Research Institutes and Universities: Does Collaboration Pay?

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Introduction

The purpose of our work is to describe 79 Swedish research institutes with bibliometric indicators. The main focus is a comparison between non-collaborative and collaborative publications with academic partners. We found that increased academic collaboration can lead to higher levels of impact for institute publications.

Research Institutes in Sweden

The science of science is often focused on the evolution of universities and to some extent on the organisation of industrial R&D. Much less attention is devoted to the third group of players in knowledge production – public and private (non-profit) research institutes. These organisations have been subject to fundamental changes during the last decade. Many governments have reappraised their innovation systems. Consequently, the role of the institute sector is under discussion.

Growth of Papers

A mere count of academic and institute papers shows that the figures have been stable during a long period of time. Consequently, growth rates are generally at the same level for both sectors, see figure 1, with approx 15-16 % growth between five periods since 1984 (geometrical mean). It can be noted that institutes account for 25 % of resources, and five % of the papers.

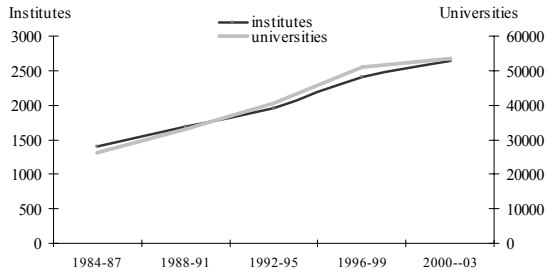

Figure 1. Growth of academic and institute publications over five periods.

Areas of Research

Regarding the distribution over areas of research (macro-classes) there is a marked difference between the sectors. While universities have a strong concentration in Medicine (clinical medicine and biomedicine) the distribution is much more even for institutes. In the period 2000-2003 institutes had a activity profile emphasising the areas of Geoscience, Materials Science, Agriculture and Engineering.

Citation Metrics for Institutes

The citation impact for institutes will be measured in relation to figures for Swedish universities (relative citation index plus relative activity index, see Sandström and Wadskog 2005). Compared to the beginning of the 1980s institutes performed better around 1990, but some years into that decade the trend became negative. To a large extent research institutes reflect the overall negative trend for Sweden (Glänzel 2000). Figure 2 illustrates that Swedish institutes are highly active in areas like Geoscience and Agriculture, see figures on RAI. In both of these areas the relative citation impact matches that of the universities. The university sector is found in the origin of coordinates in figure 2. Except for ICT (Information and Communication Technologies), Mathematics, Physics and Social Science research institutes seem to produce at the same quality level as Swedish universities. That is an unexpected result.

Going further into details it can be noted that the trends for ICT and Mathematics are negative. In Physics institutes are increasingly becoming better and more active. Typically, Social Science is a problematic area with strong activity but increasingly lower impact.

Granted that research institutes will continue to compete at the international publishing markets it is interesting to analyse strategies. Probably the most obvious one would be to intensify the collaboration with university researchers. Many of the institutes have strong links with the universities. This applies not only to institutes in the medical areas of research, but also to the institutes in Materials and Engineering sciences. Many are located at the university campuses. University employees and PhD-students split their time between institute and university.

Does Collaboration Pay?

Is it possible to identify areas with underutilized potential for such collaboration? For analytical purposes we split the Swedish institute database in two: 1) articles produced by institutes in collaboration with universities and 2) articles produced

internally in the institute sector. Other collaborations are rare and will not be included in the investigation. In numbers both groups of articles are of the same size, approximately 8,500 each. While the collaborative articles are in the medical areas most of the non-collaborative are evenly distributed over the areas (data not shown here).

Therefore, this could point in the direction that there are potentials for academic partnership in quite a number of areas of research. An analysis can be made from figure 3, which shows the relative activity and relative citations for the relevant areas of research (macro-classes). While articles from institutes alone have a low impact, there is a tendency that academic partnerships have made the articles more cited than the EU-average. In the areas of Engineering, Materials Science and Social Science research institutes have a rather high activity. At the same time there are potentials for achieving a higher impact through academic partnerships. When institutes collaborate in these areas they reach higher markedly levels of citation impact.

The conclusion is not that higher performance will be the case if universities and institutes start to collaborate more intensively. It only shows that there might be a latent possibility for more efficient research in partnerships.

References

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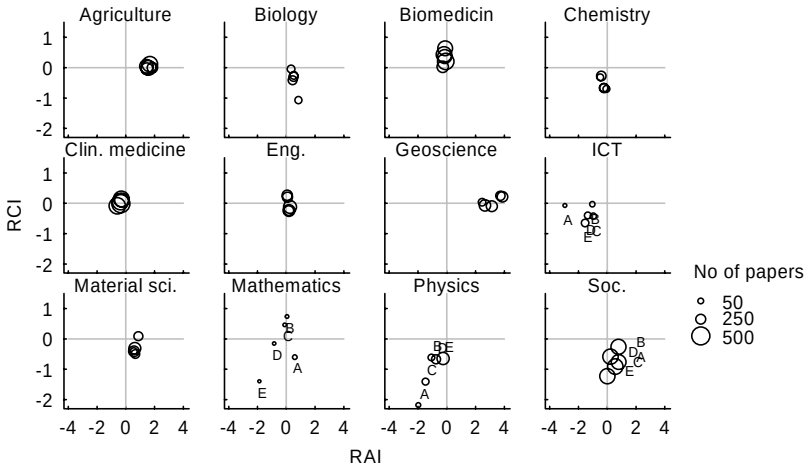

Figure 2. Relative Activity Index and Relative Citation Index for macro-classes during five time periods. A=1984-87, B=1988-91, C=1992-95, D=1996-99, E=2000-03. When differences between periods are small legends are not displayed. Origin of coordinates is the position of university sector research in each area.

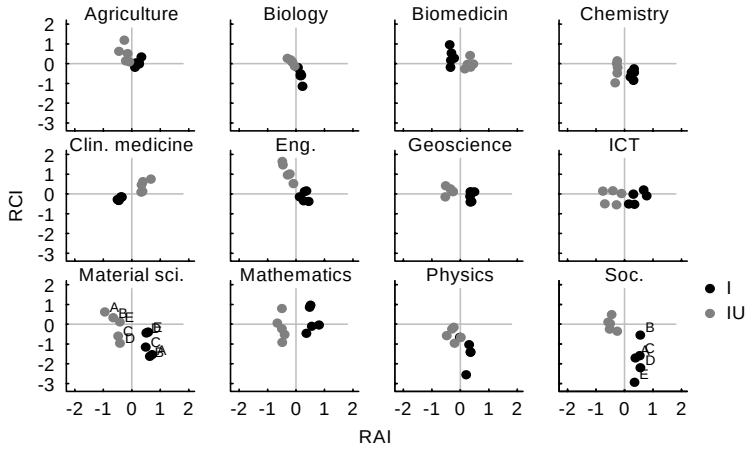

Figure 3. What a difference a partner makes! Relative Activity Index and Relative Citation Index for macro-classes during five time periods for collaborative and non-collaborative articles from Swedish institutes. Origin of coordinates is EU 15 (+Norway).