ECONOMICS DEPARTMENT
ECONOMIC POLICY COMMITTEE

NAEC INNOVATION LAB

A blueprint

This document sets out a blueprint for the establishment of OECD NAEC Innovation LAB as set out in the 2018 Strategic Orientations of the Secretary-General.

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NAEC Innovation Lab: A Blueprint

Implementing new approaches to economic challenges requires new tools and techniques to make sense of a wide range of economic and social phenomena. Digital innovation is opening up new possibilities for data generation and policy analysis that need to be explored and mastered. The aim of the NAEC Innovation LAB is to encourage the adoption of new and innovative analytical methods across the Organisation to address new policy questions and bring new policy insights. It will help to mainstream the "NAEC state of mind" by continuously reviewing and upgrading the OECD's analytical capabilities, promoting further horizontality and providing a platform to engage with broader research communities.

This blueprint sets out the objectives and background for the LAB as set out in the 2018 Strategic Orientations of the Secretary-General [ADD reference to C/MIN(2018)1], what the LAB will do, and how it will function.

1.1. Background and LAB objectives

1.   New questions and new approaches to policy challenges often require new tools. At the same time, digital innovation is leading to new analytical techniques and opening up new sources of evidence, notably big or smart data. The new issues that can be explored in this way include policy interactions, complex systems, non-rational behaviour, multi-dimensional outcomes, network phenomena, non-linear responses, distributional impacts and geospatial effects. Using the new tools should help to provide innovative, accurate and targeted analysis to support providing concrete and targeted policy advice.

2.   Machine learning techniques allow less restrictive analysis of data than conventional linear models. This can improve prediction accuracy and allow for richer non-linear relationships and interactions between effects that can be relevant to how policies work together. Interpreting the outcome of machine learning-based models is a key challenge, but can open up new insights and targeted-advice taking into account the interaction of many factors at the level of the individual. For example, these models are being used to improve economic forecasting and to better understand the rich and complex sources of growth. Big data allow more timely, granular and richer information to be used from new sources to be used to address policy questions and it is particularly powerful when data from different sources (including established sources) can be combined to provide a multi-dimensional picture of a problem. For example, different sources of data about individuals could be combined to present a geospatial picture of living standards and their determinants. Agent-based models explore how non-linear interactions of individuals and institutions can lead to complex and unpredictable behaviour, for example in the context of explaining financial crises and evaluating policies to reduce their costs. Experimental approaches help to shed light on behaviour at the

individual, for example through whether relationships are founded on trust, that influences the aggregate behaviour and policy outcomes. There are many linkages between these approaches including big/smart data providing inputs that leverage the power of machine learning and experimental outcomes helping to inform agent-based modelling.
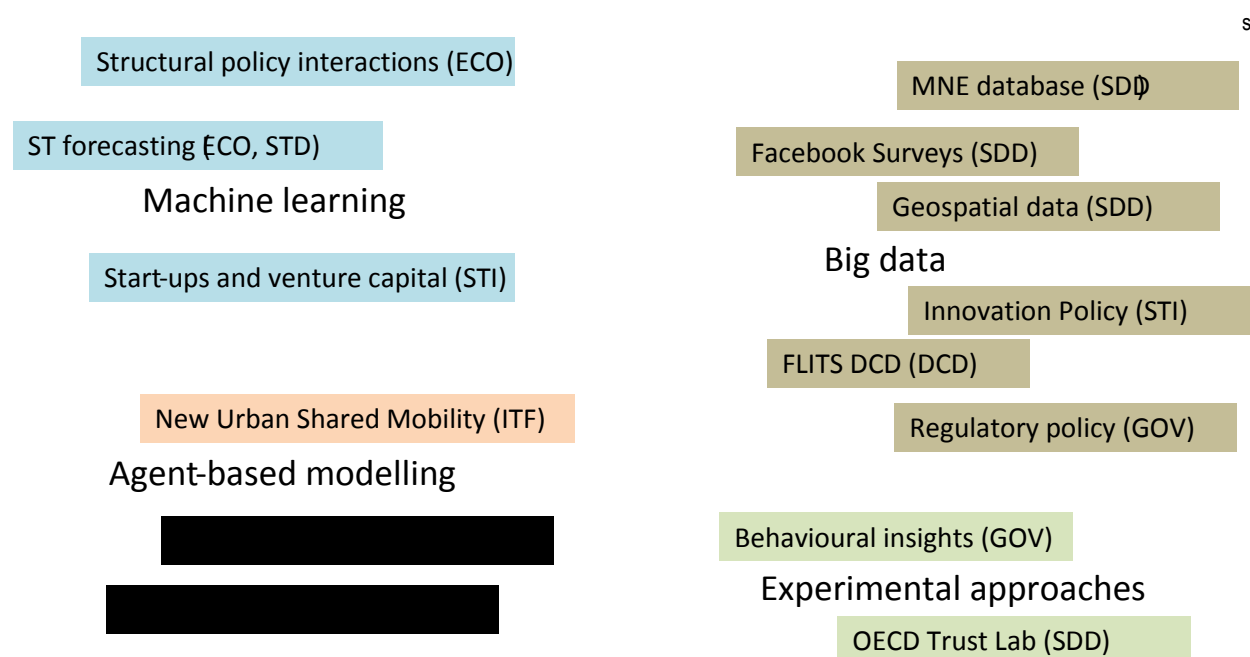
3.   There is innovative work going in the OECD to apply these techniques, but the number of projects is small and projects are isolated. The LAB aims to encourage more projects and to make them connected. Innovative projects are defined here as those that depend on applications of new techniques. They address many different policy issues and draw on a wide range of techniques. What many of them have in common is reliance on very large datasets and computationally-intensive methods. These projects may carry greater risks than relying on existing techniques, but potentially offer high returns. Investigation and experimentation on a relatively small scale and in a safe environment may encourage required experimentation, while working with others will help diffuse lessons from experiences gained. There are many other interesting new projects underway in the OECD, for example those making increasing use of microdata, but these rely primarily on well-established techniques where the OECD already has a high level of expertise.

