

# Implementation of Artificial Intelligence based on Natural Language Processing to Enhance MSME Sales

Enok Tuti Alawiah<sup>1</sup>, Dini Setyorini<sup>2</sup>, Helina Apriyani<sup>3</sup>  
<sup>1,2,3</sup>Information System, Universitas Bina Sarana Informatika, Indonesia  
Email: enok.etw@bsi.ac.id<sup>1</sup>, dini.die@bsi.ac.id<sup>2</sup>, helina.hld@bsi.ac.id<sup>3</sup>

## Abstract

Micro, small and medium enterprises have contributed to gross domestic product and help support the people's economy. However, there are many challenges in the era of digital transformation so that MSMEs must innovate so that their products can be accepted by the market more widely. This study aims to help MSMEs increase their sales by carrying out digital transformation through a website-based sales information system equipped with a chatbot facility based on natural language processing. The goal is to provide a different experience for customers in shopping online and convenience for MSMEs in providing customer service satisfaction. The implementation of artificial intelligence based on natural language processing is expected to help micro, small and medium enterprises in expanding the market, increasing sales and providing a different experience in shopping.

**Keywords:** natural language processing, chatbot, online sales

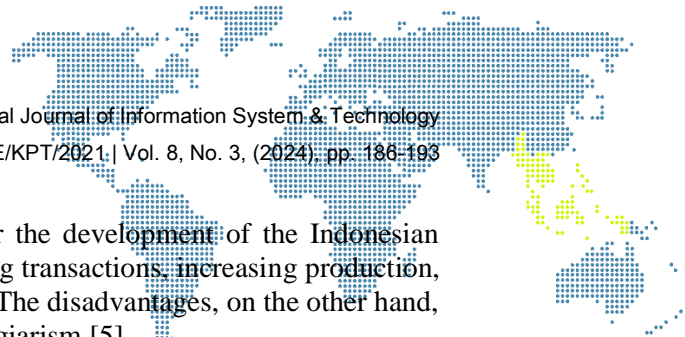
## 1. Introduction

In 2023, Micro, Small, and Medium Enterprises (MSME) business actors will reach around 66 million. MSME contributions reach 61% of Indonesia's Gross Domestic Product (GDP), equivalent to IDR 9,580 trillion. MSMEs absorb around 117 million workers (97%) of the total workforce. This is certainly a positive sentiment to support the growth of the people's economy. Although these MSMEs have good economic growth, MSMEs have major challenges related to innovation and technology, digital literacy, productivity, legality or licensing, financing, branding and marketing, human resources, standardization and certification, equalization of coaching, training, and facilitation, and a single database.

In 2023, MSMEs showed impressive performance through a positive growth trend. In Java, the provinces of DKI Jakarta, West Java, DI. Yogyakarta, and East Java are stable with positive growth throughout 2023. Meanwhile, outside Java, there are 19 provinces that are stable with positive growth. This phenomenon reflects the comparison between regions, MSME business activities in Java and outside Java have increased in line with the improvement of the Indonesian economy over the past few years. In Bogor Regency, there are MSMEs that have good economic growth with a large number of members, namely the Tajur Halang Makmur MSME located in Tajur Halang District. The biggest challenge for MSMEs today is digital business transformation and business competition so that MSMEs need to improve their ability in product marketing so that they can reach a wider market.

Digitalization of MSMEs is very beneficial for business actors because it provides a wider marketing reach and increases public trust in brands that generate profits [1]. The digital economy offers significant opportunities for MSMEs to digitally transform, create markets, and become part of the global supply chain [2]. A successful digital marketing strategy is one that provides complete and easily accessible product information, ease of purchasing, availability of responsive customer service, relevance and personalization, and positive testimonials and reviews from other consumers [3].

Digital marketing and social media play an important role in maintaining the continuity of MSME businesses in facing the challenges posed by the pandemi [4].



