15-minute cities – a spark of controversy or a haven of liveability? A sentiment analysis approach in the context of the theory of planned behaviour

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Abstract

The concept of a 15-minute city has garnered significant attention as a transformative urban planning model aimed at enhancing urban liveability, sustainability, and resilience. Contrary to the academic world, it sparks significant adverse reactions with citizenry as crucial stakeholders of the concept. Through the lens of Ajzen and Fishbein's theory of planned behaviour, this study demonstrates the nuanced dynamics shaping public sentiment toward the 15-minute city concept. Methodologically, the paper builds on natural language processing, in particular VADER sentiment analysis, that generates scores for positive, negative, neutral, and compound sentiment, but also allows to identify sarcastic content. The study's results shed light on how TPB components interplay in shaping public sentiment and, by extension, intentions to support or oppose the 15-minute city model.

Keywords: 15-minute city; sentiment analysis; urban planning

Track: Consumer Behaviour

1. Introduction

The concept of a 15-minute city has garnered significant attention as a transformative urban planning model aimed at enhancing urban liveability, sustainability, and resilience. It emphasizes the importance of having essential services and amenities within a 15-minute walk or bike ride from residents' homes, thereby reducing reliance on cars and promoting healthier lifestyles. The sentiments towards this concept in the scientific world are mostly positive, with stakeholders recognizing its potential to address urban challenges, specifically related to sustainability and quality of life (Allam et al., 2022; Khavarian-Garmsir et al., 2023).

While the 15-minute city model is largely viewed as a positive step towards sustainable urban development, the success of the model can be derived from its simple rationale, its ability to address social inequalities and adapt to the unique characteristics of different urban environments. Proponents argue that it can reduce carbon emissions, improve public health, and enhance community engagement by fostering local interactions and reducing travel times (Khavarian-Garmsir et al., 2023; Moreno et al., 2021). Additionally, the model encourages a re-evaluation of urban spaces, promoting multifunctional public areas and sustainable transportation options. The main critique revolves around accessibility challenges (Guzman et al., 2024), increasing social inequalities (Casarin et al., 2023; Mouratidis, 2024), missed economic opportunities and capacity and implementation limitations (Mouratidis, 2024; Murgante et al., 2024).

The 15-minute city concept has sparked debate, challenging car-centric urban planning by promoting walkability and local access. Criticisms focus on personal freedom, social equity, and practicality. Resistance to reducing car use stems from cars being seen as symbols of freedom, comfort, and status (Sovacool & Axsen, 2018). Addressing these concerns is crucial for gaining public acceptance of the 15-minute city, the focus of this paper.

2. 15-minutes Cities in the Context of Theory of Planned Behaviour

The Theory of Planned Behaviour (Ajzen, 1985) distinguishes three core beliefs that influence individual’s intention to engage in a particular behaviour: (1) behavioural beliefs (attitudes), (2) normative beliefs (subjective norms), and (3) control beliefs (perceived behavioural control). TPB has been often applied in the mobility-related context, as it provides a framework to understand and predict residents' behaviours in urban settings, hence acceptability of urban transport policies (Stern, 2000).

Attitudes towards different modes of transportation, such as walking, cycling, and public transport, significantly influence residents' willingness to adopt these modes within a 15-minute city framework. Subjective norms, or the perceived social pressure to engage in a behaviour, play a role in shaping residents' travel choices (Bąk et al., 2024; Suchanek & Szmelter-Jarosz, 2023). The influence of family, friends, and community can encourage individuals to adopt more sustainable travel behaviours, such as using public bicycles or walking (Li et al., 2015). Perceived behavioural control, which refers to the ease or difficulty of performing a behaviour, is a critical determinant of whether residents will engage in walking, cycling, or using public transport. Factors such as infrastructure quality, safety, and accessibility influence this perception (Mandal et al., 2023). Enhancing perceived control by improving urban infrastructure, such as safe pedestrian pathways and cycling lanes, can increase residents' confidence in using these modes of transport within a 15-minute city.

3. Sentiment Analysis in Customer Behaviour

Sentiment analysis involves the computational study of opinions, sentiments, and emotions expressed in text, and hence provides valuable insights into behavioural intentions, which aligns with the TPB (Cero et al., 2024). It gauges consumer attitudes by analyzing sentiment polarity in reviews and social media and captures the influence of subjective norms by examining how consumers perceive others' opinions. These discussions often shape individual behaviour (Priya & Deepalakshmi, 2023). In relation to perceived behavioural control, sentiment analysis can provide insights by identifying barriers or facilitators expressed in consumer feedback. For example, negative sentiments about a service's usability can indicate perceived difficulties, while positive sentiments can highlight ease of use (Shao et al., 2019). Understanding these perceptions can help stakeholders address consumer concerns and enhance perceived control, thereby influencing behavioural intentions (Murugan et al., 2023).

While sentiment analysis offers significant advantages in understanding consumer behaviour, it is important to consider its limitations. Sentiment analysis tools may struggle with complex language features such as sarcasm or negation, which can lead to misinterpretations of consumer sentiments (Ali et al., 2019; Cero et al., 2024). Additionally, the integration of sentiment analysis with TPB requires careful consideration of the context and cultural factors that may influence consumer behaviour.

