Department of Digital Business
Journal of Artificial Intelligence and Digital Business (RIGGS)
Homepage: https://journal.ilmudata.co.id/index.php/RIGGS
Vol. 4 No. 2 (2025) pp: 5555-5565
P-ISSN: 2963-9298, e-ISSN: 2963-914X

Geometric Evaluation of Bends Implications for Traffic Performance: A Systematic Literature Review

Agus Wirdianto[1], Surya Natawibawa K[2], Ahmad Fadillah[3], Arief Rijaluddin[4], Muhammad Isradi[5]
[1,2,3,4] Civil Engginering, Faculty of Engineering, Universitas Majalengka
[5] Faculty of Engineering, Universitas Mercu Buana Jakarta, Indonesia
[1]aguswirdianto40@gmail.com, [2]Suryanataaa8@gmail.com, [3]ahmadfadillah486@gmail.com, [4]arief_rijaluddin@unma.ac.id, [5]isradi@mercubuana.ac.id

Abstrak

Every accident that occurs inevitably involves injured or deceased victims. Cross-country analysis of accident rates at curves is often the focus of comparative research to identify risk factors and possible solutions. This study aims to systematically evaluate the implications of curve geometry design on traffic performance and driving safety. Road curves, particularly those that do not meet geometric standards, are known to be significant accident-prone areas. This study was conducted using a Systematic Literature Review (SLR) approach on 1,000 scientific articles obtained through Google Scholar using the Publish or Perish software. Analysis was conducted using VOSviewer to map keyword relationships, publication trends, and thematic classifications visually and statistically. The study results indicate that aspects such as curve radius, elevation, visibility, driver behavior, traffic signs, and environmental factors are the primary dimensions influencing curve performance. Bibliometric visualization revealed the dominance of related literature in developed countries and indicated a shift in research focus toward the use of technology and data to support safety. A conceptual framework was developed by integrating four dimensions: physical design, Environment, user behavior, and safety effectiveness. This research is expected to provide a theoretical and technical foundation for formulating safer road design standards and promoting the development of data-driven safety policies.

Keywords: Curved Road Geometry, Road Safety, Curves, Systematic Literature Review

1. Introduction

Accidents are unplanned and uncontrollable situations [1]. According to [2], A traffic accident is an unexpected and unintended event involving a motor vehicle, whether with road users or others, resulting in personal injury or property damage. Meanwhile, “accident” refers to an event that causes someone to suffer harm [3]. Every accident always has victims, whether hurt or dead [4]. In comparative research, cross-country analysis of bend accident rates often focuses on identifying risk factors and potential solutions.

Sharp bends are locations with a high rate of traffic accidents. One of the suspected causes of Bend design is not by established planning standards. This is exacerbated by Driving above the speed limit [5]. Corners are highly prone to accidents, and they cause 25% to 30% of deaths and damage [6]. Horizontal alignment is the shape of a curve resulting from the projection of a line on the z- and y-axis planes. It is also called a bend or turn [7], primarily due to insufficient geometry of roads and signs. Horizontal curves are among the most critical factors affecting road efficiency and safety [8]. Many bends can cause accidents because the bend radius does not follow Bina Marga guidelines [9]. Similar patterns have also been seen in several ASEAN nations, leading to a greater emphasis on curve design in road safety action plans across the country. A well-designed road is expected to make drivers feel comfortable and safe [10].

Indonesia's bends, which are frequently places with a high accident risk, are a significant obstacle to road infrastructure development. Highways are essential to some countries' infrastructure because they can help with all types of transportation [11]. This is an important issue that requires special attention throughout the country. Accidents on bends can result from road designs that do not meet standards [12]. One of the geometric design of a good road is on a longitudinal piece of a road there is a horizontal alignment [13].The geometric design of roads, along with the lack of appropriate warning signs, makes it more risky for road users in various places. Accidents

often occur in areas with many curves . Especially on bends where most young people like to turn at high speeds. In a way, the shape of the road determines how safe and comfortable we are when using it [14]. Road geometric planning aims to optimize the ratio of implementation costs to the level of use in addition to providing safe infrastructure and effective traffic flow services [15].

Road bends in various locations are often worsened by a variety of geographical conditions, ranging from flood-prone lowlands to steep mountains. As a result, in order to maintain smoothness and safety, it is very important to prioritize traffic infrastructure and give priority to other motorists [16]. When driving on bends, a lot of things can affect the risk level, like road bends that can limit visibility and visibility distance. One way to improve road safety is to improve the geometric design of the road to reduce the occurrence of accidents on the road [17]. Geometric roads must be properly planned to reduce the number of accidents [18]. Road designs should also take rainwater runoff into account [19]. Furthermore, the width of side roads and traffic sign attributes, such as visibility, frequency, and location, can be affected. Instead, variables that affect driver behavior include speed, control, fatigue, and distraction [20].

Therefore, an adaptive road planning approach that considers geographical conditions is becoming increasingly important, especially in areas with extreme topographical characteristics. Regular evaluations of road geometric functions and performance, including curves, can help determine the need for improvements or reconstruction [21]. The use of technologies such as 3D modeling and traffic simulation software has also proven effective in redesigning high-risk curves, thereby significantly reducing accidents [22]. This technology-based approach also supports a more accurate and efficient decision-making process, as it is able to visualize the geometric impact on vehicle behavior in real-time before being applied in the field [23].