The benefits for MSMEs from digitalization for the development of the Indonesian economy include increasing market share, simplifying transactions, increasing production, simplifying payments, and diversifying promotions. The disadvantages, on the other hand, are lack of acceptance, vulnerability to fraud and plagiarism [5].

Based on this, it is very important for MSMEs to carry out digital transformation in order to survive in the era of technological disruption to increase sales and survive in the midst of global competition. However, with the many digital applications, of course there must be added value offered so that the strategy used is appropriate and on target. Therefore, it is very important for MSMEs to implement a digital marketing strategy using artificial intelligence with an automatic chatbot feature based on natural language processing so that it can be used to communicate interactively with customers dynamically. If MSMEs want to survive, then MSME actors really need to maximize the benefits of digital developments [6].

In order for digital marketing strategies to be carried out properly, one of the features that can be added is a chatbot feature based on natural language processing. Natural Language Processing (NLP) is to provide the ability for computer users to understand what users are saying to interact and answer user questions according to the options provided by the developer [7].

Chatbot is an application in the Natural Language Processing (NLP) science group based on Artificial Intelligence (AI) or also known as Artificial Intelligence which can simulate a conversation between users like via SMS applications, websites, private chatrooms, or via mobile applications [8].

Natural Language Processing (NLP) or often abbreviated as NLP is a branch of artificial intelligence where computers are designed to communicate with humans using natural language AND facilitate communication between humans and computers in terms of searching for information [9].

Based on the observations that have been made, it is necessary to provide promotion and sales support for MSMEs in order to significantly increase their sales turnover. Tajur Halang Makmur. To support the transformation of Tajur Halang MSMEs in an effort to increase sales, this study aims to design and implement a sales information system equipped with a chatboot based on Natural Language Processing Language that can be used interactively by customers in making transactions and providing a different experience in shopping online.

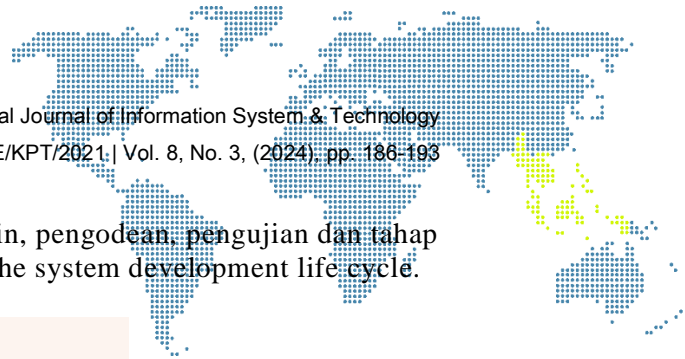
## 2. Research Methodolgy

### a. Research Method

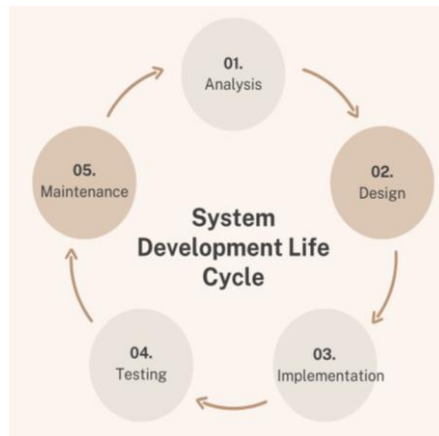
The research method used was observation, interview and literature study. The observation method was carried out by conducting a direct review of the study object, namely members of the Tajur Halang Makmur UMKM. Observations were carried out to determine the condition of UMKM in running their businesses. Then interviews were conducted with members of the Tajur Halang Makmur UMKM to find out the problems faced by UMKM. In this method, a literature study was also carried out to strengthen theoretical studies related to the problems faced by UMKM from various reference sources related to the research studied regarding the obstacles of UMKM in product marketing and UMKM efforts to increase sales of their products.

