The review on

Dissertation thesis: Evaluation of the Role of Crucial Impacts on Networks for Technological Innovation

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Theoretical background:

A recognised pillar of the knowledge economy, in addition to the economic and institutional framework, is an effective system to support Innovation. The innovation system is composed of relatively independent systems - national, regional and sectoral/technological. At the same time, overall innovation performance increases if the innovation systems are interconnected with large penetrations promoting positive externalities based on mental or spatial proximity. Technological innovation systems (TIS), examined in this dissertation, draw mainly on cognitive proximity and sectoral grouping. The importance of a system approach lies in understanding the factors of innovation performance and redesigning the system towards a more integrated approach to the implementation of innovation policies.

This way of thinking is present in the presented dissertation. The author relies on influential authors (Iammarino, Fritsch, Carayannis) and key sources in a literary review and appropriately combines them to create a coherent text leading to research questions. This part is pleasant to read, although I would accept a better definition of TIS in relation to other innovation systems and their interactions. Besides, it is always appropriate to illustrate the innovative concepts in specific sectors or regions, so as to provide a better impression of the concept.

Obviously, the focus on the technological innovation system evokes the idea of mainly technological innovations. From section 1.7, technological Innovation comes to the forefront of the discussion, focusing on the role of financial, interactive, institutional and structural factors on technological innovation generation.

Research questions and methodology:

The research plan is designed straightforwardly and comprehensibly (page 34). Hypotheses H1 to H6 are partial within the integrated model, examining the impact of the factors human capital, research system, public funding, cooperation on technological performance. There are two innovation outputs examined in the model - p*atents, trademarks and design* and

sales and exports. The input variables in the model are appropriately documented and justified as proxy variables. The reader can also find the references to data sources used in the proper place. The object of interest of the dissertation is the countries of the European Union, for which there is a reasonable basis in the data (European Innovation Scoreboard 2018).

The structural equation modelling (partial least squares technique - PLS-SEM) using SMART PLS modelling application is applied. There is a long-term discussion on whether SEM should be integrated amongst standard econometric research tools. When using SEM, it is always imperative to correctly interpret the results on relations between observed and latent variables and to avoid pitfalls. The author is aware of the need to evaluate models and test data. Subsequently, the use of OLS is also specified, but SEM and OLS are not sufficiently substantiated, only announced.

The structure of the research is shown in Figure 5. The author supports the proposed multilevel model with links to previous results. As composed of several parts, there is always some risk of whether the partial implications are chosen correctly and are also causal. Gradual testing, the disintegration into segments raise the question of whether this "engine" really works when putting all parts together.

I have some concerns about the interpretation of the SEM results. The author states in hypotheses whether or not they should be rejected. This would indicate a standard way of testing the null hypothesis and its alternative. What, then, is the null hypothesis in your case? Isn't it rather a research (not statistical) hypothesis and verification of influence-correlation?
Also, it is a bit of a mystery how the relationship between the title of the thesis and its content manifests itself; what is meant by "Crucial Impacts on Networks".

Comments/questions:

1. Could you justify why the technique method/model PLS-SEM suits best for hypotheses testing and whether some other (econometric) method might be used instead.
2. Could you better explain and interpret the results of SEM?
3. The correspondence of the title of the work with the content is not entirely clear. What is meant by "crucial impacts on networks"?

Statement:

I consider the work beneficial and especially appreciate the professional style of the dissertation. The author has demonstrated his research abilities and professional expertise, and the work submitted meets the requirements of the dissertation thesis. I recommend

submitting the presented dissertation for the defence and to award Ing. Anderson Henry Junior the Ph.D. degree.

Košice, 08.07. 2020

prof. RNDr. Oto Hudec, CSc.