Because two-lane highways are a vital part of the road network, highway authorities should prioritize improving their geometry because of this study [24]. This study aims to identify the main geometric parameters affecting bend geometry and traffic performance by reviewing the latest international literature. It also makes suggestions for future road design standards. It ensures that drivers can drive safely and without significant problems in normal and emergencies [25].

2. RESEARCH METHOD

We collected and analyzed data through a Systematic Literature Review (SLR) of previous studies that address how bend geometric evaluation affects traffic performance and safety. With SLR, we can identify, review, evaluate, and interpret all studies relevant to the topic we are focusing on [26]. Identification, selection, and analysis of literature from various reliable sources, including research reports, scientific journals, and conference proceedings. SLR is conducted systematically [27]. Criteria were established for including and eliminating literature by topic, year of publication, and quality of research. Furthermore, the study results are studied to find trends, techniques, and shortcomings in implementing road rider safety. This is a bold endeavor, especially when we look at the data that shows how the SLR system has come a long way since its inception. [28].

SLRs have an obligation to adhere to the review protocol [29]. SLR provides a thorough and unbiased analysis of current research, which is important for finding research gaps and encouraging evidence-based practice [30]. Using this method, researchers want to gain a solid theoretical foundation and a comprehensive understanding of best practices for road use. They make systematic literature reviews and find references to academic journals and other research sources that can be used as a reference or theoretical basis for new research. The basic framework and formulation of the problems found are then expanded into analysis through structured steps [31]. New technologies are increasingly being incorporated into SLR methods, allowing for more efficient data collection and analysis, which speeds up the review process while maintaining its integrity [32].

2.1 Basis Data Yang Digunakan

Geometric Evaluation of Curves Implications on Traffic Performance and Safety was chosen to search literature using Publish or Perish and Google Scholar [33]. We decided to use Google Scholar because it has a wide range of Various types of scientific works and journals, including proceedings, books, and these various fields of science available there, which significantly supports the systematic literature review process in our research. Google Scholar also excels in terms of ease of use, open access, and the ability to access regional and local publications that are often not available in paid databases such as [34]. Literature was searched from 2000 to 2025 to get up-to-date and detailed data [35]. The search was done using filters that included keywords, article titles, author names, institutional affiliations, and publication years. To find connections between studies and to determine their significance and impact in the academic field, features like "Cited by" and "Related articles" were also used.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

The VOSviewer application was used to collect the research data. VOSviewer is a network visualization tool that creates maps of publications, countries, journals, or keywords based on relationships between elements [36]. VOSviewer can analyze bibliometric data collected from various sources, such as Scopus, Web of Science, and Google Scholar [37]. In addition, it can perform qualitative analysis, such as cluster identification, citation analysis, and topic mapping [38]. VOSviewer processes bibliographic data by importing RIS files from Publis or Perish (PoP) this application supports the RIS format as the standard for exchanging bibliographic data from various sources. VOSviewer automatically reads and manages the bibliographic data after importing the RIS file. Then, it displays the systematic literature review (SLR) results in a map visualization that includes keyword networks, authorizations, and other relevant information.

2.2 Search Strategy

A determining factor in the success of a bibliometric analysis is how accurate and thorough the search queries we use to find relevant literature are *[39]*. We can search for keywords in the title and abstract to find articles or research on intersection and curve performance. Using Publish or Perish software, a set of articles categorized as "bibliometric analysis" or "systematic review" are searched; keywords used include "Curved road geometry, Road safety, Curves, Systematic Literature Review."The goal of this search is to find 1,000 articles that are evenly distributed according to all five keywords. The search results will include about 200 articles for each keyword.

2.3 Collecting initial statistical data

Documents that meet the criteria and data obtained from Google Scholar are stored in Research Information System (RIS) format [40]. Bibliometric information, abstracts, keywords, and other essential data components are included in the RIS format. In the first stage, data is collected using Publish or Perish software [41]. The Data will be saved in two formats: ris (for displaying data with the VOSviewer program) and CSV (for processing data in Microsoft Excel) [42]. To understand the impact of bend design on driving safety, we must be selective in choosing journals, look for relevant publications, and use specific keywords, especially those that focus on design effectiveness, because complete and ready-to-use guidelines in this field are still rare. Because the complete guidelines on how to use or perish are still far away or difficult to find. The mapping of data made and presented by the standards of scientific writing will make the results of bibliometric analysis as a whole more readable and clear.