4.   A mapping of on-going or recent projects suggests four main clusters:

- Machine learning

- Big data

- Agent-based modelling

- Experimental approaches

Among these areas, there are several projects around big/smart data, including work using geospatial approaches and another stream on semantics. Experimental approaches are relatively well-established through the TrustLab and Behavioural Insights. Less has been done to apply machine learning and only one project currently involves Agent-Based Modelling.

Figure Innovative projects in the OECD

Structural policy interactions (ECO)

ST forecasting (ECO, STD)

Machine learning

Start-ups and venture capital (STI)

New Urban Shared Mobility (ITF)

Agent-based modelling

MNE database (SDD)

Facebook Surveys (SDD)

Geospatial data (SDD)

Big data

Innovation Policy (STI)

FLITS DCD (DCD)

Regulatory policy (GOV)

Behavioural insights (GOV)

Experimental approaches

OECD Trust Lab (SDD)

5.   The aim of the LAB is provide a space for researchers across the OECD to work together on specific projects that apply and experiment with new analytical tools and techniques so as to diversify and strengthen the OECD's analytical tools. Ideas and approaches emerging from the NAEC initiative could be tested and assessed further to demonstrate their value and policy relevance. Some Directorates are already undertaking small-scale "sand box" projects but these efforts require support. The LAB would facilitate this by providing cross-fertilisation, scale and incubation. It would provide increased credibility and support to work for Committees using innovative techniques.

6.   A key feature of the LAB would be to encourage cooperation both across Directorates in the Organisation and a wider research, data and policy community. The LAB would develop innovative projects drawing on talents from across Directorates and mixing different skills, including as part of the OECD Smartdata Framework. As a platform for collaboration with wider communities, the LAB could help develop links and make use of expertise and data outside the Organisation, including in national governments, academic and think-tanks and the private sector. The LAB will leverage the contributions and networks that the NAEC Initiative has developed. This would include building on long-established partnerships with the Joint Research Centre, Institute for New Economic Thinking (INET), the International Institute for Applied Systems Analysis (IIASA) and the Santa Fe Institute.

