



## Summary Report 1<sup>st</sup> JRC Workshop on

# Economic Complexity to Inform Policy From Industrial Innovation to Industrial Competitiveness

Online workshop, 15, 17, 19 June 2020

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## 1. EXECUTIVE SUMMARY

The Joint Research Centre (JRC) started in January 2019 an institutional activity to explore how Economic Complexity could be used by the Commission to guide policy. A year later this initiative is now articulated into several projects, carried out both internally in the JRC Directorate B (Growth and Innovation) and externally. This workshop of economic complexity accompanies these activities with external experts from academia and other institutions. The objectives were to (1) validate our work; (2) increase awareness for the JRC team within the complexity community; (3) disseminating across the Commission the ideas of complexity and the work of the JRC team.

The workshop took place online on three separate dates: 15, 17, and 19 June 2020. Dario Diodato, Emanuele Pugliese, Andrea Tacchella, and Alexander Tübke presented the internal work of the JRC. Luciano Pietronero, Angelica Sbardella and Bart Verspagen presented the external work funded by the JRC. Two leading academics, Maria Savona and Koen Frenken, and a policymaker from the International Finance Corporation (IFC, World Bank), Masud Cader, acted as external experts, providing feedback and delivering a keynote each. The workshop also included a closed-door roundtable and a Q&A session, ended with the closing remarks of Mikel Landabaso, director of JRC's Directorate B.

The objectives of the workshop were met and the JRC activities welcomed by the participants, who engaged in a constructive discussion of our work and economic complexity-inspired policies in general. The JRC will continue these activities and produce infographics, continue exchanges in the group of stakeholders, with a follow-up workshop in 2021 and a potential publication of a handbook of good practices. The potential for using the quantitative results to support to Smart Specialization policies was outlined.

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<sup>2</sup> The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission

## 2. BACKGROUND AND RATIONALE

Starting in January 2019, the Joint Research Centre (JRC) of the European Commission started a new institutional activity to explore the use of the Economic Complexity framework for addressing policy relevant themes in territorial development and industrial innovation and competitiveness. Economic Complexity is the natural continuation of earlier evolutionary and institutional research (Hirschman 1958, Cimoli and Dosi 1995, Teece, et al. 1994), using advancements in network science and complex and dynamical systems (Hausmann and Klinger 2006, Hidalgo and Hausmann 2009, Tacchella, Cristelli, et al. 2012) to separate random noise from the underlying signal. By doing so, it allows shifting the focus of quantitative economic analysis toward research questions that are traditionally tackled either qualitatively or with ad hoc quantitative measures. The framework, in particular, is designed to use information on the current technological and productive capacity of countries and regions assess where new technologies are more likely to emerge. As such, Economic Complexity could offer additional guidance to policy priorities of the European Commission, such as foresight, strategic autonomy and green new deal.

A year on, this initiative is now articulated in several projects, both internal and external. Internally, the JRC has built a team with the capabilities of producing in-house research across the Directorate B (Growth & Innovation). The internal research is exploring cutting-edge topics such as GDP forecast, product progression, and multi-layer networks; at the same time, it is translating the Economic Complexity research into relevant information for European policies. The JRC Policy Brief applies these techniques to Slovakia as one example of an effort to build infographics for each EU Member State.

Externally, these competences are complemented by a series of projects funded by the Joint Research Centre. CNR Italy is tasked with conducting a meticulous mapping of competitiveness of European countries and regions in complex products, services, technologies, and scientific domains – providing the Commission with valuable data as well as analysing and revealing hidden patterns that help understanding the link between innovation and economic prosperity. UNU-MERIT is exploring novel methods designed to understand the impact of Economic Complexity on multiple outcomes (GDP, GDP growth, pollution), and to then retrieve which products have the highest impact on which outcome. Lastly, a pilot project that links Economic Complexity to the Commission's climate and environmental objectives was a researcher from Scuola Superiore Sant'Anna (Pisa).

This first Validation Workshop – Economic Complexity to Inform Policy – aimed at showcasing the JRC initiatives to a panel of scientific experts in the field, to get their view on Economic Complexity-inspired policies in general, as well as more specific comments on our approach. With several of these projects well on the way, yet not in a final phase, we organized the workshop in June to maximize its impact. This would allow consolidating or adjusting the approach according to the feedback we receive.