3. RESULT AND DISCUSSION

3.1 Visualization Research Keyword Connection

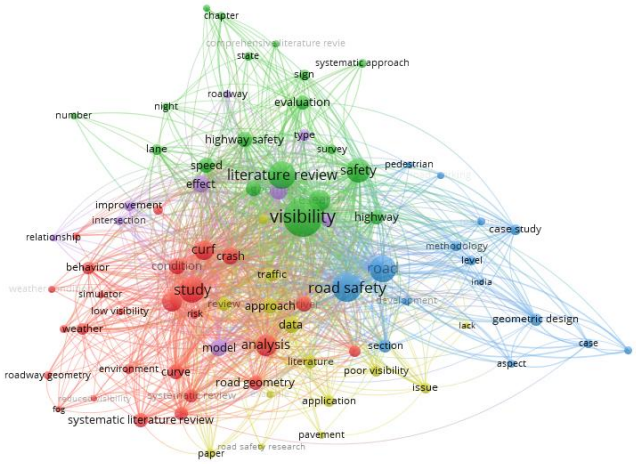

Figure 1Network Visualisation

VOSviewer uses Publish or Perish and 1000 papers for curved road geometry, road safety, visibility, curves, and systematic literature review. In addition, VOSviewer displays various keywords related to the selected keywords, and the correlation results are shown in the figure above.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

VOSviewer data shows that keywords like visibility, road safety, study, literature review, road, and safety are frequently mentioned in research publications. A network map of these keywords is shown in VOSviewer visualizations, with each circle representing a keyword, with the size of the circle indicating the frequency with which the word appears. All the lines connecting the words indicate that they often appear together in one document. For example, the words "planning" and "transport" have a strong connection, meaning they are often spoken of together in traffic performance and safety.

The graph above shows some of the most frequently occurring keywords in the research data set analyzed using VOSviewer, complete with occurrences and relevance levels. The keyword "regulation" has 202 occurrences, indicating that literature review, aspect, safety, and reduced visibility are the primary focuses in the analyzed publications. However, despite its high occurrence count, its relevance level is only 0.17, indicating that this term is commonly used.

In addition, some keywords have high frequency but low relevance, such as roadway geometry and road user, which shows that although they do not appear very often, these words are particular and relevant in describing the core of the study. High-frequency keywords indicate broad and frequently discussed topics, while high-frequency keywords indicate how deep and specific the topic is.

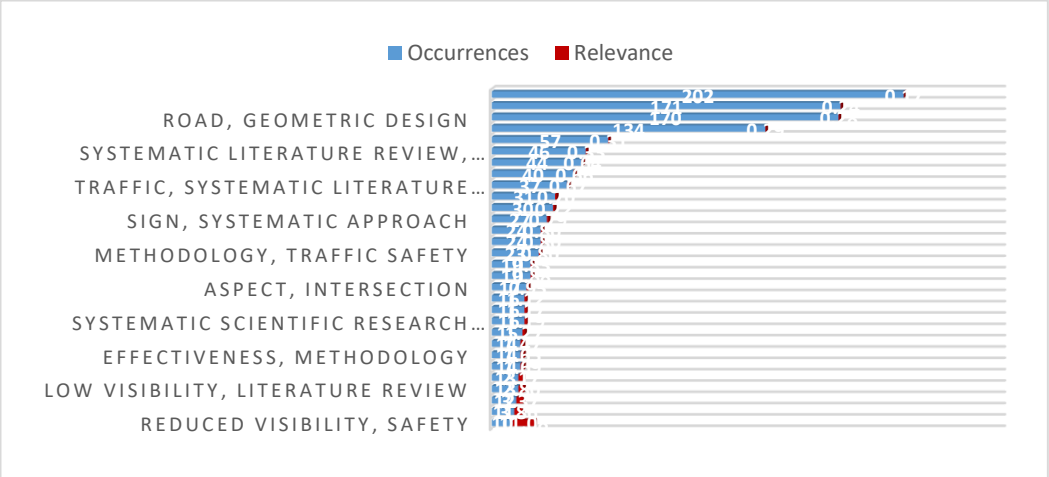

Figure 2 Keyword Graphics

Table 1. Keywords according to the highest studies

Keywords	Total Studies
Literature Review	202
Safety	171
Systematic Literature Review	170
Geometric Design	134
Weather	57
Sign	46
Crash	44

Of the 202 studies, the keyword "literature review" was the most important, indicating a primary focus on infrastructure, according to Table 1. The keywords "safety" and" systematic literature review "are also very important, with 202 and 171 studies highlighting the importance of road and traffic safety, while the keywords" geometry design " and "accident" have 170 and 134 studies, respectively. studies, with a focus on accidents, safety, and de roads.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

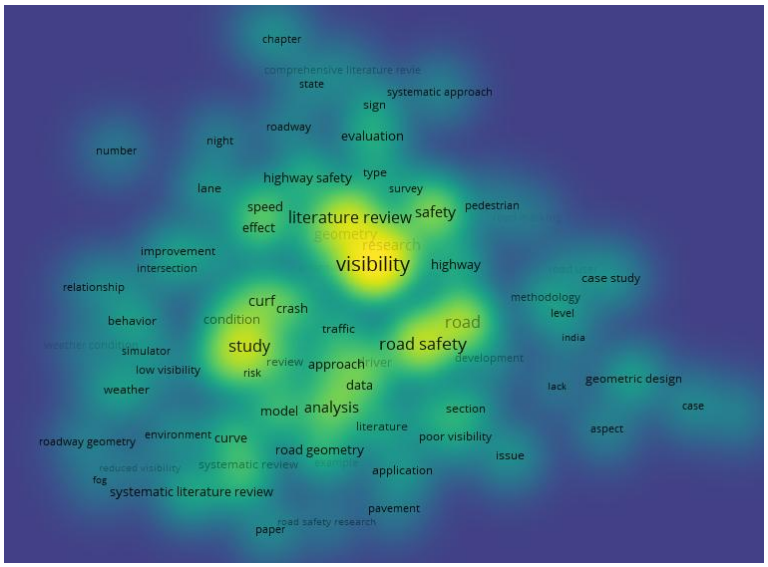

Figure 3 Density Visualisation

Keywords such as visibility and road safety appear to dominate the yellow areas in the study, indicating that they are both popular topics and often the main focus of various studies. In contrast, keywords such as" aspect "and" aspect " seem to have a low frequency of occurrence, indicating that the topic is rarely discussed or only appears sporadically in the study.

