

Mapping Relationship Dynamics in Marketing: A Text-Mining Approach for Human–AI Interaction Studies

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Extended abstract

Artificial intelligence (AI) is profoundly transforming the business landscape, economic structures, and societal interactions by redefining stakeholder and citizen experiences and relationships(Loureiro et al., 2021). In the current digital era, artificial intelligence (AI) is anticipated to significantly transform the job market, particularly through the deployment of text-based conversational agents such as chatbots(Letheren et al., 2020). Despite the widespread adoption of chatbots by numerous business leaders in recent years, consumer acceptance and sustained usage remain comparatively limited(Forbes, 2019). Research on artificial intelligence (AI) has emerged from various fields of study. However, progress in AI development has largely occurred in isolated domains, with limited interdisciplinary collaboration(Loureiro et al., 2021). One of the vital areas of research in the field of intelligent chatbots is examining how humans understand and interact with these systems.

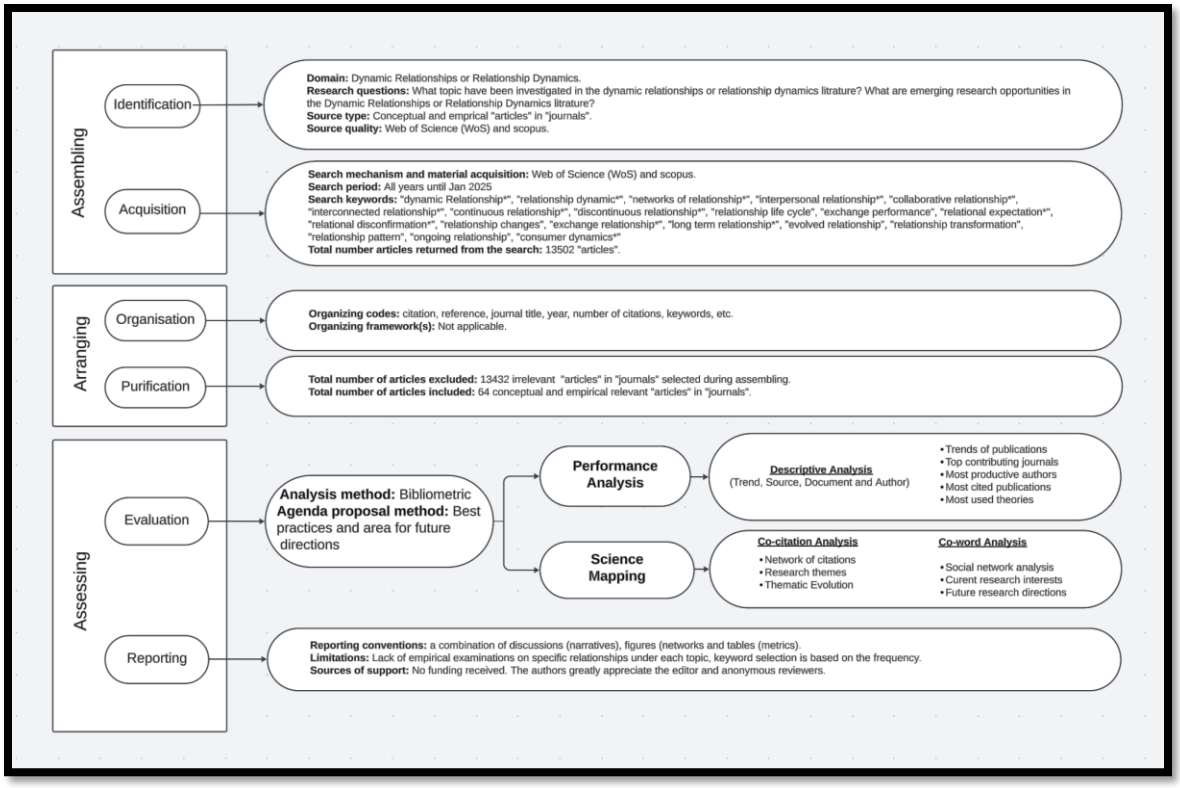
As Adler(Adler, 1954) aptly stated, "All problems of life are essentially problems of human relationships." Following this logic, we conclude that a comprehensive understanding of human relationship dynamics is a prerequisite for effectively examining the evolving nature of human–AI interactions. Through our initial studies on the core of our research, we found that the terms "dynamic relationships" and "relationship dynamics" are often used interchangeably and convey the same meaning. However, our review revealed that while relationship dynamics have been extensively explored in organizational contexts such as vendor, supplier, and company relationships, they have been less frequently examined from