### b. System Development

System development is designed with the system development life cycle method. SDLC is a development stage method that has 5 stages, namely planning, analysis, design, program coding, maintenance [10]. Model SDLC air terjun (*waterfall*) sering juga disebut model sekuensial linier (*sequential linier*) atau alur hidup klasik (*classic life cycle*). Model air terjun menyediakan pendekatan alur hidup perangkat lunak secara



sekuensial atau terurut dimulai dari analisis, desain, pengodean, pengujian dan tahap pendukung [11]. The following are the stages of the system development life cycle.



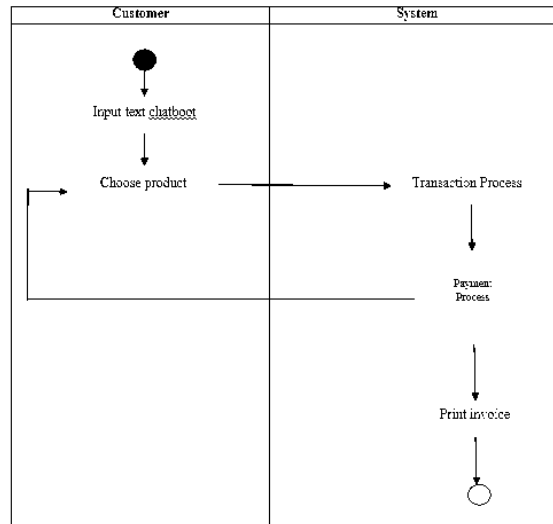
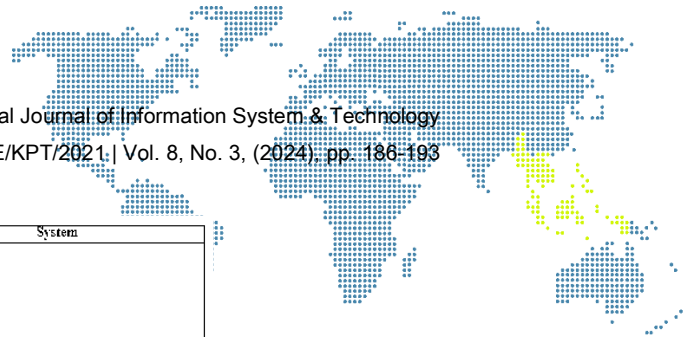
**Figure 1.** System Development Life Cycle

The following is an explanation of the stages:

1. Analysis  
 The analysis is done by analyzing user and system needs. Analysis of user needs consisting of website administrators and customers, namely customers who buy MSME products. While the analysis of system needs is to analyze the needs of website design consisting of product menus, transaction menus and chatbot menus based on natural language processing that can be used by customers to interact in real time.
2. Design  
 Design is designing the user interface display consisting of front end and back end menus. The front end menu contains the interface display menu that can be accessed by the user consisting of product menus, transactions, and chatboot. While the design of the back end menu consists of product management menus, transactions and administrator management. In this stage, the design of the Unified Modeling Language diagram is also carried out consisting of use cases and activity diagrams as well as database design with entity relationship diagrams.
3. Implementation  
 In the implementation stage, the integrity of the interface design is carried out by integrating the design and database as well as system interaction with hardware in the operational environment of the system.
4. Testing  
 The stages are carried out by testing the system to find and fix bugs or problems to ensure that the system functions properly according to the desired objectives. Testing is carried out using the black box testing method, namely testing the input and output of the system so that the system can run as expected.
5. Maintenance  
 This is done by performing maintenance and repairing the system after implementation to ensure optimal performance and meet user needs so that the system is available for use.