3.2 Publication Development by Year

The amount of research and topics studied is growing every year. Therefore, it shows the development of the topic and the number of journals published over time.

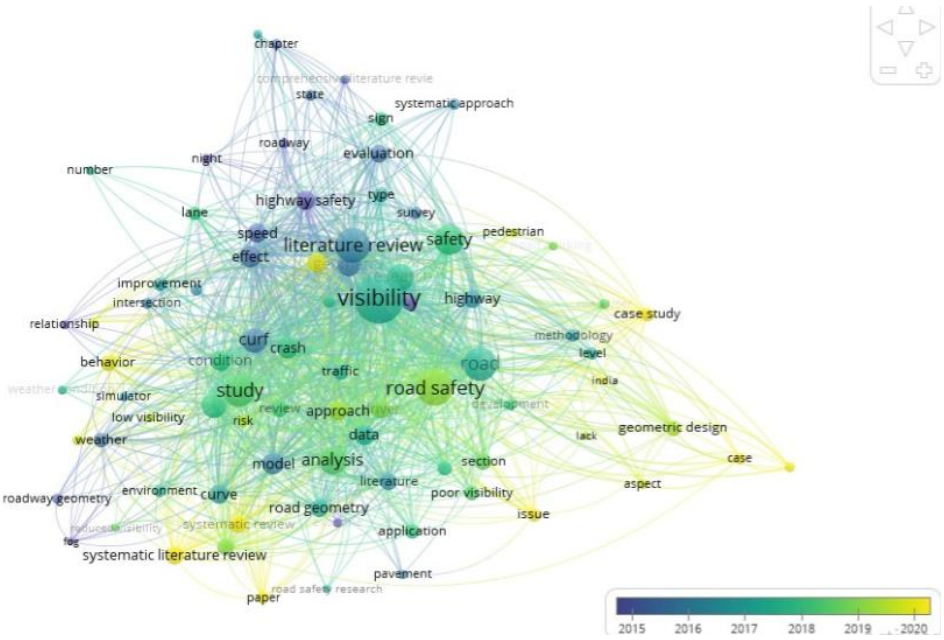

Figure 4 Overlay Visualisation

Words like "paper" and "case study" have been discussed extensively in this study. Overlay visualization uses the color of the keyword to show the year when a keyword became a trend in research and began to appear more often. The 2000s is the year when the keyword was most frequently discussed.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

3.3 Research type determined by publisher and classification of research

To give an idea of the various studies involved in research on the effectiveness of curve designs, Table 2 provides a good overview of the different types of studies available for such research. With 1,000 journals or articles, most of the studies reviewed consisted of journal articles. This indicates that the publication of research results in this field is generally done through peer-reviewed scientific journals. Besides journals and articles, there are also publications in other formats, such as data sets, monographs, and research reports. However, the number of these publications is much smaller. This suggests that empirical studies or in-depth analysis in the form of case studies may still be rare in this field.

Table 2 Publishers and Number of Studies

Publisher	Studies
Elsevier	237
mdpi.com	167
ieeexplore.ieee.org	72
Springer	67
Taylor &Francis	63
journals.sagepub.com	59
rosap.ntl.bts.gov	32
Wiley Online Library	23
researchgate.net	15
books.google.com	14
ascelibrary.org	13
academia.edu	11
ijoms.internationaljournallabs.com	11
Others	216
Total	**1000**

Elsevier and mdpi.com are the two leading publishers that contributed the most studies to this review, with 237 and 167 publications, respectively. These two platforms serve as the primary channels for disseminating research on the evaluation of geometric curves and their implications for traffic performance and safety.

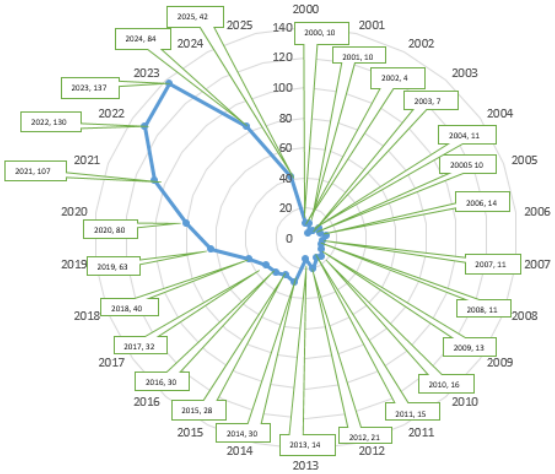

Figure 5 The annual publication trend from 2000 to 2025 shows significant growth in bend research, peaking in 2023

DOI: https://doi.org/10.31004/riggs.v4i2.1473

Figure 5 above is a radar chart or polar chart that illustrates the distribution of publications or data based on year, from 2000 to 2025. Each axis represents one year, and the line length from the center to the edge indicates the number of publications in that year. The labels accompanying each line specify the year and the number of data points, such as "2023, 137," meaning there were 137 publications in that year. The blue lines connecting each point reflect the trend in publication growth over time. In addition, the type of publication in the form of journal articles is the type that is most frequently used compared to other types [43].