the perspective of human relationships, particularly customer interactions. This finding further motivated us to conduct initial bibliometric research to establish a scientific foundation for understanding human relationships through a marketing lens, with the aim of providing solutions for fostering stronger connections between AI (especially chatbots) and humans.

As AI technologies increasingly mediate interactions between brands and consumers—through chatbots, virtual assistants, and intelligent recommendation systems—it becomes essential to examine the nature of these evolving relationships. Therefore, understanding the dynamics between humans and artificial intelligence (AI) is not only a growing academic concern but also a practical imperative. This study investigates the dynamics of human relationships within marketing contexts using bibliometric analysis and text-mining techniques, with the goal of generating insights that can help overcome current limitations in human–AI interaction. In this study, we seek to answer the question: How can insights derived from the dynamics of human relationships in marketing literature contribute to improving human–AI interactions, particularly in the context of chatbot-mediated communication?

In this research, we adhered to the Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR) protocol, as outlined by Paul et al(Paul et al., 2021). This protocol has been employed in various bibliometric studies, including those by Kumar et al.(Kumar et al., 2022), Lim et al.(Lim et al., 2022), and Chandra et al.(Chandra et al., 2022). Figure 1 illustrates the SPAR-4-SLR protocol, which encompasses three primary steps: assembling, arranging, and assessing. The research is based on a dataset of 13,502 articles retrieved from Scopus and Web of Science. After applying exclusion criteria, 64 high-impact marketing articles explicitly addressing relationship dynamics were selected for analysis.

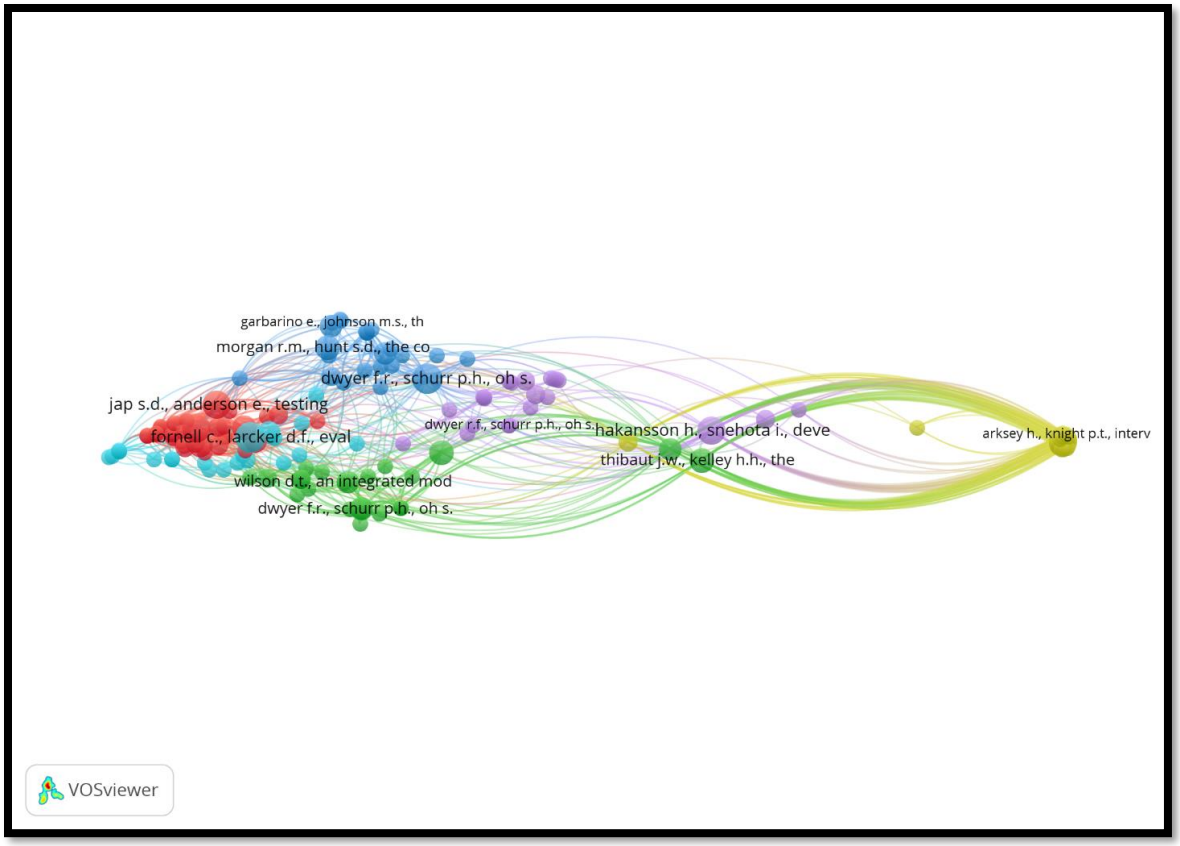
Fig 1. The SPAR-4-SLR Protocol: A Framework for Data Collection and Analysis



