

WP6: Intangibles in Global Value Chains

An overview of the GLOBALINTO Input-Output Intangibles database, applications, extensions and future research

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An overview of the database and the work completed so far

Quantifying intangible capital

- Intangible (or knowledge-based) capital has been identified as a key determinant of growth in a large variety of growth accounting studies (e.g. Corrado et al., 2018; Roth, 2020)
- Previous attempts on quantification focus on investment and purchase of intangible capital using national account framework (“old” intangibles) and beyond (“new” intangibles)
 - INNODRIVE database (Piekkola, 2011; Jona-Lasinio et al., 2011)
 - INTAN-Invest database (Corrado et al., 2018)
 - EU-KLEMS 2019 Release (Stehrer et al., 2019)
- These approaches provide key qualitative data regarding the wide range of intangibles utilization of intangible assets at the country and industry (NACE 1 and NACE 2-digit level)
- A key question remains: Location/ origin of the intangibles (particularly important in the fragmented global economy)

A new approach based on I-O analysis

GLOBALINTO I-O Intangibles database addresses this dimension under a specific framework:

- Intangible assets are produced by certain knowledge-intensive service industries in each economy.
- Intangibles are utilized as intermediates in the production of each industrial sector.
- Intangibles are traded alongside other intermediates in the inter-industry and inter-country trade.

Intangibles data in the GLOBALINTO I-O Intangibles database

Indicators calculated based on the 2016 release of WIOD

- ✓ *Intangible inputs* provided by 4 NACE Rev. 2 sectors: J62-J63 -Computer programming, consultancy and related activities; M72 - Scientific R&D; M73 Advertising and market research; N Administrative and support service activities
- ✓ Made in 42 countries (all EU members included) and RoW; Aggregates for BRIC, EA, EU28 aggregates
- ✓ Used by 56 2-digit NACE Rev.2 sectors in each EU country and the UK
- ✓ Time coverage: 2000 – 2014

Indicators directly from Eurostat

- ✓ R&D spending to output ratio (current prices): data for 37 sectors 2-digit NACE Rev.2 , years 2007 - 2013
- ✓ R&D personnel to employment ratio: data for 37 sectors 2-digit NACE Rev.2, years 2008 - 2014

An output dimension with special focus on exports

Indicators calculated based on WIOD

- Data for exporting performance of 56 2-digit NACE Rev. 2 sectors for the EU-27 and the UK.
- Data for different categories of export uses:
 - ✓ intermediate inputs,
 - ✓ household consumption,
 - ✓ non-profit organisations serving households consumption,
 - ✓ government consumption,
 - ✓ gross fixed capital formation
- Intra–EU, Extra–EU and overall aggregates
 - Special focus on intermediates inputs, `
 - Additional data for exports to sectors producing intangibles
- Additional competitiveness indicators (relative ratios based on VA and exports)
- *Time coverage: 2000 – 2014*

Indicator directly from Eurostat

- Patent applications to the European Patent Office: data for 19 2-digit NACE Rev. 2 sectors and years 2000 - 2013

Database contribution

- An empirical approach for trade in intangibles
- Key novelty: Location dimension
 - *Who supplies the intangibles*
 - *Who uses the intangibles*
- Focus on the procured intangible capital from exogenous sources
 - Subset of total intangibles expenditure
 - Data correspond to purchased intangibles
 - Exogeneity of intangibles from the primary factors of production (i.e., VA) in each industry
 - Possible double-counting with capital expenses (special treatment in empirical applications)
- Own production is not accounted, however not excluded!
 - MNEs maintain research facilities as subsidiaries (different industrial classification) → intangibles production is recorded as an inter-industry transaction in the I-O framework
 - Parent companies (and their research centers) trade with their subsidiaries in different countries → key dimension of the intra-firm trade across countries and industries is the knowledge component

Applications of the database

- Cross country and cross-sector analysis
- Comparative studies
- Regional studies
- Econometric applications
- Integration with growth accounting frameworks
- Compatibility and integration in the I-O framework → inter-industry transactions mapping

A global value chains framework

- The main application of the database is within the context of GVCs:
 - Intangibles are treated as traded intermediates
 - Direct integration in the global production network as inputs of production (producer services)
 - Rising importance of services in the coordination of GVCs and the “servicification/ servitization” of manufacturing activities (Miroudot and Cadestin, 2017)
- ✓ Mapping of intangibles origin
- ✓ Calculating the contribution to intangible imports of different types of intangibles that are produced in different locations
- ✓ Implications and contribution to productivity growth and export performance (using data directly drawn from the database)