This graph shows that before 2014, the number of publications tended to be low and relatively stable but increased significantly after 2019. This increase peaked in 2023 with the most publications, namely 137, before declining slightly in 2024 and 2025. This trend suggests that the studied topics are likely related to road geometry, curves, and traffic safety, as they align with the context of the journal being compiled, making them increasingly attractive to researchers over the past five years. This data also reinforces the argument that issues related to road geometric evaluation are becoming increasingly relevant and vital in both academic discourse and technical policy within the transportation field.

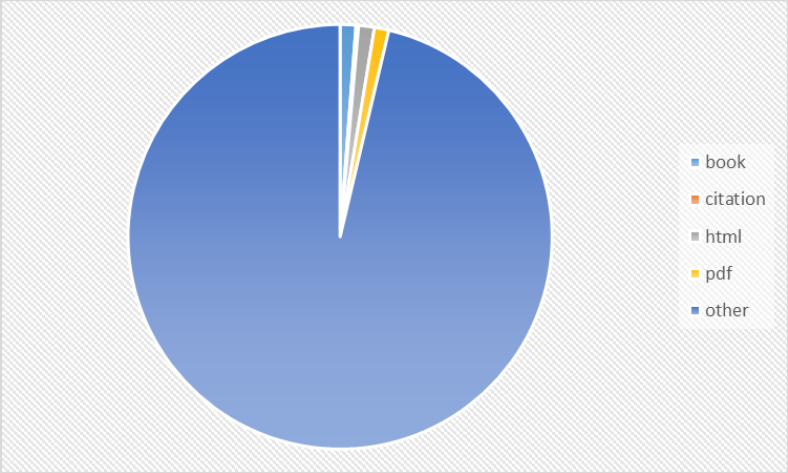

Figure 6 Study Type

From this visualization, the reference sources used are very diverse, covering various types of scientific and non-scientific publications, and each section contributes a different portion to the total data analyzed. Most systematic literature review results are not specifically classified into a particular category, so they are included in the "other" group due to limitations in metadata or automatic classification. Additionally, the number of citations recorded is relatively small, indicating that only a few references originate from direct citations in related publications.

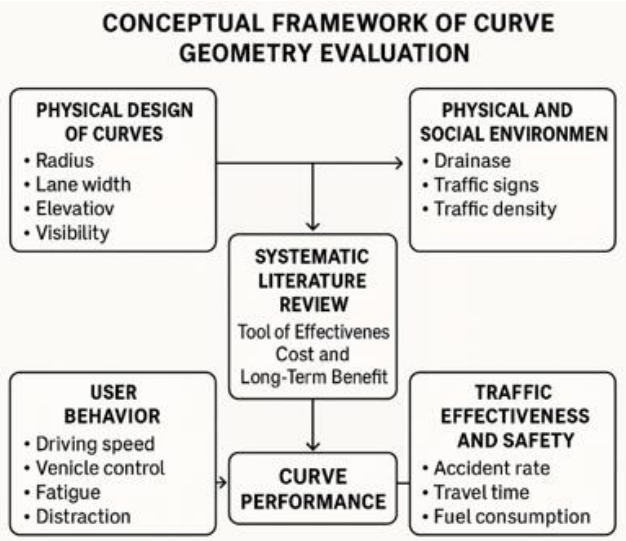

Figure 7 Conceptual framework of curve geometry evaluation

DOI: https://doi.org/10.31004/riggs.v4i2.1473

3.4 Theoretical framework and conceptual framework

This study aims to acquire a conceptual understanding of curve geometry evaluation and its implications [44]. The theoretical framework presented in Figure 7 shows that curve geometry evaluation is not just about road dimensions or curve shapes; it is a complex system that includes technical design, user behavior, environmental factors, and evidence-based analysis through SLR. Preliminary results show that roundabouts or curves as part of the road geometry system significantly impact driving efficiency and safety [45]. International studies emphasize that research contributions are strongly influenced by the regional context; developed countries dominate the scientific publication landscape compared to developing countries, and this reflects differences in technology adoption capacity as well as resource and data limitations.

Systematic research shows that roundabout design is a popular solution, but people differ on how to use it in different places, especially cities [46]. For example, a study in Milton Keynes, England, found that roundabout design can improve traffic safety by 15% and reduce car emissions by 15%. However, this depends a lot on the elements of the design being adapted to said Environment [47].

This structure supports the systematic literature review approach as a basis for finding essential variables that affect cornering performance. Nonetheless, geometric interventions, such as replacing sharp corners with roundabouts or improving curve smoothness, can yield benefits in terms of cost efficiency and road user safety in the long run. This can be demonstrated through theoretical approaches such as the Tool of Effectiveness Cost and Long-Term Benefit.