In recent years, there has been a rapid increase in academic studies employing bibliometric analysis. This surge in bibliometric research is largely due to the availability of extensive bibliometric data within scientific databases such as Web of Science and Scopus, alongside the development of advanced software tools like VOSviewer and Gephi(Donthu et al., 2021). The primary tools used in bibliometric analysis are performance analysis and science mapping(Moral-Muñoz et al., 2020). Science mapping encompasses methods such as citation analysis, co-citation analysis, and co-word analysis(Donthu et al., 2021; Kraus et al., 2022). Recent studies often employ a combination of co-citation analysis and co-word analysis to identify research trends within a particular field(Khanra et al., 2021; Leung et al., 2017).

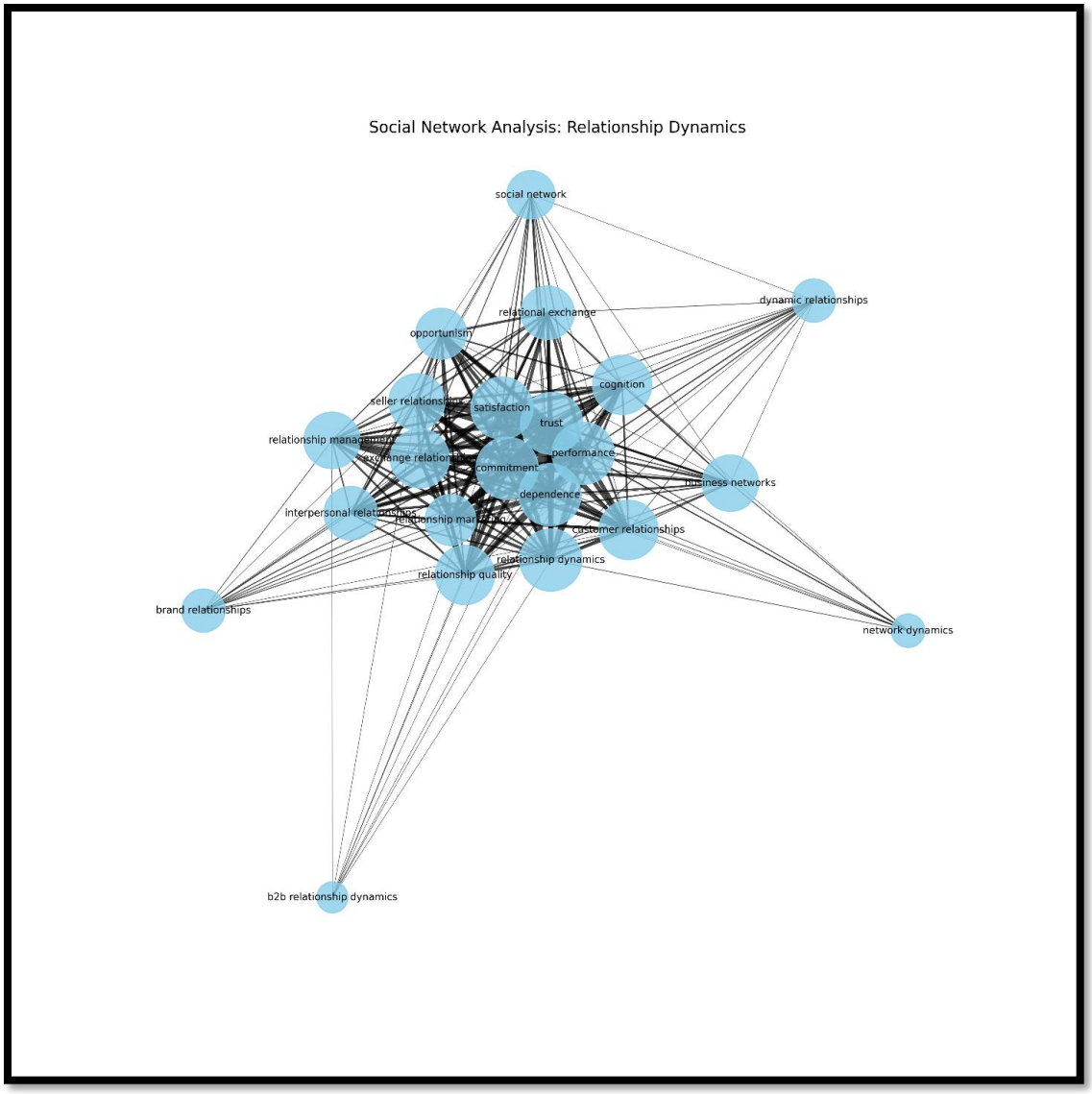
In Study 1 (Co-citation analysis), bibliometric tools such as VOSviewer and Gephi were used to explore structural patterns in the academic literature on relationship dynamics. This phase included performance evaluation, cluster mapping, and keyword co-occurrence analysis to identify influential themes and conceptual trends in the field.

Fig 2. Network of popular co-citations over the entire period.



In Study 2 (Co-word analysis), text mining and social network analysis (SNA) using Python were employed to examine how concepts such as Trust, Satisfaction, Relationship Dynamics, and others are related and have evolved over time. This two-stage approach provided a comprehensive understanding of the conceptual and intellectual structures in the field of relationship dynamics in marketing, which formed the basis for recommendations aimed at fostering deeper human-AI engagement.

Fig 3. The Social Network Analysis of the Relationship Dynamics research.



The analysis revealed that foundational concepts such as "Trust," "Satisfaction," and "Commitment" play a central role in relationship dynamics, with strong interconnections to "Relationship Quality" and "Customer Relationships." These concepts were identified as critical in fostering relational governance and are particularly significant in loyalty programs and AI-mediated interactions, such as those involving chatbots. The evolving landscape of AI-driven systems necessitates an adaptation of these traditional relationship metrics to ensure trust and satisfaction in increasingly automated environments.

Furthermore, "Relationship Dynamics" emerged as a core integrative concept, unifying various aspects of relationship studies, from "Relational Exchanges" to "Marketing Strategies." While keywords like "B2B Relationship Dynamics" and "Dynamic Relationships" remain in peripheral categories, they represent emerging areas with considerable research potential, especially in the context of AI-driven customer engagement. The findings highlight the need for further research to bridge the gap between traditional relational concepts and

modern technologies, providing valuable insights into the future of relationship marketing and human-AI interactions.

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