Empirical work based on the database

- The contribution of intangible inputs and participation to GVCs in productivity performance – Evidence from the EU-28, 2000-2014 (**D6.1: Global perspective on innovation value chains and related industrial policy, intended as a book chapter, successfully submitted**)
- GLOBALINTO Input-Output Intangibles Database: Industry-level data on intangibles for EU-28 (**D6.2 Formulating the industry-level data on intangibles in Europe in a web form, successfully submitted**)
- Are innovation and intangible assets drivers for EU's manufacturing competitiveness in Global Value Chains? (**D6.3 Academic article on linking intangibles, patents in the innovation value chain and productivity growth, successfully submitted**) – also submitted to *Technological Forecasting and Social Change* (under review)
- Intangibles and GVC Participation in the EU: Evidence from the GLOBALINTO I-O Intangibles Database (submitted to the *Economic and Business Review*)
- Additional contributions to upcoming international conferences

A brief glance in current research and future work

Novel research: The international database

- Expansion of the GLOBALINTO I-O Intangibles database framework to cover global economies (based on the raw WIOD data)
- New data for:
 - Brazil, Canada, China, Japan, Republic of Korea, Japan, Mexico, Norway, Switzerland, USA
 - Used by 56 2-digit NACE Rev.2 sectors in each country
 - Time coverage: 2000 – 2014
 - Intangible inputs, competitiveness and exports indicators included

Empirical application of the global dataset

- A new empirical application regarding location of intangibles in the global production network and their contribution to growth and competitiveness
 - Focus on the G7 economies (Canada, France, Germany, Italy, Japan, the UK and USA)
 - De-industrialized, advanced economies that are characterized by innovation (innovation producers according to the World Development Report (2020))
 - Intellectual monopolies that control intangible assets
 - How do their manufacturing industries response to the outsourcing of industrial production?
- **Research question:** Is the “intellectual monopoly” consolidated via the control of intangibles? Do domestic intangibles have a different impact than the imported intangibles for these economies?

Variables of interest

- Sector exports performance / specialization: Adjusted RCA Balassa index (prepared for the upcoming D5.9)
- Labor productivity in a traditional growth accounting framework that introduces intangibles as exogenous inputs to the primary production
- Backward participation in GVCs and traditional trade indicators also included

Preliminary results

- Intangible inputs – both domestic and imported – are identified as major drivers for export performance and labor productivity in the G7 manufacturing sectors.
- When accounting for origin, domestic intangibles appear to have a significantly stronger positive effect on competitiveness and growth.
- Backward participation in GVCs is a driver for export performance. However, there is a negative effect on labor productivity that is intuitively explained based on individual sector characteristics and positioning on the GVCs

Remarks for policy discussion

Evidence-driven implications

- Intangibles' trade is growing globally, and particularly in the EU
- EU's future industrial policy should provide coherent framework that correspond to the rise of the intangibles and the regionality of the EU value chain:
 - ❖ Secure investment in infrastructure and public intangibles, such as the quantity and quality of a highly-skilled labor force and well-functioning formal and informal institutions
 - ❖ Enhance intangible's production in the business sector (financial incentives to enterprises, tax relief, research subsidies) and establish collaboration routes for public-private sector joint initiatives
 - ❖ Foster cross-country collaborations under the scope of developing knowledge intensive goods and services
 - ❖ Align individual policy agendas from different member states under a common umbrella framework for growth with special focus on the creation and diffusion of knowledge via intangibles

Requirements for future industrial policy

- At this moment, policies regarding intangibles are incomplete, imbalanced and highly differentiated across countries as different conceptualizations regarding intangibles emerge
- We need at the policy level:
 - ✓ A coherent and **explicit definition** framework that provides guidelines regarding different aspects of intangibles and properly addresses their ambiguous nature (including non-market and public intangibles)
 - ✓ A unified quantification framework for all EU-members, that extends national accounts and allows all European economies to speak the same language in terms of intangible capital
 - ✓ Complement the above with systematic policies regarding data acquisition, dissemination and protection that could bolster the diffusion of knowledge and information across and between the member countries

Thank you for your attention.

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