Natural Hazards
and Earth System
Sciences

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Discussions

Interactive comment on "Developing a performance evaluation functional model for cities impacted by a natural hazard: application to a city affected by flooding" *by* G. Bambara et al.

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Interesting paper and approach to a very complex problem. The use of tools/methods traditionally used in engineering for charactering the vulnerability and resilience of a municipality seems to be a good idea. However, the authors do not really explain how they use these methodologies and how they will help managing emergencies related to natural hazards. When considering the performance (or resilience) of a city, human factors and critical infrastructures dependencies/interdependencies are very important. The approach proposed does not seem to consider these elements. I am not sure that the proposed approach can be used for manmade events. For anthropogenic threat,

intent and adaptability must be considered - Game theory seems more appropriate. Authors state that at the end of the FMEA approach, all the city's subsystems failure modes, causes, and effects are known - I really doubt it. Why did not you use FMECA and consider the criticality component. I understand that this combination of tools can help understand what happened. However, the authors do not prove how they help to be better prepared for the next event, even if this is a similar event. A city is in dynamic interaction with its environment and the proposed approach does not integrate this interaction. How do you integrate geographic components, that are preponderant for the consideration of natural hazards, in your tool?

The paper does not use any references to organizational resilience, decision analysis, dependencies and interdependencies analyzes that are traditionally used for the assessment or regional/municipality resilience. It would have been interesting to present the advantages and limitations of the proposed approach with "classical" assessments. Authors say in conclusion that their tool "may not be used to implement proactive crisis management procedures based on hazards the city has never experienced before". Therefore, what is the interest to use this tool? How can we be sure that the next event will be similar to a past event? Improving the resilience of a city requires to increase preparedness, adaptation, restoration, and recovery capabilities. How do we do that with this tool?

The structure of the paper should also be revised. It is difficult with the way the example is presented to see/understand the benefits of this tool. You should do a separate section with the example. The discussion should be more developed.

This paper raises lots of questions without providing all answers, which may be correct. However, the authors should explain the difference between risk and resilience, how the use of risk assessment tools can be used for resilience management? this is still not clear. For example, the authors state that the event-tree "procedure helped determine how the city of interest would behave in the event of a crisis". This statement should be explained. How much time is needed for applying this approach? what type of

information is needed? how this information is gathered? Who will use the results provided with this tool?

Again, the approach proposed seems interesting but it is difficult with the current version of the paper to understand how this new approach can be useful for improving the resilience of a city.

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