

# IARIW-ESCoE Conference

## “Measuring Intangible Assets and Their Contribution to Growth”

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### Measuring intangible assets at the firm level – an occupation based approach

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Over the last 20 years, work on intangibles measurement has been instrumental in demonstrating the contribution of intangible assets to productivity and how the omission of intangibles as investments has led to a systematic underestimation of productivity growth (Corrado et al. 2005; Nakamura 2010). However, many challenges remain within the measurement of intangibles, and this is particularly the case at the firm level. This paper develops and applies an occupation based approach for firm level measurement of intangible assets. This work is part of the Horizon 2020 GLOBALINTO project (“Capturing the value of intangible assets in micro data to promote the EU's growth and competitiveness”) (Piekkola 2020), and builds on earlier work within the FP7 Innodrive project (Görzig et al. 2011; Piekkola 2016).

Intangibles are derived from the labor costs of innovation-type occupations using linked employer-employee data. The approach is consistent with National Accounting and offered as one method in OECD (2010) and applied in statistical offices e.g. in measuring software. OECD & Eurostat (2005) sets forth the guidelines for innovation surveys to cover a wider set of intangibles.

Both the GLOBALINTO and Innodrive methods for measuring firm-level intangibles can be characterized as occupation or task based approaches. This approach seeks to quantify intangibles investments based on the resources used in generating intangibles, forming estimates of own-account investments, which though may also encompass some intangibles purchases. The approach is based on three assumptions. First, the generation of new knowledge and knowhow is assumed to be undertaken by employees within knowledge intensive occupations that are related to the specific type of intangible. The second is that a share of these knowledge intensive employees' time is devoted to the development of intangible capital (while the remaining share is devoted to day-to-day operations). The final assumption concerns an estimate of purchased intangible capital that is connected to the own-account activities. Three types of intangible assets are identified: organizational, ICT and broadly measured research and development.

The Innodrive and Globalinto projects have analysed multipliers how innovation labour is combined with other factor inputs to produce intangible investment in each firm. Projects suggest that such “overheads” can be evaluated from the use of other factor inputs especially in intangible producing industries; such as certain business services for organizational investment, R&D services and telecommunication and ICT services. Equally, at industry-level intangible intermediate inputs are known and combined with labour and capital for total intangible investment. The method is analogous for measuring “overheads” in OECD (2010); a method applied to evaluate ICT from related labor costs in most NSIs, proxying in most countries software and database expenditures.

Our measurement of intangibles stem in micro approach from intangible related labour and in macro industry-level approach from intermediate input from intangible asset producing (IA) services (selected business services including R&D services and ICT services. More precisely, IA

producing services are Nace 2-digit industries M69, M70, M73 for OC, J61, J62-J63 for ICT and M72 for R&D). A crucial issue in micro approach is how innovation work is accompanied by tangibles and intermediate input in producing intangible investment. We continue EU FP7 framework project Innodrive methodology but apply Eurostat national accounts dataset rather than EU Klems data. The share of rate of return on tangible capital and intermediate input for one unit of labor costs in relevant IA producing services shows how different factor inputs are used in other industries in the intangible investment. Furthermore, we evaluate intangible investment for one unit of innovation labor cost and profits combined since intangibles also produce returns to the company.

This paper describes the approach for the firm level measurement of intangibles developed in the Globalinto project and applies the approach in productivity analyses for four countries: Finland, Denmark, Norway and Slovenia. We examine and validate different specifications of the intangibles based on occupational classifications and, as described above, conduct new work on the estimation of multipliers to labor costs in intangibles investment.

We also experiment whether any performance-based intangibles such as relying on output elasticities of R&D and OC in four countries could provide information on the appropriate multipliers (Piekkola (2016)). Based on the method, we show intangibles statistics for four countries over the period 2000-2016. Here we also compile aggregated level statistics in order to compare with other data, such as that for IntanInvest. Finally, we examine the properties of the intangibles measures through productivity analysis.

## References

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