By creating a conceptual model based on these four dimensions, the study not only focuses on physical design but also integrates environmental factors, user behavior, and socioeconomic context into a holistic framework. With this understanding, we will thoroughly analyze the literature and identify unexplored research gaps to develop evidence-based technical and policy recommendations.

4. CONCLUSION

By evaluating aspects such as the horizontal design of curves, sign characteristics, driver behavior, and geographical conditions, this study aims to uncover important factors that play a role in traffic safety and efficiency at road curves. The entire description in the previous paragraph forms a strong foundation for producing Results and Discussion that not only describe the empirical findings from literature studies and actual data but also explain the relationship between geometric variables and accidents at curves. The results of this research suggest that it can contribute significantly to the formulation of recommendations for safer road geometric designs, particularly on high-risk curves, and support the formulation of national and regional road safety policies. These findings also hold promise for application in developing technical guidelines for road designers, improving early warning systems in the field, and integrating technologies such as innovative signage and AI-based traffic modeling in the future. Going forward, the results of this study can serve as a foundation for more specific follow-up studies, such as simulating driver behavior on curves using a driving simulator, developing a risk classification system based on curve geometry, and utilizing UAV (drone) and LIDAR technology in real-time analysis of road curve conditions. Thus, this research is not only scientifically relevant but also practically applicable to support ongoing efforts to enhance road safety. Future applications are therefore expected to include integration with geographic information systems (GIS) to map dangerous bends and optimize maintenance strategies. In addition, policymakers and engineers can collaborate by adopting these research insights into national geometric design guidelines, ensuring that technological innovation is aligned with regulatory and field-based practices.

References

[1] Y. Van Yallen and H. Yermadona, "Analisis Faktor-Faktor Penyebab Kecelakaan Lalu Lintas Di Jalan Raya Padang-Bukittinggi Km 67," *Ensiklopedia Research and Community Service Review,* vol. 2, no. (1), pp. 240-245, 2022.

[2] F. Iskandar, M. Yenni and N. Berliana, "Determinant of Safety Riding Behavior of Motorcycle Riders," *Community Research of Epidemiology (CORE),* pp. 35-44, 2021.

[3] R. H. Zulka, "Evaluasi Geometrik Jalan Pada Tikungan Rawan Kecelakaan Lalu Lintas (Studi Kasus: Jalan Lintas Sumatra KM 11 Mendalo Darat)," *(Doctoral dissertation, UNIVERSITAS JAMBI),* 2023.

[4] S. Samasal, S. E. Manakane and F. S. Leuwol, "The Impact of Traffic Congestion on Lecture Entrance Hours for Students in the Geography Education Study Program, Faculty of Teacher Training and Education," vol. 2, pp. 54-63, 2024.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

[5] D. Purwanto, A. K. Indriastuti and K. H. Basuki, "Hubungan antara kecepatan dan kondisi geometrik jalan yang berpotensi menyebabkan kecelakaan lalu lintas pada tikungan.," *Media Komunikasi Teknik Sipil,* vol. 21, no. (2), pp. 83-90, 2025.

[6] J. Joshua and A. I. Rifa'i, "Road Geometry Horizontal Alignment Planning Using Manual Design Method (Case Study Highway Kejayaan District â€“Pasrepan District, Pasuruan Regency, East Java STA 2+ 566 to STA 5+ 164)," *LEADER: Civil Engineering and Architecture Journal,,* vol. 1, no. (3), pp. 275-288, 2023.

[7] F. A. Muizz, A. I. Rifa'i and A. Fajarika, "ANALYSIS OF THE SUITABILITY OF HORIZONTAL ALIGNMENT TO DRIVER SAFETY LEVEL NEEDS CASE STUDY OF CIGASONG-MAJA ROAD, MAJALENGKA ROAD," *LEADER: Civil Engineering and Architecture Journal,* vol. 2, no. (3), pp. 818-825, 2024.

[8] Y. Herdiana, A. I. Rifai, M. Taufik and J. Prasetijo, "The Evaluation of Horizontal Alignment Design: A Case Study of Jalan Tarikolot Majalengka," *Asian Journal of Social and Humanities,* vol. 2, no. (11), pp. 2814-2825, 2024.

[9] S. Salsabila, A. I. Rifai and M. Taufik, "The Geometric Design of Horizontal Curves Using The Autocad Civil 3D® Method: A Case Study of Trans Flores Roads," *Indonesian Journal of Multidisciplinary Science,* vol. 1, no. (1), pp. 251-264, 2022.

[10] H. I. Prabawa, Analisis Usia Layan Tanah Dasar Pada Struktur Jalan Kereta Api Berdasarkan Perbedaan Ketebalan Balas, vol. 7, Indonesia,, 2023.

[11] R. Agustian, A. I. Rifai, A. Rijaluddin and J. Prasetijo, "Village Road Geometric Design Using AutoCAD® CIVIL 3D: The Case of Majalengka, Indonesia," *Engineering Proceedings,* vol. 84, no. (1), p. 8, 2025.

[12] H. Sampurna, "EVALUASI TINGKAT KESELAMATAN JALAN PADA TIKUNGAN DI JALAN RAYA AJIBARANG WANGON KM 1+ 650 s/d KM 1+ 950 KABUPATEN BANYUMAS," *ISMETEK,* vol. 14, no. (2), 2022.