4. Methodology

This study employs an explorative approach methodology to analyse the sentiment expressed in online discussions about the concept of the 15-minute city. We decided to conduct a search on the YouTube platform and collect the comments under videos addressing this urban planning model. YouTube is a key website for individuals and organisations where they can freely distribute video content. We used keywords strings: “15-minute city” and “15-minute cities” and picked top ten results from each search, eliminating duplicates, which left us with 16 videos. The dataset comprised 15,543 comments, each comment was annotated with metadata, including *video_id*, *author*, *published_time*, and *like_count*.

The analysis leveraged a combination of lexicon-based sentiment tools and contextual analysis models to capture the nuanced nature of public sentiments. Initially, lexicon-based methods such as Bing and NRC were applied to assign sentiment polarity based on predefined dictionaries (Borg & Boldt, 2020). These tools provided measures of *positive_score*, *negative_score*, and an overall *sentiment_category*. However, recognizing the limitations of lexicon-based approaches - especially their inability to detect sarcasm or contextual negativity - a phrase-level analysis was conducted.

The Valence Aware Dictionary and sEntiment Reasoner (VADER) was then employed to address the challenges of detecting sarcasm and context-driven sentiment misalignment. VADER sentiment is a lexicon-based framework, that generates scores for positive, negative, neutral, and compound sentiment, while also enabling the identification of sarcastic content (Borg & Boldt, 2020; Indian et al., 2024). Rule-based sarcasm detection flagged comments where sentiment polarity mismatched the surrounding context, enabling a more precise understanding of public reactions.

5. Results

The analysis revealed a distribution of sentiment across three primary categories: positive (43%), neutral (30%), and negative (27%). On the surface, the high proportion of positive sentiment suggested widespread public support for the 15-minute city concept. However, the mean compound score of 0.1744 – indicating mildly positive sentiment overall – masked significant variations in the dataset.

A closer inspection of frequently used words revealed a more complex picture. Words such as "like" (2,628 occurrences), "freedom" (761), and "work" (1,049) were commonly

associated with positive sentiment but often appeared in contexts that negated their positivity. For instance, comments like “I feel like cockroaches” and “taking away our freedom” illustrate the limitations of lexicon-based sentiment analysis in isolating true public sentiment. Conversely, negative keywords such as “conspiracy” (868 occurrences) and “control” (207) frequently surfaced in discussions, particularly in comments critical of the perceived sociopolitical implications of the 15-minute city.

Phrase-level sentiment analysis uncovered additional insights. Extreme positive phrases, such as “15-minute cities are a brilliant solution,” contrasted sharply with extreme negative ones like “This is absolutely disgraceful” and “It's a cultural Marxist agenda.” These extremes underscored the polarizing nature of the debate.

Figure 1. Word Cloud for the Sentiment Analysis

Approximately 9.6% of comments were flagged as sarcastic. These sarcastic comments often paired superficially positive sentiment with underlying negativity, as seen in examples like “We elect people to make our lives BETTER not worse” and “15-minute cities sound perfect—if you want to be a prisoner in your own neighbourhood.” The VADER model's ability to detect sarcasm helped correct the sentiment misclassification observed in lexicon-based methods, providing a more accurate reflection of public attitudes. Sarcasm analysis based on sentiment polarity mismatches the rest of the dataset or expected context (e.g., excessive positive words in an overall negative sentiment).

Discussion

A close qualitative examination of the dataset reveals significant nuances in public sentiment, particularly regarding the sarcastic undertones and ambiguous language that

complicate sentiment analysis. Sarcasm emerged as a recurring theme, with many comments superficially expressing positive sentiments but embedding negative or sceptical messages upon closer inspection. For instance, comments like "We elect people to make our lives BETTER not worse" and "15-minute cities sound perfect—if you want to be a prisoner in your own neighbourhood" exemplify how sarcastic phrasing can mask discontent. These comments, while containing words with positive connotations, clearly convey distrust and resistance to the 15-minute city concept. "Another great movie that predicted this 60 years ago is Soylent Green," draws a parallel to dystopian themes, further illustrating how sarcasm amplifies criticism within seemingly benign language.

Ambiguity in word usage further complicated the analysis, particularly with terms like "freedom" and "like." While traditionally associated with positive sentiment, these words were frequently employed in contexts that negated their usual meanings. For instance, the word "freedom" appeared in comments criticizing the perceived restrictions imposed by the 15-minute city model, such as "taking away our freedom." Similarly, "like," a neutral or positive term in most contexts, surfaced in negative statements such as "I feel like cockroaches," metaphorically expressing dehumanization and disdain. These examples highlight how individual words, when stripped of their context, can mislead traditional sentiment analysis methods.