Figure NAEC Innovation Lab as a network
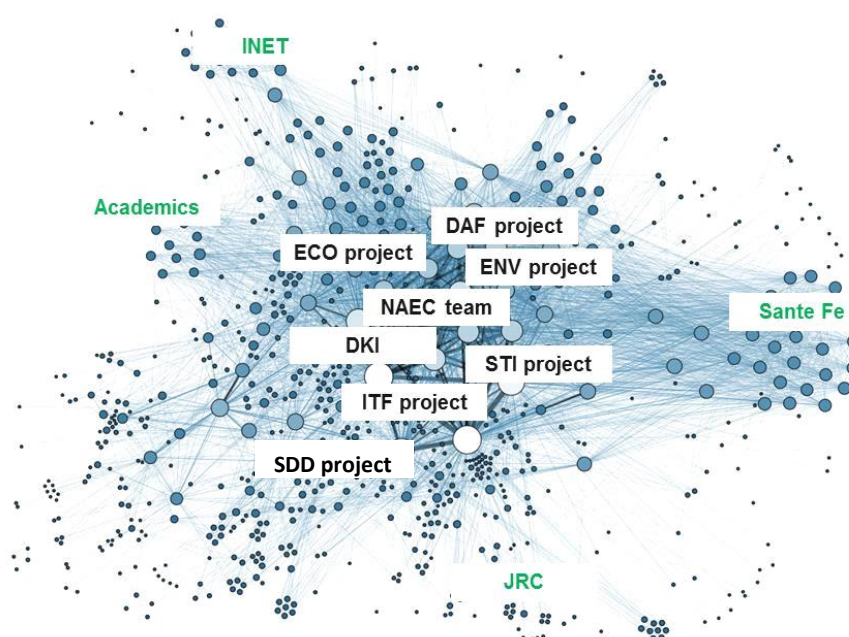
7.   The LAB has informally begun to organise events, build networks and prepare this blueprint. There have been 4 LAB workshops: agent-based modelling (ABM) and labour markets; AMB and financial markets; machine learning and forecasting; and introduction to machine learning. Close to 200 people have expressed an interest in LAB work or attended events. Connections have already been made between a few research projects in different Directorates.

1.2. What the LAB would do

8.   The LAB would incubate and connect projects in Directorates drawing on new tools to take new approaches to policy challenges. The LAB would involve a core team of researchers working together on projects. As associates of the LAB, these researchers would be able to share approaches and build common understanding. The projects and the researchers would remain primarily supported by Directorates, ensuring that they are part of the mainstream of Directorates and Committee work. Directorates would be encouraged to undertake projects that could be associated with the LAB.

9.   The LAB would play a facilitating role. As well as the support of the team, it would provide facilities and a strong link to the "sandbox" that provides access to additional computing power for specific projects and access to outside expertise to support such work. Researchers could work together in the LAB and use a common electronic library of data and code. The LAB would be a focal point for training, seminars and engagement with outside partners, including discussions currently taking place within knowledge management practice working groups on web scraping, geospatial data and machine learning. There could be an annual LAB conference.

10.   The LAB would be at the centre of a wider community where dialogue and expertise around the use of new techniques could develop. People in the

community with relevant experience could provide guidance to projects in the LAB, and provide a place where people can draw on expertise of others to develop new ideas and projects. A central issue is developing applications of new techniques relevant to policy work and dialogue around the LAB that would help to achieve this.

11.   To increase visibility of innovative projects, LAB projects would be clearly identified and outputs would include LAB branding. Identifying projects as being part of the LAB could help build Committee support, underlining their contribution to Organisation-wide goals and ensuring that the necessary support is in place.

12.   The LAB will provide on a limited scale seed funding as co-financing with Directorates for innovative projects, including as a channel for voluntary contributions. However, the aim would be for projects to remain Directorate- and Committee-driven to ensure that work remains relevant and in the mainstream of the Programme of Work and Budget. LAB support could also include bringing in some temporary staff or experts with relevant skills that could be made available to specific projects.

13.   The initial set of new projects could cover a range of areas. Three projects are currently being considered. First, a new project would use agent-based modelling (ABM) to analyse financial interactions and network effects in the global economy based on a stylised representation of the financial system and the behaviour of key agents. This would highlight policy spillovers and show how policies and institutions affect resilience. Second, another project would use machine-learning   techniques   to   improve   short-term   macroeconomic nowcasting/forecasting and to understand the non-linear interactions between growth-enhancing policies and inclusive growth outcomes, allowing for rich interactions between policies and with country circumstances. This opens the way to give model-based policy advice that is more country specific. A third project would use big data approaches to understand how prices are being affected by technological change and exposure through trade and global value chains with implications for well-being and policy.