[13] I. R. Andito, A. I. Rifai and A. F. Akhir, "The Design of Alignment Horizontal Using Indonesia Highway Design Standard: A Case of Jalan Babat–Tapen, East Java," *Indonesian Journal of Multidisciplinary Science,* vol. 1, no. (1), pp. 199-210, 2022.

[14] A. Adhar, "ANALISIS PENGARUH GEOMETRI JALAN RAYA TERHADAP TINGKAT KECELAKAAN (BLACKSPOT AREA)," *(Doctoral dissertation, Universitas Islam Sultan Agung Semarang).,* 2023.

[15] M. G. Pramadita and A. I. Rifai, "GEOMETRIC EVALUATION OF ROADS ON MAJALENGKA-CIKIJING ROAD: A CASE STUDY OF PASUKAN SINDANGKASIH-JALAN CUCUK DALEM.," *LEADER: Civil Engineering and Architecture Journal,* vol. 2, no. (1),, pp. 541-548, 2024.

[16] G. T. N. Fatimah and A. I. Rifa'i, "ANALYSIS OF UNSIGNALIZED INTERSECTIONS: CASE STUDY OF THE INTERSECTION OF JALAN SUKARAJA WETAN, MAJALENGKA.," *LEADER: Civil Engineering and Architecture Journal,* vol. 2, no. (1), pp. 612-620, 2024.

[17] S. H. Maulana, A. I. Rifai and M. Isradi, "The Horizontal Curved Geometric Redesign on Jalan Kayu Api Kuala Penaso, Riau Using the Autocad Civil 3d® Method," *Indonesian Journal of Multidisciplinary Science,* vol. 1, no. (1), pp. 318-330, 2022.

[18] A. Megarestya, A. I. Rifai and M. Isradi, "The Horizontal Curved Geometric Design with Autocad® Civil 3D on Jalan Muara Wahau, East Kalimantan," *Indonesian Journal of Multidisciplinary Science,* vol. 1, no. (1), pp. 237-250, 2022.

[19] Z. D. Fadillah, A. I. Rifai and A. Fajarika, "Road Geometric Planning at the Kertajati Toll Gate Towards Kertajati International Airport," *LEADER: Civil Engineering and Architecture Journal,* vol. 2, no. (3), pp. 878-886, 2024.

[20] T. Yared, "Drivers' Ability to Detect Traffic Signs on Curves with the Presence of Clutter in the Visual Field: A Systematic Review.," *Transportation Research Record,* vol. 2678, no. (10), pp. 1110-1122, 2024.

[21] A. Arifin and A. I. Rifai, "Geometric Design of Upper Cisokan Hydroelectric Power Plant Access Road with AutoCAD® Civil 3D (STA 3+ 000-STA. 4+ 800)," *Citizen: Jurnal Ilmiah Multidisiplin Indonesia,* vol. 2, pp. 851-858, 2022.

[22] S. Stefanus, A. I. Rifai and N. Nasrun, "Implementation Autocad® Civil 3D for Horizontal Alignment Design of Indramayu-Jatibarang Highways," *Citizen: Jurnal Ilmiah Multidisiplin Indonesia,* vol. 2, pp. 739-747, 2022.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

[23] A. I. Rifai, E. J. Purviyanto and J. Prasetijo, "The implementation of AutoCAD® Civil 3D for highway geometric redesign: a case of Indonesian toll road," *In IOP Conference Series: Earth and Environmental Science,* vol. 1347, no. 1, 2024.

[24] J. Goyani, P. Chaudhari, S. Arkatkar, G. Joshi and S. M. Easa, "Operating speed prediction models by vehicle type on two-lane rural highways in Indian hilly terrains," *Journal of transportation engineering, Part A: Systems,* vol. 148, no. (3), p. 04022001, 2022.

[25] R. T. Reta, A. I. Rifai, M. Taufik and J. Prasetijo, "Analysis of Road Sight Distance and Support Facility: A Case of Jalan Babakan Anyar–Majalengka," *Jurnal Syntax Transformation,* vol. 5, no. (8), pp. 1048-1057, 2024.

[26] E. Triandini, S. Jayanatha, A. Indrawan, G. W. Putra and B. Iswara, "Metode systematic literature review untuk identifikasi platform dan metode pengembangan sistem informasi di Indonesia.,," *Indonesian Journal of Information Systems,* vol. 1, no. (2), pp. 63-77, 2023.

[27] M. Rizqi, A. I. Rifai and S. K. Bhakti, "Design of Road Geometric with AutoCAD® Civil 3D: A Case Jalan Kertawangunan–Kadugede, Kuningan-Indonesia.," *Citizen: Jurnal Ilmiah Multidisiplin Indonesia,* vol. 2, pp. 879-887, 2022.

[28] A. Löcher, J. Kusche and Y. Nie, " A 40-year record of the Earth's time-variable gravity field from SLR and DORIS.," *Advances in Space Research.,* 2025.

[29] A. ul Husnain, N. Mokhtar, N. Mohamed Shah, M. Dahari and M. Iwahashi, "A systematic literature review (SLR) on autonomous path planning of unmanned aerial vehicles," *Drones,* vol. 7, no. (2), p. 118, 2023.

