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.

Anonymous Referee #1

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Review comments to Bambara et al "Developing a performance evaluation functional model for 1 cities impacted by a natural hazard: application to a city 2 affected by flooding" submitted to NHESS

General Comments: The paper does good effort to make aware of already existing risk methods and how to make use of it to apply it on the topic of cities at risk. The main benefit is to structure the process of analysis which makes sense for better process definition and documentation. At the present stage the paper only gives few hints how this is really novel and gives only few recommendations on how others might make use of it that goes beyond the usual process of level of observation differentiation, and

structuring of hazards and crisis outcomes. The case study of the city of Nimes should be elaborated much more and used more explicitly to demonstrate the full potential of such an analysis. Over large sections, this paper reads more like a textbook, which is unnecessary, since the methods are established since decades – yet got slightly out of focus in recent studies. And this could be the benefit of this paper, to show how an engineering type of approach could enrich recent vulnerability, risk and resilience analyses of cities at risk. The language needs to be checked since it is sometimes hard to understand for the reader what is meant to be said. And more sources are needed and supports for the arguments.

Specific comments:

Abstract is too short, lacks description of where and when, why and for whom this study is conducted and useful. Why is this study necessary? Logical sequence of sentences needs to be reconsidered.

Language Grammar and spelling need to be improved substantially. A professional native speaker editing service is highly recommended.

Confusing use of city and cities – is a specific city selected as a case study?

Sources selected in the introduction are rather old and there should be more than just one source to such statements, reflecting more the vast body of research.

On page two the concept of resilience is simplified to an equilibrium model. Meanwhile there exist many more differentiated views on resilience including stability, but also recovery and transformation aspects. The literature selected is good, but also a bit old meanwhile and it would be good to add a few more sources.

Specifically, throughout the paper, many sources and arguments are based solely upon previous work by the authors. The paper needs more balance by including other sources.

The paper is written rather generic and abstract over longer sections and makes it

difficult for the reader to follow what is meant in detail by certain terms such as performance. Examples would be good or more precise descriptions – for instance, examples of granularity in 2.2.1. What is the difference between granularity and level, scale and units? What is meant here?

2.2.1 Abbreviations need to be spelled out on the first mentioning of them.

Page 6 line 4: how can an analysis define such norms? It is humans that conduct such analyses that determine them?

Page 7 lines 1 to 13: could be put into a table?

Generally this is a quite technical language for a process that actually is much like an expert system determined by the researcher. The paper lacks revealing the intentions and considerations of the researcher who decided about which variables to include and which to exclude here. The paper could use more balance here.

What is the great benefit of this functional analysis? It seems like a pretty much standard way of simply separating certain scales or levels.

And norms or qualitative information should also be separated from technical function, sure – but what is really unique about this method?

2.2.2. Just to make sure: is it MIL-STD 1269 or 1629? Page 7 line 28: sequence should be consistent with following description (does 'cause' come first?)

P 8 line 13: industry does not just observe failure modes, FMEA is also heavily applied for effect analyses in terms of cost estimations of risk analysis in the sense of calculating human loss, mission or weapon loss.

2.2.3 ETM should be spelled out here again since it is difficult for readers not familiar with this term to grasp it.

2.2.3 ETM is not always truly inductive – it is also often used to explain events such as Chernobyl in hindsight and is merely used to show up how things developed to this

specific outcome.

Page 8 line 30: strong statement: ALL events of a city crisis can be known – is this possible?

Page 9 line 1: this seems to be a mistake: ETM is not necessary anymore to model the "failure modes" but rather the "consequences?!

2.2.4 I heavily doubt that "any event" will have such an impact and I doubt that any variable will propagate to any other. Yes, there exist many bimodal relationships, but just as often, sequences in reality and in the model do not always connect every vector with every node. And this is especially due for the initiating event. Even dust storms that hit numerous surfaces simultaneously, do not cause the same effects on all materials.

Many statements without proper arguments, examples or sources throughout the paper but especially in 2.2.4.

Sources should be included especially for all the numbers mentioned in 3.2 and 3.3. How were the thresholds decided in 3.3.? (for instance, 50%?)

The discussion chapter includes only a discussion of the results, but lacks a proper discussion of what the authors observed as shortcomings of a) their methodologies b) the results c) the applicability for other research or end-users. While parts of b) and c) are loosely described in the conclusion chapter, the discussion chapter lacks comparison with findings in literature. Since FMEA and ETM are long established methods, it would be vital to discuss what is really novel about their approach and what is not and how this compares with previous applications.

Tables and Figures are helpful and illustrative yet they lack a description on which basis the variables and boxes were selected and arranged. Some like Fig 1 and 2 seem arranged and selected rather randomly. Some explanation in the text around it would be a recommendation. Many figures are just like the methods chapters like cutouts from a textbook and too generic. Would be great to link all of it more to the Nimes

case study. Abbreviations in the figure headings should be avoided – difficult for the reader

Please do not be discouraged by those comments - just meant to be constructive.