

## Abstract submitted for the 30<sup>th</sup> IIOA

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**Title:** Addressing technical issues in the compilation of the AfCIOT and TiVA indicators in Africa

**Authors:** Xiaoning Gong<sup>1</sup>, Eleanor Keeble<sup>1</sup>, Ana Deveza<sup>1</sup>, David Boko<sup>1</sup>, Emilio Lopez Cano<sup>1</sup>, Pauline de Bannes Gardonne<sup>1</sup>, Norihiko Yamano<sup>2</sup>, Collin Webb<sup>2</sup>, Christophe Degain<sup>3</sup>, Ali Yedan<sup>1</sup> (1) UNECA, (2) OECD, (3) WTO

### **Abstract:**

This paper describes the technical compilation process of the first African regional Input-Output table, entitled the African Continental Input-Output Table (AfCIOT), led by the United Nations Economic Commission for Africa (ECA). The main objective of this tool is to support the implementation of the African Continental Free Trade Area (AfCFTA) through the calculation of Trade in Value Added (TiVA), carbon embodied in trade, and employment indicators for African countries. Such indicators will allow for an in-depth understanding of countries' positioning in regional and global value chains that will empower governments, development partners, and other policymakers to make informed decisions for regional integration. The research responds to the question: How to develop a regional input-output table to promote regional integration in a data-constrained environment?

The defining feature of the AfCIOT is the detailed representation of African countries through a "bottom-up" approach based on the country's Supply-Use Tables (SUTs), National Accounts (NAs) and trade statistics. It generates indicators for these countries and other foreign countries originating from OECD's Inter-Country Input Output (ICIO). The process of building the AfCIOT is in itself a tool for the statistical capacity development of African countries. It allows the identification of data gaps that, in turn, foments interactions with Member States.

The development of AfCIOT follows the OECD's methodology as close as possible, allowing for the data limitations of the region. The steps are: 1) standardisation to international classifications; 2) balancing and harmonization of national SUTs based on their NAs; 3) conversion from purchasers' to basic prices and from SUT to IOT; 4) separation of the use table into domestic and import matrices; 5) construction and balancing of the inter-country use table (ICUT) and inter-country supply table (ICST); 6) conversion to IO table; and 7) production of indicators. This paper highlights the adaptation of these methods for the African context.

Key to the AfCIOT's compilation is the matching of national product and industry descriptions with international standards CPC and ISIC 4 codes at two-digits level. These codes are used by AfCIOT to enable integration with the OECD's ICIO. To perform this task, an expert system for semi-automated classification was developed. This module involved tests with machine learning, Large Language Models (LLMs), text mining and expert assessment.

The technical compilation also involves several balancing steps using RAS-based methods. These steps are performed both at the individual country data level to harmonize with country NAs and at the aggregated level to balance international trade flows. Where key indicators are missing for the required year and country, cluster analysis alongside econometric regression provide estimations. These estimations shall be replaced with country data as direct discussions with Member States progress. Countries not explicitly represented are incorporated into the "Rest of the World".

Data dissemination is also a key aspect, with the development of an interactive platform using the R programming language. R's shiny package provides users with a user-friendly interface for visualization

of the indicators and download of the underlying data. A country profile, with key visualizations and descriptive text, can also be exported from the interface. This platform supports a multilingual interface to cater to a diverse user base, enhancing accessibility and engagement.

In conclusion, this paper will detail not only the technical processes behind the AfCIOT but also explore its dissemination strategy; underscoring its potential to drive informed policy-making and foster regional integration in Africa amidst data constraints.

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