



G20 Monitor Challenge Submission

A Global Hackathon for Students and Universities

For competition details and a sample proposal please refer to the G20 Monitor Challenge Brochure.

Team Information

Full names of all team members <i>If you are submitting as an individual, include your full name only</i>	Lubos Pernis
Email addresses of all team members <i>Please use your university addresses. If you are submitting as an individual, include your email only.</i>	lubos@fna.fi
University <i>If team members are affiliated with more than one university, please list the details of all institutions.</i>	FNA

Dashboard Proposal

Proposal title	Supply Chain Resilience Dashboard
Please describe your proposed dashboard in no more than 400 words. You may want to highlight: <ul style="list-style-type: none">• Analytics you plan to deploy (e.g. centrality measures...)• Visualization techniques you want to use (e.g. network diagram, scatterplot, ...)• Any references to academic literature	<p>The Supply Chain Resilience Dashboard dashboard combines time series multiregional input output tables with network science and data visualisation.</p> <p>The dashboard will provide two main features.</p> <p>Firstly, the dashboard will identify the most central sectors of the global economy and assign a score to them. The centrality criterion for this network will consider the effects of a sector's decrease in demand/supply on other sectors in the global economy. As an example, a sector will be deemed very central and thus assigned a high score if it is a unique supplier in a long</p>

supply chain. This computation of centrality of sectors based on the aforementioned criterion will run both on the global level and for all countries in the database so that the dashboard is also useful for national analysis. Additionally, since the computation of centrality for each sector will be performed on an annual basis, users of the dashboard will be able to compare and monitor changes in the network.

Secondly, the dashboard will calculate and display an overall score for the resiliency of the network. This score should provide a quick first answer to the question of whether the global economy is becoming more or less resilient to various supply or demand shocks. The overall measure which I propose to implement can be based on the work Xu et al. (2011) where their approach runs a monte carlo simulation disabling value facilitation in the US economy and observing the effect on a metric defined in the paper. The advantage of this single measure of resilience for the entire network, albeit somehow crude, lies in the fact that it can be easily monitored over time.

The 2 main pieces of analytics will be visualised using various dashboard widgets. I propose to feature a widget highlighting the overall resiliency score for the network. The sectors of the economy together with their centrality score should be listed in list widget and ordered by their criticality. Additionally, the list should be accompanied by a world map. If a country is chosen on the world map, the list with the most central sectors will be updated to reflect the most critical sectors from the nation's perspective. Finally, there will be a network widget displaying the map of the interconnected world or national economies.

Xu, M. et al. (2011)

INTERCONNECTEDNESS AND
RESILIENCE OF THE U.S. ECONOMY.

Advances in Complex Systems. [Online] 14

Target Audience and Realised Benefits

Please describe the relevance of your dashboard for a target audience (e.g. central banks, regulators, government agencies, FMs or banks...) in no more than 250 words.

In 2020, we live in an interconnected and increasingly digitized world. The global COVID-19 crisis has shown just how interconnected the world economy really is. The proposed dashboard is aimed at central banks and government agencies to better understand their embeddedness in the global economy. More importantly, it should be used to provide insights about the resilience of the key sectors of their national economies.

At the same time, regulators and central banks also need to take into account the global picture and how their economies are placed within it. That is why the global resiliency score can be seen as particularly compelling in this context.

The proposed dashboard can be used by central bankers and governments not only to study economic resiliency at one point in time, but thanks to the built-in time dimension of the dashboard can also monitor changes in resiliency over time.

These analytical insights can be instrumental in guiding both the policies of central banks and national government agencies. On the side of central banks they can guide their asset purchase programmes to support critical sectors of the economy in times of crises. On the side of government agencies, they can inform the longer-term industrial and development strategies aimed at transforming economies to make them more resilient.



Submission Checklist

- I have filled-in all of the fields above and exported this document in pdf
- I have attached both this document and a mock-up of the dashboard as part of the submission email. (Example of dashboard mock-up)