### 3. PROGRAM

#### DAY 1 – 14:00-16:15 (Monday, 15 June)

##### 14:00 – 14:10

Welcome and forewords (Alex Tübke, JRC)

##### 14:10 – 14:30

Introduction on economic complexity (Emanuele Pugliese, JRC)

##### 14:30 – 15:00

Presentation from external expert (1 speaker, 30 min)

“Vertical vs. Horizontal Policy in a Capabilities Model of Economic Development” (Koen Frenken, Utrecht University)

##### 15:00 – 15:15 (15-minute break)

##### 15:15 – 15:45

Presentation from JRC researchers: (2 speakers, 15 min each)

“Country analytics with economic complexity: The case of Slovakia” (Andrea Tacchella, JRC)

“The technological frontier: economic complexity and start-up creation” (Dario Diodato, JRC)

##### 15:45 – 16:15

Presentation of JRC project contracted out externally (1 speaker, 30 min)

“Economic complexity and canonical correlation analysis” (Önder Nomaler & Bart Verspagen, UNU Merit)

#### DAY 2 – 14:00-15:20 (Wednesday, 17 June)

##### 14:00 – 14:30 Presentation from external expert (1 speaker, 30 min)

“Innovation policies and economic complexity” (Maria Savona, SPRU – University of Sussex)

##### 14:30 – 15:00

Presentation of JRC project contracted out externally (1 speaker, 30 min)

“Production, science, and technology fitness of EU countries and regions” (Luciano Pietronero. La Sapienza e Centro Fermi)

##### 15:00 – 15:20

Presentation of JRC project contracted out externally: (1 speaker, 20 min)

“Assessing EU green technological potential through Economic Complexity” (Angelica Sbardella, Scuola Superiore Sant’Anna)

##### 15:30 – 16:15 [Closed door roundtable]

#### DAY 3 – 14:00-15:45 (Friday, 19 June)

##### 14:00 – 14:45

Presentation from external expert (1 speaker, 45 min)

“What does economic complexity do for the World Bank?” (Masud Cader, IFC World Bank)

##### 14:45 – 15:40

Q&A: “The challenges of the European Commission and Economic Complexity” Policymakers from the European Commission pose questions to external experts.

##### 15:40 – 15:45

Closing remarks (Mikel Landabaso, JRC Director Growth & Innovation)

### 4. ATTENDANCE

The workshop was attended by had 68 people (including the speakers) who RSVP’d for at least one of the three events. Besides the organisers and colleagues from the JRC, 14 Commission staff (CONNECT,

ECFIN, GROW, REGIO RTD), and 15 external researchers from academia and policymaking participated in the workshop.

## 5. OBJECTIVES

The Validation Workshop had three main objectives:

- 1) Steering and validation. The workshop will give an opportunity to our research (internal and external) to get an honest feedback. This has the main purpose of maximizing its likelihood to be effective. Moreover, presenting our work to academic experts also aims at increasing the persuasiveness of our initiative, maximizing the likelihood to be absorbed and implemented in policies by the Commission
- 2) Awareness and reputation. Showing our work to academic experts is also aimed at letting the academic community know that the Joint Research Centre is conducting relevant research on Economic Complexity. This may have long-run benefits (future collaborations, attraction of talents)
- 3) Dissemination. Exposing policymakers to Economic Complexity and how its tools can help guiding policy

The final discussion in a roundtable provided the opportunity for open exchange on these objectives.

## 6. SUMMARY OF THE SESSIONS

- A. Presentations of the JRC. On Monday, Alex Tübke, Emanuele Pugliese, Andrea Tacchella, and Dario Diodato on the first day showed gave an overview on how Economic Complexity fits with the Commission objectives and a broader introduction of is the main characteristics of Economic Complexity. The JRC showcased some of the output that the team has produced to address policy-relevant questions.
- B. Presentations of JRC-funded projects showed the progress of the projects. One is progressing in the characterization of EU competitiveness and innovation via Economic Complexity ; the second one is applying a new methodology of canonical correlation to address the heterogenous impact of Economic Complexity; and the third one provides a synthesis between economic complexity and the green economy.
- C. Each day was introduced by a keynote speech. Koen Frenken presented on Monday a model that suggests – from a complexity perspective – that industrial (vertical) policies are more useful at lower level of development, while developed economies might benefit more from horizontal policies. Maria Savona gave her expert view by highlighting the many areas of research that Economic Complexity could contribute to, but still has not. Masud Cader explained in great detail the process followed by the IFC World Bank to design policies based on the results of Economic Complexity for emerging countries, together with hands-on examples.
- D. The roundtable closed the workshops and received the views of external experts on the JRC activities and its policy support potential, esp. designing policies from the perspective of Economic Complexity. Part of the debate revolved around whether, for communication purpose to policymakers, this should rather focus on the simpler tools of Economic Complexity, leaving aside those tools that are more intricate, albeit more powerful. The opinion of experts on this matter varied.

- E. The roundtable was complemented with a Q&A session where attendees vividly discussed the practical issues of implementing Economic Complexity to support policies.

## **7. CONCLUSIONS**

In the closing remarks, the usefulness of the Economic Complexity approach was underlined. The JRC will continue these activities and produce infographics for each Member State by autumn. It is envisaged to continue exchanges in the group of stakeholders and workshop participants, with a follow-up workshop in 2021 and a potential publication of a handbook of good practices. The potential for using the quantitative results to support to Smart Specialization policies was outlined.