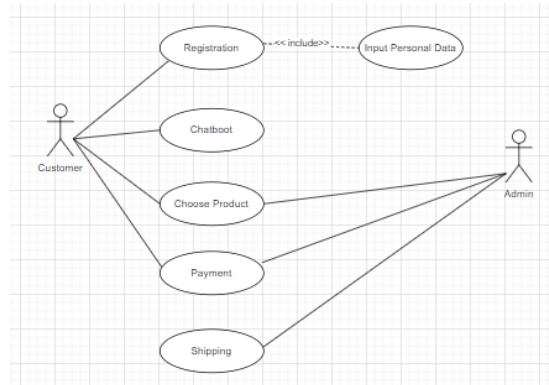
### 3. Result and Discussion

Based on the design of the system developed. Here is the activity diagram, namely:



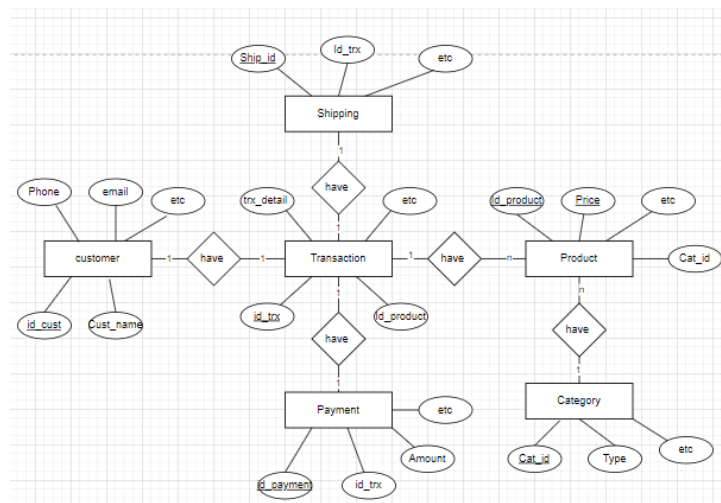
**Figure 2.** Activity Diagram

The following is the use case diagram, namely:

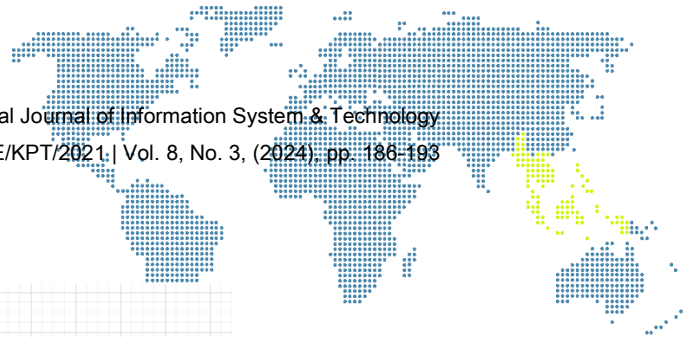


**Figure 3.** Use Case Diagram

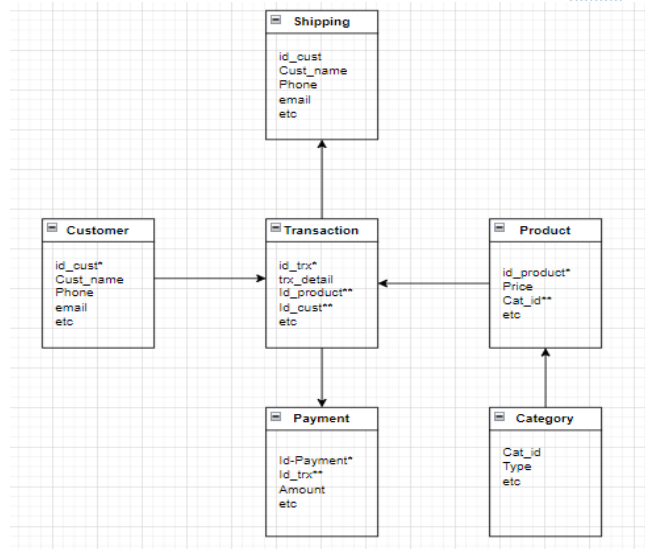
The next step is to design the database display design which is designed using Entity Relationship Diagram and Logical Record Structure:



