

Bibliometric analysis of telematics applications in the automotive insurance sector

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Abstract

Telematics, the integration of telecommunications and informatics, has emerged as a disruptive and innovative force in the automotive insurance sector. This paper presents a bibliometric analysis of the application of telematics within this domain. The analysis focuses on the co-occurrence and connections between telematics and automotive insurance, offering insights into trends, advancements, and future directions. By mapping the connections in the literature, the paper aims to provide conceptual clarity and further understanding of how telematics is shaping the automotive insurance landscape. The findings highlight the role of telematics in transforming traditional risk assessment models and customizing insurance premiums based on real-time driver behaviour.

Subject Classification: 90B06, 68T01.

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1. Introduction

Telematics, a multidisciplinary field combining telecommunications and informatics, has undergone significant growth [1], particularly in the

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automotive sector. Technological advancements have revolutionized vehicle design, transitioning from mechanical to electric systems, with telematics systems facilitating more efficient monitoring and data capture. Telematics devices installed in vehicles record various parameters such as speed, acceleration, braking patterns, journey duration, and location, transmitting this data to insurers for behavior-based risk assessment [2].

Once primarily associated with fleet management, telematics has now found a strong foothold in the automotive insurance sector. Insurers leverage real-time data and advanced analytics to inform underwriting decisions, enhance customer experiences, and optimize policy management. In India, where car insurance premiums are traditionally based on vehicle features, innovative telematics-based insurance models such as “Pay As You Drive” (PAYD) and “Pay How You Drive” (PHYD) are transforming the industry by linking premiums to driver behavior [4], [8], [9]. These models not only assess traditional risk factors but also consider dynamic variables like driving patterns to offer more personalized and data-driven premiums.

In the context of examining such as telematics in insurance a systematic literature reviews combined with bibliometric analysis approach is used in this present research as a valuable methodology. This approach not only supports evidence-based analysis but also highlights the evolution and direction of research in fields experiencing rapid technological integration. Tools like VOSviewer have been effectively utilized in recent studies [5],[6] to map scientific literature and uncover research trends, thematic clusters, and key contributors in emerging domains. VOSviewer enables researchers to visualize relationships between keywords, citations, and authors, facilitating a more comprehensive understanding of the literatures.

2. Objective of the Study

The objective of this study is to understand the interconnectedness between telematics and the automotive insurance sector, with an emphasis on how telematics systems influence insurance practices, user behavior analysis, and technological advancements.

3. Research Methodology

A bibliometric analysis was conducted using literatures collected from 2016 to 2024. The analysis involved searches across various academic

databases, including PubMed [13], Scopus, and Google Scholar, and employed VOSviewer for visualizing the co-occurrence and connections between telematics [14], [15] and the automotive insurance sector. This methodology enabled the identification of key studies and emerging trends in the field.

4. Findings Using Bibliometric Analysis of Literature Review

The bibliometric analysis, visualized through VOSviewer, reveals the transformative impact of telematics on insurance practices. The analysis highlights key aspects such as user behavior, technological advancements, and the widespread adoption of telematics across the automotive and insurance sectors.

Figure 1 explores the interconnectedness of telematics within the automotive and insurance sectors, covering topics such as comparative studies, regional variations, human usage, infrastructure requirements, and utility assessment. The findings emphasize how telematics solutions are utilized in different regions and the comparative effectiveness of various applications like vehicle tracking, traffic and accident warnings, and their interactions with demographic variables such as gender and age. The analysis also outlines the necessary infrastructure to support these technologies.

The bibliometric analysis of key studies highlights the increasing significance of telematics in the automotive insurance sector. Chauhan and Yadav [3] reviewed the evolution of telematics-based automobile insurance, emphasizing its growing influence on shaping insurance policies. Their work provides a comprehensive examination of how telematics is transforming the insurance landscape and highlights the

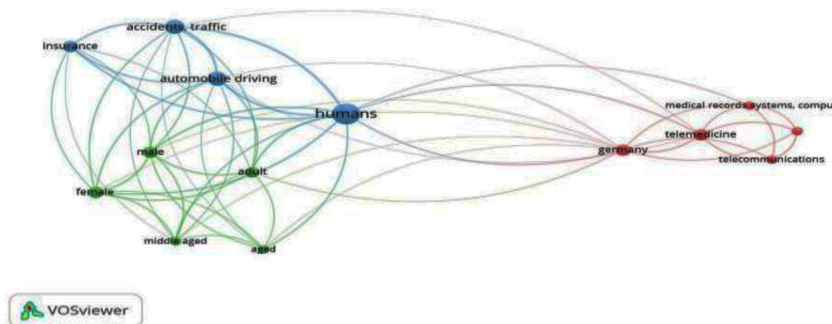


Figure 1
Telematics Adoption in Automotive & Insurance Sector

need for further research in this rapidly developing field. Similarly, Guillen et al. [7] explored the use of telematics devices to enhance automobile insurance rates. Their study illustrates how telematics is revolutionizing traditional insurance models by enabling the offering of personalized premiums based on real-time driving behavior. This shift from traditional actuarial methods to data-driven, real-time insights signifies a fundamental transformation in insurance underwriting practices. These studies collectively contribute to a deeper understanding of the role of telematics