1.3. LAB design

14.   The LAB should operate in a dynamic, open and flexible way within the OECD framework. The LAB is supported jointly by the Chief of Staff through the NAEC team, ECO through the Chief Economist's Office, and Statistics and Data Division (SDD) through the Chief Statistician Individual LAB projects would contribute to the work of the corresponding Committees, while the Economic Policy Committee (EPC), Committee on Statistics and Statistics Policy (CSSP) and the NAEC Group should play a role in ensuring the robustness and policy-relevance of the work of the LAB.

15.   The "Core LAB" would consist of Associates from Directorates working on projects and relevant IT infrastructure experts from DKI. The day-to-day management responsibility for the LAB would be managed by the LAB Coordinators attached to the NAEC team and the Chief Economist's office. The work of the LAB would be guided by the LAB adviser. The core would involve

associates spending some of their time working together as a team in the LAB. It would provide support and facilitate the work of associates.

16.

Figure Design of NAEC LAB
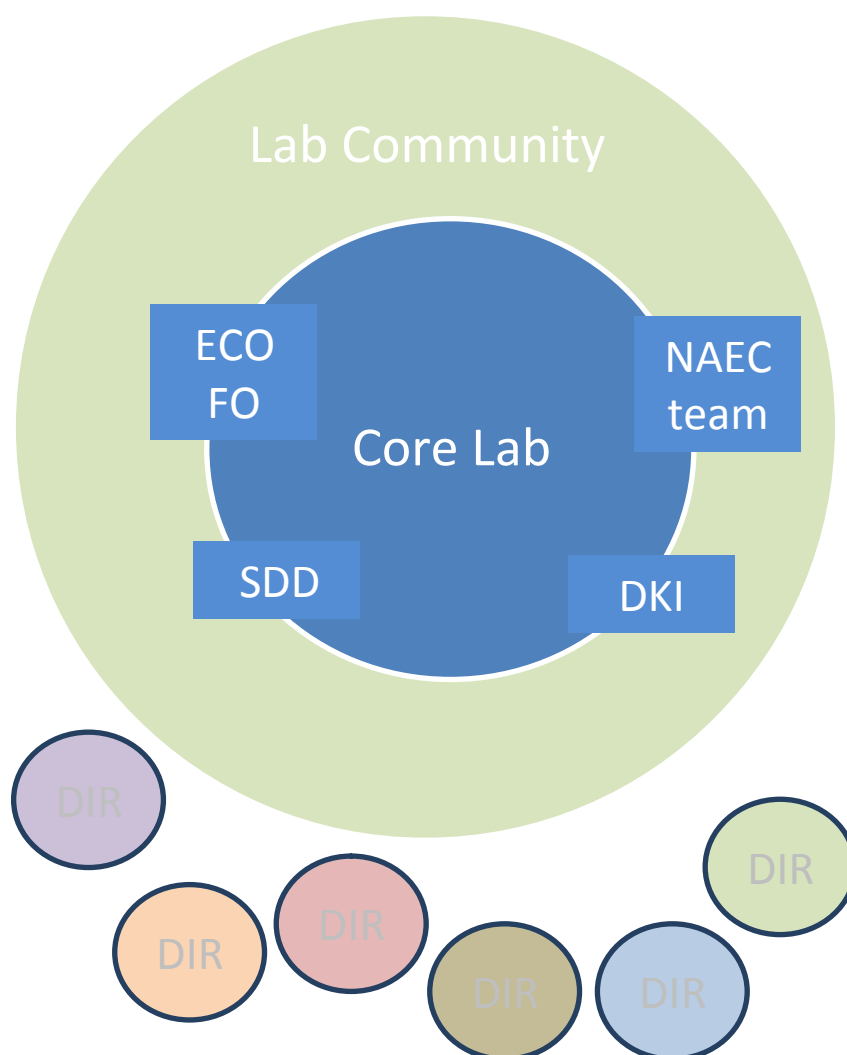
17. The work of the LAB would be closely associated with other initiatives, such as NAEC and the OECD Digital Strategy. The LAB would directly contribute to the latter in terms of developing the intellectual framework and analytical approaches to use new tools.

18. LAB work would primarily be driven by projects principally funded by Directorates in support of their PWB outputs with the goal that the LAB would encourage greater innovation, whether through large-scale projects or small-scale work. A small amount of start-up funding for LAB activities and seed funding for initial projects would be channelled through OSG/NAEC, ECO and SDD. The LAB could also act as a catalyst for external partnerships, either connecting the OECD to external expertise or resources in the form of expertise, data or voluntary contributions.