An Input-Output Virtual Laboratory in practice â€“ Development, uptake, application and impact of the first operational IELab

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The Industrial Ecology Virtual Laboratory (IELab) is a recently established collaborative cloud-computing platform for compiling large-scale, high-resolution, enviro-socio-economic accounts based on multi-region input-output (MRIO) tables and for conducting integrated sustainability assessment projects for a wide range of topics. IElab has brought together a diverse set of input-output and sustainability researchers and practitioners from around Australia and other countries, enabling tangible, inter-disciplinary research outputs. These include, for example, published triple bottom line assessments of biofuels, low-carbon construction materials or high-resolution waste modelling. This contribution provides a review of past and current IELab applications with a specific focus on the input-output modelling capabilities. The main research question posed is "What are the specific features of IELab that were used in the research and could the research have happened without them?" It is thus investigated whether the IELab has actually and truly enabled new research. The method used is a structured review of research outputs that were published in either peer-reviewed journal papers or in the form of conference proceedings or presentations. An evaluation matrix is presented that lists defined IELab characteristics against possible alternative approaches and the implications of employing those in the research projects. A critical review is also undertaken of the collaborative workflow elements of the IELab, e.g. the writing of data feeds, as well as the actual impacts of the research using the infrastructure. The results of this review can help with the design of new research projects and inform existing and prospective users of the academic research community, public sector agencies and private sector companies and consultancies.