Broader themes emerging from the analysis cantered on fears of control, loss of autonomy, and the proliferation of conspiracy theories. Negative sentiments often revolved around the idea that the 15-minute city model represented governmental overreach or an infringement on personal freedoms. This was reflected in comments like "This is all about control, not community," where the focus shifted from urban planning benefits to perceived coercion. Interestingly, while some comments genuinely praised aspects of the model, such as improved walkability and sustainability, these sentiments were often overshadowed by sarcastic or conditional expressions. Even comments that appeared to support the concept tended to imply scepticism, indicating that positive sentiment often lacked authenticity or was contingent on addressing perceived threats to personal liberties. This qualitative layer of analysis underscores the complex interplay of sarcasm, ambiguity, and deeply held fears within public discourse. It highlights the limitations of surface-level sentiment analysis and the need for context-sensitive approaches to accurately capture the nuances of public opinion. These insights not only enrich our understanding of the challenges in implementing urban planning models

but also emphasize the importance of addressing these emotional and rhetorical complexities in public engagement efforts.

The findings of this study offer valuable insights into public attitudes toward the 15-minute city concept, particularly when analysed through the lens of Ajzen and Fishbein's Theory of Planned Behaviour (TPB). The study's results shed light on how TPB components interplay in shaping public sentiment and, by extension, intentions to support or oppose the 15-minute city model.

Attitudes represent an individual's positive or negative evaluation of a behaviour or concept. While the analysis revealed an ostensibly high proportion of positive sentiment (43%), deeper scrutiny exposed substantial scepticism and sarcasm underlying many positive comments. For example, phrases like "We elect people to make our lives BETTER not worse" reflect a sarcastic dismissal of the concept rather than genuine support. This misalignment highlights the complexity of public attitudes, where the theoretical benefits of sustainability and walkability are often overshadowed by fears of reduced personal freedom and overreach by authorities.

The polarized nature of the sentiment suggests that many individuals view the 15-minute city as a threat to their autonomy rather than a tool for enhancing community well-being. This aligns with the TPB framework, as negative attitudes are likely to lower behavioural intentions to accept or advocate for the model. Subjective norms—the perceived social pressure to engage or not engage in a behaviour—also emerge as a significant factor in the discourse. Comments frequently reference societal expectations and collective fears, such as "Everyone knows this is about control, not community." These statements reflect the influence of groupthink and conspiratorial narratives, which shape public perceptions and amplify resistance.

The presence of sarcastic comments within this context further suggests a normative undercurrent wherein scepticism toward 15-minute cities is socially reinforced. This phenomenon underscores the need for planners and policymakers to actively engage with communities to reshape these norms. Promoting stories of successful 15-minute city implementations and addressing misinformation can help foster more supportive subjective norms. Perceived behavioural control refers to the ease or difficulty of performing a behaviour, shaped by external barriers and internal confidence. Many negative sentiments in the dataset highlighted practical concerns about the feasibility of the 15-minute city model. Comments

such as “This concept only works if you force people to stay in their neighbourhoods” and “It’s just a utopian idea that doesn’t fit reality” reveal a perception that implementing the model is impractical, particularly in sprawling or car-dependent cities.

Moreover, sarcasm-laden comments such as “15-minute cities sound perfect—if you want to be a prisoner in your own neighbourhood” reflect a sense of disempowerment and scepticism about the promises of inclusivity and mobility. These sentiments align with TPB’s assertion that low perceived behavioural control can lead to resistance or disengagement.

Policy recommendations and conclusions

From a theoretical perspective, the findings emphasize the relevance of TPB in understanding public sentiment toward urban policies. Negative attitudes, unsupportive subjective norms, and low perceived behavioural control collectively contribute to resistance against the 15-minute city concept. Addressing these elements requires targeted interventions:

Shaping Attitudes: Communication strategies should focus on highlighting the tangible benefits of the 15-minute city model, such as improved quality of life, reduced commute times, and environmental sustainability. Policymakers should also address key misconceptions, such as fears of restricted movement or government control. **Building Supportive Norms:** Collaborative storytelling and showcasing real-world success stories can help shift subjective norms. Engaging community leaders and influencers to champion the concept may also foster positive social pressure. **Enhancing Behavioural Control:** Urban planners must demonstrate how the model can be practically implemented, even in car-dependent or sprawling cities. This includes presenting realistic timelines, ensuring equitable access to resources, and involving citizens in the design and decision-making process.

Conclusion

Through the lens of Ajzen and Fishbein's Theory of Planned Behaviour, this study demonstrates the nuanced dynamics shaping public sentiment toward the 15-minute city concept. While initial findings suggested a predominance of positive sentiment, deeper analysis revealed that sarcastic and sceptical attitudes often underlie these ostensibly positive comments. These findings underscore the importance of addressing public attitudes, subjective norms, and perceived behavioural control to foster greater acceptance of the model.

Public resistance, as seen in this analysis, is rooted in a combination of fears about freedom and autonomy, practical concerns about feasibility, and the amplification of

conspiratorial narratives. These barriers align closely with TPB's framework, providing actionable insights for policymakers and urban planners. Future efforts to promote the 15-minute city must prioritize public engagement, transparency, and the co-creation of solutions to ensure inclusivity and trust. By addressing negative attitudes, reshaping social norms, and empowering citizens with practical solutions, proponents of the 15-minute city can enhance its viability and public acceptance, paving the way for sustainable and liveable urban environments.

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