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Wireless valley, silicon wadi and digital island—Helsinki, Tel Aviv and Dublin and the ICT global production network

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Abstract

Hyper-capitalism in global information and communication technology (ICT) markets during the late 1990s created a new global production network, shaped by multinational corporations, international capital flows, and a flourishing of high-tech entrepreneurship. Each of the cities considered here benefited substantially from this growth, but their positions as nodes in the ICT global production network differed markedly, as did their ability to appropriate the value they generated. In Dublin, value creation was based largely on inward technology and capital flows, although indigenous Dublin-based software companies did demonstrate their ability to compete internationally. ICT development in Helsinki and Tel Aviv drew more strongly on the local knowledge base, and benefited from changes in national regulatory and political conditions. In Helsinki, public and private R&D investments supported the highly effective globalisation strategy of Nokia to create a strongly localised, vertically-integrated and strongly specialised sector. Value creation in the more diverse Israeli ICT sector was also based primarily on locally developed technology, university R&D and the commercialisation of technology developed initially for military applications. By the end of the 1990s, the resulting ICT node in Tel Aviv was grounded in the local knowledge-base, technologically diverse, strongly entrepreneurial and globally oriented.

Keywords: Global production network; ICT; Globalisation; Ireland; Israel; Finland

1. Introduction

During the 1990s, ICT markets grew at unprecedented rates stimulated by international inward investment, global capital flows and a flourishing of high-tech entrepreneurship. Nations' and regions' participation in the ICT boom varied, however, with Finland, Israel and Ireland among the smaller countries to achieve dramatic growth rates. From 1995 to 2000, Finland achieved an average annual real GDP growth rate of 5.1% per annum, Ireland, grew at 4.4% pa, and Israel achieved a notable 4.0% pa. Over the same period, GDP growth in the EU as a whole averaged 2.6% pa. [1] The growth and development of these three 'tiger' economies has, of course, been extensively described elsewhere; on Finland see, for example, Steinbock (2001) and Paija (2000); on Israel see, for example, De Fontenay and Carmel (2001), and Kipnis (2001); and, on Ireland see, for example, O'Riain (1997) and Grimes (2003). Some comparative analyses have also been undertaken, notably Roper and Frenkel (2000) on Israel and Ireland and Koski et al. (2002) who examine the geographical distribution of ICT activity throughout Europe. Our paper extends previous comparative analyses and sets high-tech growth within each area firmly in

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[1] *Sources:* OECD Economic Outlook 69, Annex Table 1; Bank of Israel, Table B1.

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the context of the global ICT sector. Our key focus is the process of value generation and upgrading in each area which we consider using the notion of the global production network (Henderson et al., 2002; Ernst, 2002; Ernst and Kim, 2002).

Aside from the importance of high-tech growth in the development of the three economies, the comparative development of Ireland, Finland and Israel is all the more interesting because of a number of other shared characteristics. First, each economy is small, forcing firms to develop export markets if they are to maximise the potential for economies of scale in production, and appropriate the full benefits of any innovative activity. Second, each of the three economies is very open with Finland and Ireland full members of the EU, and Israel benefiting from a free-trade agreement with the EU concluded in the mid-1970s. Third, each country shares a somewhat peripheral location in terms of access to 'core' European markets. Fourth, each country has limited natural resources and future competitiveness and growth therefore depends on their ability to compete in knowledge-intensive markets. Fifth, each of the countries has a very different history of industrial and technology policy which has shaped their involvement in global ICT markets. Some of the main contrasts are illustrated in Table 1, which highlights the dominant role of foreign direct investment (FDI) in Ireland, and the increasing importance of foreign direct investment in Finland over the 1997–1999 period.

Sixth, central to the growth of each country was the rapid development of ICT activity in their major cities—Helsinki, Tel Aviv and Dublin. As Koski et al. (2002) notes: 'ICT-related businesses in Europe are concentrated around major urban centres' (p. 11). Cities may offer particular advantages for innovation and the development of knowledge-based industry in terms of the availability of highly skilled labour, high quality business services, and the local availability of technological and financial partners (e.g. Shefer and Frenkel, 1998). Cities may also act as international 'gateways' through which human, financial and informational resources flow into and out of a country (Simmie, 2002), and act as attractors for inward investment. Less tangible benefits may also result from an urban location in the form of externalities from academic research (e.g. Anselin et al., 1997, 2000), or more generalised knowledge spillovers (Feldman and Audretsch, 1999; Zucker et al., 1998) arising from specialisation (e.g. Griliches, 1992) or sectoral diversity (e.g. Jacobs, 1969). Finally, cities may provide a more supportive environment and institutional framework for high-tech entrepreneurship than other more rural or peripheral areas (e.g. Cooke et al., 2001).

The central focus in the remainder of this paper is how, and why, ICT activity developed in the way it did in Dublin, Helsinki and Tel Aviv during the 1990s. National influences prove to be important but cannot be viewed in isolation from more global trends, in particular, the growth in global high-tech markets during the 1990s and increasing levels of international capital mobility. To reflect both the 'global' and 'local' dimensions of each city's development, we base our analysis around the notion of a global production network which is outlined in Section 2. Section 3 then provides a brief overview of the ICT global production network of the 1990s and the implicit process of value generation and upgrading. Sections 4–6 then focus on each of the three study areas in turn concentrating on the process of value generation and upgrading in each area and the particular role of inward investment, entrepreneurial activity and public policy. Section 7 briefly draws out some common themes and Section 8 concludes.

2. Embeddedness and the global production network

The importance of the centripetal and centrifugal forces which lead to spatial agglomeration and the dispersion of commercial and industrial activity have long been recognised in both the geography and economics literatures. A desire to avoid local competition, the search for lower production costs, and costs of transportation may encourage dispersion; while positive Marshallian externalities, reduced transport costs and informational advantages may encourage spatial agglomeration and clustering (see, for example, the discussion in Koski et al., 2002, pp. 145–147). Arguably, however, global moves towards knowledge-based competition, accompanied by the rapid development of con-

Table 1
Foreign direct investment and transnationality indictors

	Finland	Ireland	Israel
FDI inflows as per cent of gross domestic capital formation 1997–1999	26.3	47.5	9.1
FDI inward stock as per cent of GDP	14.3	45.4	17.9
Value added of foreign affiliates as per cent of GDP	9.5	40.2	8.7
Employment of foreign affiliates as per cent of total employment	10.1	9.8	10.2
Transnationality index	15.0	35.7	11.5

Source: The World Investment Report 2002, United Nations, New York.
Annex table A.1.6. p. 275.