**Figure 4.** Entity Relationship Diagram

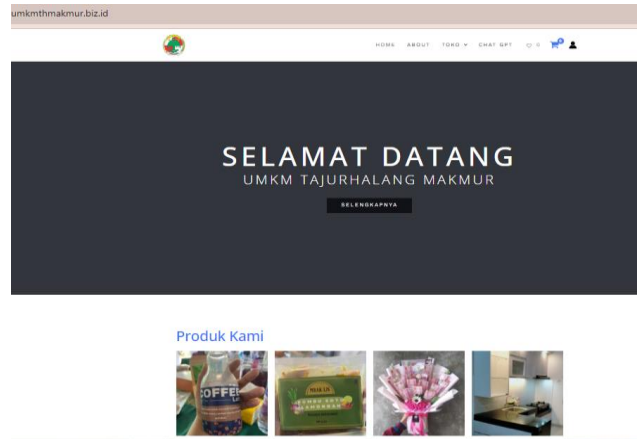


The following is the Logical Record Structure:



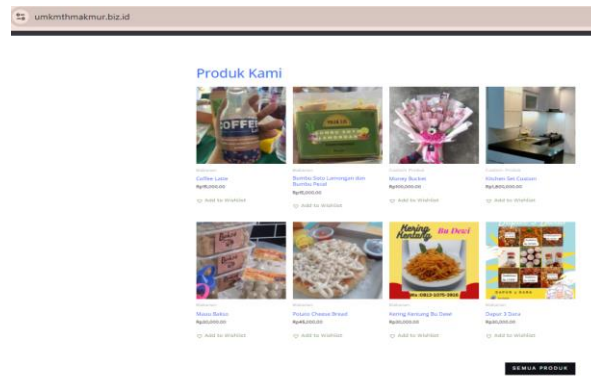
**Figure 5.** Logical Record Structure

Here is a design of the user interface design

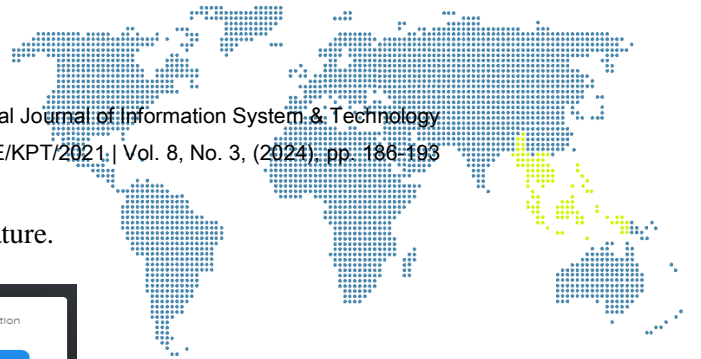


**Figure 6.** User Interface Design

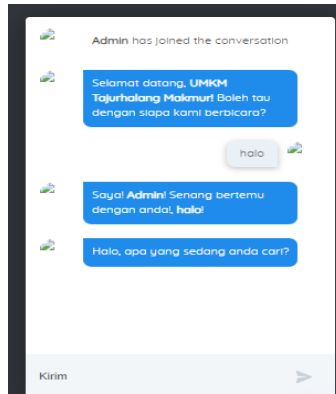
Here is the product display design design



**Figure 7.** Product Interface Design

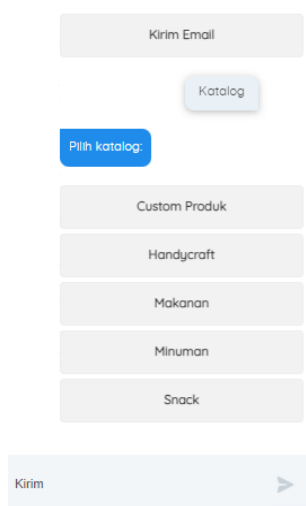


Here is a design for the appearance of the chatbot feature.