[30] F. González, M. P. del Val and A. R. Cano, "Systematic literature review of interpretative positions and potential sources of resistance to change in organizations," *Intangible Capital,* vol. 18, no. (2), pp. 145-165, 2022.

[31] W. Andriani, "Penggunaan metode sistematik literatur review dalam penelitian ilmu sosiologi," *Jurnal PTK Dan Pendidikan,* vol. 7, no. (2), 2021.

[32] X. Zhang, P. Zhang, Y. Shen, M. Liu, Q. Wang, D. Gašević and Y. Fan, "A Systematic Literature Review of Empirical Research on Applying Generative Artificial Intelligence in Education," *Frontiers of Digital Education,* vol. 1, no. (3), pp. 223-245, 2024.

[33] A. I. Rifai, M. Isradi, J. Prasetijo and G. Immanuel, "Bibliometric Analysis of Driver's Behavior on Signalized Intersections," *In Emerging Cutting-Edge Applied Research and Development in Intelligent Traffic and Transportation Systems,* pp. 32-43, 2024.

[34] S. Handayani, F. Ferial and J. Thole, "Knowledge Mapping of Transportation Optimization Researcher: A Visual Analysis Using Publish or Perish.," *United International Journal for Research and Technology,* vol. 3, no. (12), pp. 31-39, 2022.

[35] Y. A. T. Sinambela and A. I. Rifai, "Bibliometric Analysis of Road Damage Due to High Rainfall Intensity in Mountainous Areas Using VOSviewer," *OPSearch: American Journal of Open Research,* vol. 3, no. (4), pp. 940-952, 2024.

[36] V. A. Ricardo, A. I. Rifai, A. S. Savitri and J. Prasetijo, "A Bibliometric Analysis of Drinking Water Distribution In Coastal Areas Using Vosviewer.," *Asian Journal of Social and Humanities,* vol. 2, no. (9), pp. 1980-1988, 2024.

[37] P. G. V. Sinaga, A. I. Rifai and M. Pamadi, "Bibliometric analysis of productivity instruments in construction management project management using Vosviewer," *OPSearch: American Journal of Open Research,* vol. 3, no. (5), pp. 980-989, 2024.

[38] S. Putri, E. W. H. Budianto and N. D. T. Dewi, "Bank Bukopin Syariah dan Konvensional: Studi Pustaka (Library Research) dan Bibliometrik VOSviewer.," 2023.

[39] A. W. P. Wardhana, R. Sugihartati, T. A. Salim and A. R. Ramadhan, "Analisis bibliometrik terhadap perkembangan topik penelitian standarisasi kualitas perpustakaan di Indonesia pada database Scopus tahun 2018-2023 menggunakan VOSviewer dan CitNet," vol. 30, no. (3), 2023.

[40] V. A. Ricardo, A. I. Rifai, A. S. Savitri and J. Prasetijo, "A Bibliometric Analysis of Drinking Water Distribution In Coastal Areas Using Vosviewer," *Asian Journal of Social and Humanities,* vol. 2, no. (9), pp. 1980-1988, 2024.

[41] J. Budiono, A. I. Rifai, A. J. Saputra and S. Handayani, "A Bibliometric Analysis Of Geotextile As Underground Filtration In Subsurface Drainage Towards Slope Stability Using Vosviewer," *Journal of World Science,* vol. 3, no. (6), pp. 648-659, 2024.

DOI: https://doi.org/10.31004/riggs.v4i2.1473

[42] Y. Wahyuningsih, B. Maftuh, S. Sapriya and D. Darmawan, "How is the Development of science Education in Primary Schools' conflict Resolution?," *Evolutionary Studies in Imaginative Culture,* pp. 1783-1802, 2024.

[43] A. I. Rifai, M. Isradi, J. Prasetijo and G. Immanuel, "Bibliometric Analysis of Driver's Behavior on Signalized Intersections," *In Emerging Cutting-Edge Applied Research and Development in Intelligent Traffic and Transportation Systems,* pp. 32-43, 2024.

[44] A. H. Pratiwi and A. I. Rifa'i, "The Horizontal Alignment Design Jalan Prabumulih-Simpang Belimbing Muara Enim, South Sumatra.," *LEADER: Civil Engineering and Architecture Journal,* vol. 1, no. (4), pp. 342-350, 2023.

[45] Y. A. Sari, R. S. Indrawan and A. I. L. M. K. A. Rifai, "Roundabouts in Urban Mobility: A Bibliometric Review of Design and Performance," *International Journal of Transport Development and Integration,* vol. 9, no. (1), 2025.

[46] Y. A. Sari, R. S. Indrawan, A. I. Rifai and M. K. A. Lazi, "Roundabouts in Urban Mobility: A Bibliometric Review of Design and Performance," *International Journal of Transport Development and Integration,* vol. 9, no. (1), 2025.

[47] J. Joshua and A. I. Rifa'i, "Road Geometry Horizontal Alignment Planning Using Manual Design Method (Case Study Highway Kejayaan District â€"Pasrepan District, Pasuruan Regency, East Java STA 2+ 566 to STA 5+ 164).," *LEADER: Civil Engineering and Architecture Journal,* vol. 1, no. (3), pp. 275-288, 2023.

DOI: https://doi.org/10.31004/riggs.v4i2.1473