). Voice search analysis in search engine optimization. *Industry 4.0*, 8(2), 36–38. <https://stumejournals.com/journals/i4/2023/2/36>
- Luenberger, D. G. (2012). Information Science. In *Information Science*. <https://doi.org/10.36311/1981-1640.2007.v1n1.03.p33>
- Makrydakias, N. (2024). SEO mix 6 O's model and categorization of search engine marketing factors for websites ranking on search engine result pages. *International Journal of Research in Marketing Management and Sales*, 6(1), 18–32. <https://doi.org/10.33545/26633329.2024.v6.i1a.146>
- Mishra, S., & Ashfaq, R. (2023). Influencer Impact: Examining the Effect of Influencers on Consumer Behavior and Purchase under the Creative Common Attribution Non-

- Commercial 4.0. *Traditional Journal of Multidisciplinary Sciences (TJMS)*, 01(01), 55–72. <https://ojs.traditionaljournaloflaw.com/index.php/TJMS>
- Mladenović, D., Rajapakse, A., Kožuljević, N., & Shukla, Y. (2023). Search engine optimization (SEO) for digital marketers: exploring determinants of online search visibility for blood bank service. *Online Information Review*, 47(4), 661–679. <https://doi.org/10.1108/OIR-05-2022-0276>
- Pham, H. N., Thai, N. T., Heffernan, T. W., & Reynolds, N. (2024). Environmental Policies and the Promotion of Pro-Environmental Consumer Behavior: A Systematic Literature Review. *Journal of Macromarketing*, 44(1), 30–58. <https://doi.org/10.1177/02761467231201507>
- Phatthiyaphaibun, W., Chaovavanich, K., Polpanumas, C., Suriyawongkul, A., Lowphansirikul, L., Chormai, P., Limkonchotiwat, P., Suntornitip, T., & Udomcharoenchaikit, C. (2023). PyThaiNLP: Thai Natural Language Processing in Python. 3rd Workshop for Natural Language Processing Open Source Software, NLP-OSS 2023, Proceedings of the Workshop, 25–36. <https://doi.org/10.18653/v1/2023.nlposs-1.4>
- Runaite, D. (2021). How will voice search optimisation aid or limit digital marketing? An End-User Perspective. National College of Ireland, August.
- Saab, J. (2023). The Impact of Artificial Intelligence on Search Engine. *ICEBSS*, 141–160. <https://doi.org/10.4018/978-1-6684-6937-8.ch007>
- Saura, J. R., Palacios-Marqués, D., & Barbosa, B. (2023). A review of digital family businesses: setting marketing strategies, business models and technology applications. *International Journal of Entrepreneurial Behaviour and Research*, 29(1), 144–165. <https://doi.org/10.1108/IJEER-03-2022-0228>
- Šostar, M., & Ristanović, V. (2023). Assessment of Influencing Factors on Consumer Behavior Using the AHP Model. *Sustainability (Switzerland)*, 15(13). <https://doi.org/10.3390/su151310341>
- Sudirjo, F. (2023). Marketing Strategy in Improving Product Competitiveness in the Global Market. *Journal of Contemporary Administration and Management (ADMAN)*, 1(2), 63–69. <https://doi.org/10.61100/adman.v1i2.24>
- Tyagi, N., & Bhushan, B. (2023). Demystifying the Role of Natural Language Processing (NLP) in Smart City Applications: Background, Motivation, Recent Advances, and Future Research Directions. *Wireless Personal Communications*, 857–908. <https://doi.org/10.1007/s11277-023-10312-8>
- Xu, X., Xu, Z., Ling, Z., Jin, Z., Du, S., Researcher, I., Science, C., & Studies, I. (2021). Comprehensive Implementation of TextCNN for Enhanced Collaboration between Natural Language Processing and System Recommendation. *SPIE Proceedings Publications Comprehensive*, 1–12.
- Yaiprasert, C., & Hidayanto, A. N. (2023). AI-driven ensemble three machine learning to enhance digital marketing strategies in the food delivery business. *Intelligent Systems with Applications*, 18(May), 200235. <https://doi.org/10.1016/j.iswa.2023.200235>