The new economy meets the old: the importance of international ICT knowledge-flows for market share dynamics

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Abstract:

Previous research by Laursen and Meliciiani (2000) has analysed the role of technology-based inter-sectoral linkages for the ability of OECD countries to maintain or acquire market shares at a 19 sector level. In that work the role of embodied “knowledge-flows” at the national level was examined and they were found to positively affect market shares in scale-intensive and specialised supplier sectors. Subsequently, Laursen and Meliciiani (2002) made an attempt to identify the importance of trade-related “knowledge-flows” at the international level, while using a combination of R&D data, import data, and input-output data. However, no evidence of an impact from such trade-related international knowledge-flows was detected. Therefore, we are in this paper tracing non-trade related national and international knowledge-flows, using ISI bibliometric data. Since Information and Communication Technologies (ICTs) are generally seen to be pervasive technologies (Freeman and Perez, 1988; Helpman, 1998) which may affect the organisation of production in all sectors of the economy, we have chosen to focus on the
The idea is to use the science-production relevance matrix, constructed by Laursen and Salter (2002). Based on publications by private business firms, the relevance of four ICT related scientific fields for 17 manufacturing sectors is conjectured. The procedure hinges on the assumption that if firms in particular sectors publish papers in particular fields of science, then they – at least partly – do it because they have, and wish to maintain, an “absorptive capacity” in the relevant scientific fields. Using this relevance scheme, we analyse the relationship between the strength of 17 OECD countries in four ICT related scientific fields and the ability of those countries to maintain and acquire export market shares in the OECD market, across 17 manufacturing sectors over the period 1981-1994. Unit labour costs and “own sector” technological activity are controlled for, while using a dynamic panel data model. The data used for the study are drawn from the ISI National Indicators on Diskette, SPRU BESST, the US Patent Office and from the OECD STAN databases.

The idea of the present paper is not only to look at domestic sources of ICT related knowledge (as done by Laursen and Salter, 2002), but also to try to assess the importance

*22 countries and the “other” category
sci1 = ARA, AI, Robotics & Auto Control
sci2 = CSE, Computer Sci & Engineering
sci3 = EL, Elect & Electronic Engn
sci4 = IST, Info Technol & Commun Syst

**Figure 1:** Calculation of international flows of ICT knowledge
of international scientific knowledge in ICTs for the ability of OECD countries to maintain or acquire market shares at the 17 sector level. In order to calculate such flows of international scientific knowledge, country-level weights are needed for determining the importance of each country as a knowledge source to any of the other countries in the analysis. In this context we are using data given by Tijssen and van Wijk (1998) on international co-publications in “computers and data processing” and in “telecommunications” for 1993-1996 across 23 countries. The key assumption here is that the more the scientists of a given country collaborate with scientists of another country, the more is drawn from the science base of the foreign country. The calculation of the international ICT knowledge variable is illustrated in Figure 1. The variable is constructed so that it will take higher values for each industry when the most important international collaborators are citizens of countries with a high number of scientific publications per capita in the relevant (to the particular industry, given by the relevance matrix) ICT scientific fields.

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