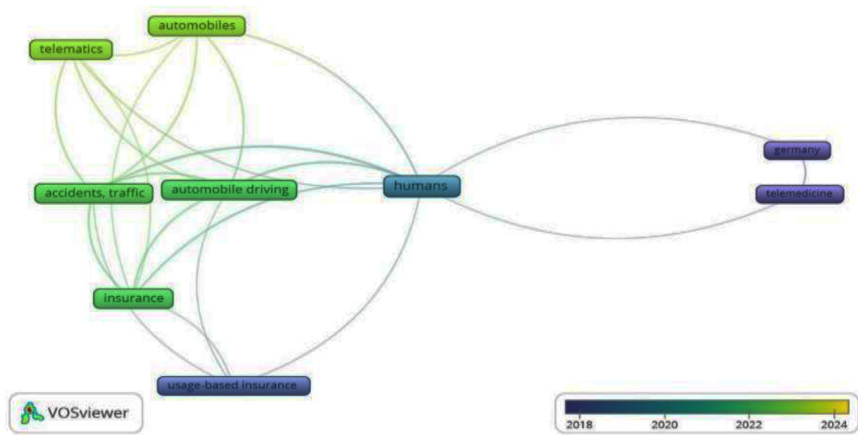


Figure 2
Telematics & Human Interconnectedness

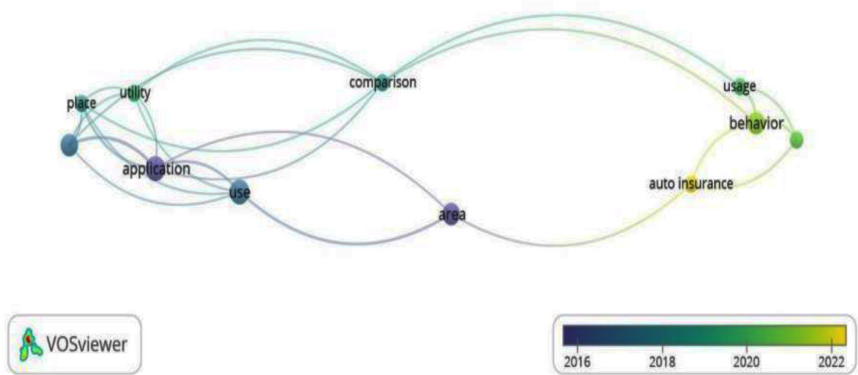


Figure 3
Interconnection between Telematics and User Behaviour in the Automotive Insurance Sector

in reshaping automotive insurance, emphasizing both its current impact and its potential for further advancements.

Figure 2 and 3 examine the intersection of telematics, user behaviour, and insurance premiums. Telematics-based insurance models, which rely on user data, are transforming the automotive insurance landscape. This segment explores how telematics data on driving behaviour, styles, and usage patterns inform insurance premiums. The findings underscore the potential of telematics to enhance predictive analysis and improve risk management, benefiting not only insurers but also policymakers and government bodies through improved road safety initiatives. Context-aware driver risk prediction using telematics data [12], showing how advanced analytics can anticipate risks more accurately. Additionally, latent class analysis [10], [11] categorizes drivers based on their behavior, offering insights into how telematics can refine risk assessment and target interventions.

Figure 4 identifies how interactions between users and telematics systems in different contexts are key to optimizing system design and enhancing user experience, particularly in accident prevention. The literature also suggests the potential for telematics to support autonomous driving technologies and the implementation of models like “Pay How You Drive” (PHYD) for insurance premiums. Zhang et al. [16] demonstrated

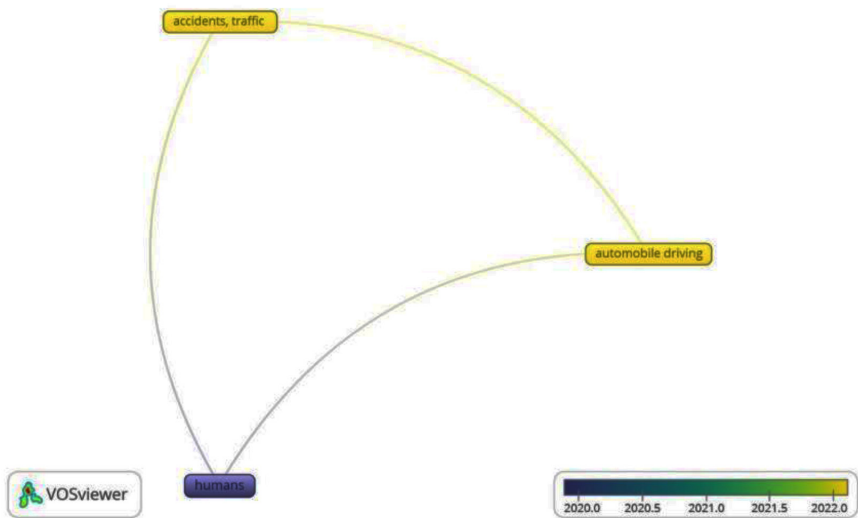


Figure 4
Future Directions

the broader application of telematics in enhancing safety standards in truck fleets, illustrating the versatility of these technologies beyond personal automobile insurance.

Hübner et al. [17] highlighted the implications of telematics in healthcare, broadening the scope of its application and demonstrating its influence on fields outside of traditional insurance.

5. Conclusion

Telematics is transforming the landscape of automotive insurance, particularly in India, by enabling insurers to move beyond traditional actuarial models and adopt data-driven, behaviour-based risk assessment frameworks. This bibliometric analysis offers valuable insights into the growing application of telematics in the automotive sector, highlighting key trends in insurance, user behaviour, and technological integration. By advancing the integration of telematics, stakeholders including researchers, practitioners, and policymakers can unlock the full potential of these technologies to improve risk management, enhance safety, and create more personalized insurance models.

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