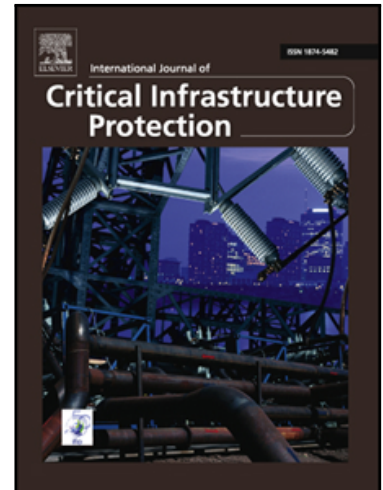


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## Critical infrastructure vulnerability—a method for identifying the infrastructure service failure interdependencies

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### Abstract

Modern society has become increasingly dependent on the resilience of critical infrastructures (CI), such as electricity distribution, telecommunications, and IT infrastructure. These systems can be interdependent in a variety of ways. The dependencies may lead to a situation where a failure in one system can cause failures in other systems. The comprehension of failure interdependencies is important for the continuous functioning of CI, especially from the viewpoints of preparedness and the response. The sector-specific interdependencies are usually well known but there is a lack of comprehension of the cross-sector interdependencies. This paper presents a qualitative method for identifying and describing the CI service failure interdependencies. The proposed method is a scenario-based approach in which CI stakeholders create a common understanding of the causes and effects of a described threat scenario. The method can be used to identify and describe the potential sector-specific and cross-sector failure interdependencies. Through the method, we have identified and described the interdependencies between the failures in CIs together with domain experts involved in the Finnish regional preparedness committees and experts working in high-level positions in CIs in Finland. The results of the case study can be utilized in the process of developing the preparedness and response activities in Finland. The method presented here can be applied in the process of identifying and describing the failure interdependencies in other countries and contexts.

### Keywords:

critical infrastructure; vulnerability; preparedness; infrastructure failure interdependencies

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