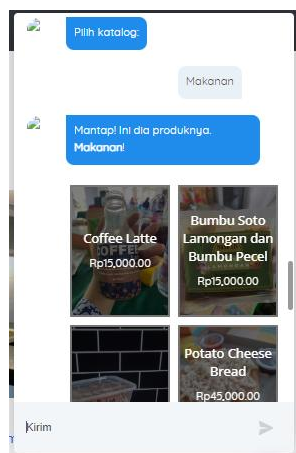
**Figure 8.** Chatboot Fitur

Here is a design for the appearance of the chatbot feature.

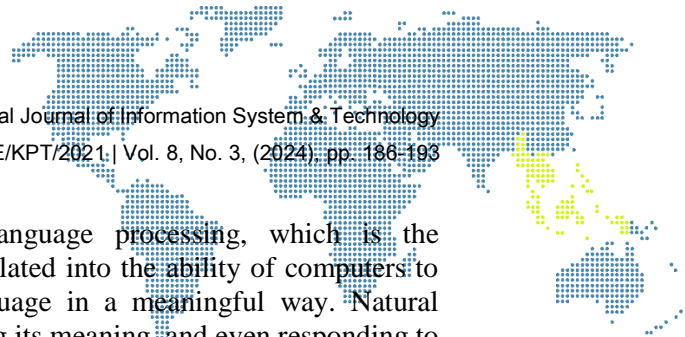


**Figure 9.** Chatboot Fitur

Here is a design for the appearance of the chatbot feature.



**Figure 10.** Chatboot Fitur



The chatbot feature above utilizes natural language processing, which is the implementation of artificial intelligence that is translated into the ability of computers to understand, interpret, and respond to human language in a meaningful way. Natural language processing works by reading text, analyzing its meaning, and even responding to questions or instructions in human language. This is useful for MSMEs to help increase sales by providing fast service and providing an effective and easy shopping experience. Customers get the experience of a fast response from the administrator who is seemingly on standby to serve customers for 24 hours even though it is served by an artificial intelligence feature. This strategy is carried out to increase marketing and help MSMEs market their products more widely with optimal reach.

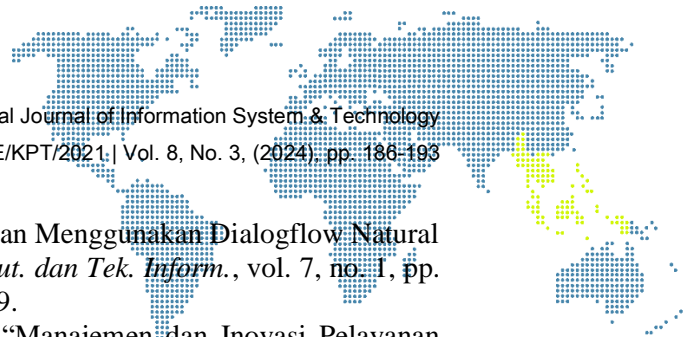
The implementation of chatboot with NLP technology allows it to look like a human when conversing with customers. The implementation of NLP-based chatboot aims to help increase the sales turnover of Tajur Halang Makmur UMKM customers so that they can provide quality customer service while keeping operational costs to a minimum with maximum results.

#### 4. Conclusion

UMKM Tajur Halang Makmur is a micro, small and medium enterprise that has many members in Tajur Halang District. The majority of UMKM actors sell food online through personal channels. This study aims to help organizations collect their members' sales through a digital-based platform that functions as an online sales medium. Online sales may seem ordinary, but the implemented platform is equipped with features that can help customers chat automatically, namely a chatboot based on natural language processing which is expected to help partners improve customer service. Customers are given a different experience in making purchases of goods with the automatic chatboot feature as if they were served directly by an operator, thus helping customers choose and find out about the products offered by UMKM. This study aims to carry out digital transformation in improving the quality of UMKM sales in order to increase sales turnover to help the growth of UMKM members in order to expand their market share and increase their sales turnover.

