# Article information:

Quantitative measures for integrating resilience into transportation planning practice: Study in Texas - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S1361920922003224?via%3Dihub=>

# Article summary:

1. This study proposes a system-level framework that uses quantitative measures to assess the resilience of road networks to inform transportation planning and project development practices.

2. The study identified four quantitative metrics to characterize road segments in terms of criticality and vulnerability: connectivity of road segments within road networks, vulnerability to extreme events, disrupted access to critical facilities, and cascading impact of critical infrastructure networks.

3. The proposed framework was applied to Texas road networks as a case study to demonstrate the effectiveness of implementing this framework in a practical scenario.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article proposes a system-level framework that uses quantitative measures to assess the resilience of road networks to inform transportation planning and project development practices. The need for incorporating resilience assessments in transportation planning and project development processes is recognized by transportation organizations in the United States and worldwide. However, the measures for quantifying system-level resilience to inform transportation planning processes are rather limited in practice.

The article provides a comprehensive review of existing literature on methods and measures for assessment of vulnerability and resilience in transportation infrastructure. It identifies four quantitative metrics to characterize road segments in terms of criticality and vulnerability, including connectivity of road segments within road networks, vulnerability to extreme events, disrupted access to critical facilities, and cascading impact of critical infrastructure networks. Finally, it integrates the four metrics to obtain the overall criticality of the road segments within road networks using two different mathematical methods.

While the scholarly literature is rich in terms of methods and measures for assessment of vulnerability and resilience in transportation infrastructure, little of the existing work has been adopted in practice. The article acknowledges this limitation due mainly to two reasons: (1) transportation planners and decision makers do not know what method and measures to use among several proposed in the literature; (2) the methods and measures for vulnerability and resilience assessment should be obtainable using the existing data available to most transportation agencies.

The article presents a case study by applying the proposed framework to Texas road networks to demonstrate the effectiveness of implementing this framework in a practical scenario. Quantitative metrics that can consider all these dimensions in resilience assessment are essential for a system-level understanding of the resilience of road networks and also inform transportation planning and project development.

Overall, the article provides valuable insights into how quantitative measures can be used to integrate resilience into transportation planning practice. However, it could benefit from more discussion on potential biases or limitations associated with using quantitative metrics alone without considering qualitative factors such as social equity or community engagement. Additionally, while acknowledging that little existing work has been adopted in practice, it does not explore why this is so or provide recommendations on how practitioners can overcome these barriers.

# Topics for further research:

* Qualitative factors in transportation resilience assessment
* Social equity considerations in transportation planning
* Community engagement in transportation project development
* Barriers to adoption of resilience assessment methods in transportation planning
* Best practices for integrating resilience into transportation planning
* Case studies of resilience assessment in transportation infrastructure

# Report location:

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