#### References

- [1] D. R. Barus, H. Natanael Simamora, M. Glora Surya Sihombing, J. Panjaitan, and L. Susana Saragih, "Tantangan dan Strategi Pemasaran UMKM di Era Teknologi dan Digitalisasi," *J. Creat. Student Res.*, vol. 1, no. 6, pp. 357–365, 2023.
- [2] D. W. Rohmana, "Peranan Ekonomi Digital dalam Peningkatan Pertumbuhan UMKM: Peluang Dan Tantangan," *Indones. Proc. Annu. Conf. Islam. Law Sharia Econ.*, vol. 1, no. 1, pp. 42–48, 2023.
- [3] M. Sirodjudin and S. Sudarmiadin, "Implementasi Digital Marketing Oleh UMKM Di Indonesia: A Scoping Review," *J. Ekon. Bisnis dan ...*, vol. 2, no. 2, pp. 20–35, 2023.
- [4] H. Sukoco and A. Krisnaresanti, "Penggunaan Media Sosial Sebagai Adaptasi Strategi Pemasaran Umkm Saat Pandemi Covid-19: Tinjauan Literatur," *J. Manajemen, Akuntansi, Ekon.*, vol. 3, no. 1, pp. 32–40, 2024.
- [5] C. I. S. Puspa, Dini Nur Oktavia Rahayu., and Muhamad Parhan, "Transformasi Pendidikan Abad 21 dalam Merealisasikan Sumber Daya Manusia Unggul Menuju Indonesia Emas 2045," *J. Basicedu*, vol. 7, no. 5, pp. 3309–3321, 2023.
- [6] A. R. Saputra and M. Malabay, "Perencanaan Strategi Dan Implementasi Sistem Penjualan Umkm Go-Digital Berbasis Web (Studi Kasus Umkm Eskimo)," *Ikraith-Informatika*, vol. 6, no. 3, pp. 151–160, 2022, doi: 10.37817/ikraith-informatika.v6i3.2219.
- [7] G. Syahrani, S. Sevira, and A. Yunizar Pratama Yusuf, "Rancangan Chatbot



- Rekomendasi Coffee Shop Jabodetabek Dengan Menggunakan Dialogflow Natural Language Processing,” *SKANIKA Sist. Komput. dan Tek. Inform.*, vol. 7, no. 1, pp. 74–84, 2024, doi: 10.36080/skanika.v7i1.3139.
- [8] R. Ramadani, Y. Cikusin, and R. WulanS, “Manajemen dan Inovasi Pelayanan Perpustakaan Umum Kota Malang terhadap Kepuasan Pengguna Jasa Layanan pada Perpustakaan Umum dan Arsip Kota Malang,” *J. Respon Publik*, vol. 13, no. 4, pp. 1–11, 2019.
- [9] M. Furqan, S. Sriani, and M. N. Shidqi, “Chatbot Telegram Menggunakan Natural Language Processing,” *Walisongo J. Inf. Technol.*, vol. 5, no. 1, pp. 15–26, 2023, doi: 10.21580/wjit.2023.5.1.14793.
- [10] Ichsan Raksa Gumilang, “Penerapan Metode Sdlc (System Development Life Cycle) Pada Website Penjualan Produk Vapor,” *Jural Ris. Rumpun Ilmu Tek.*, vol. 1, no. 1, pp. 47–56, 2022, doi: 10.55606/jurritek.v1i1.144.
- [11] M. Bisri Mustofa, F. Shiddiq, K. Miftakhudin, H. Rahmawati, and S. Wuryani, “Utilization of Social Media in Building Personal Branding for Career Women in the Society 5.0 Era,” *Komunika J. Dakwah dan Komun.*, vol. 16, no. 1, pp. 2548–9496, 2022.