Feature Article

WHAT'S WRONG WITH SCOTTISH FIRMS? LOCAL SOURCING IN ELECTRONICS

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Introduction

Given the importance of the electronics industry in Scotland this article sets out to analyse one of the presumed benefits of attracting foreign electronics firms to set up manufacturing facilities other than the direct employment effects. It deals with the sourcing of material inputs by foreign firms in the Scottish economy in an attempt to determine the level of material inputs purchased from indigenous electronics suppliers. The electronics industry in Scotland has for several years been actively promoted by government agencies and the press as one of the major industrial success stories during a period of industrial stagnation and decline in the more traditional manufacturing areas of the Scottish economy. The concept of "Silicon Glen" is an attractive one which views Scotland as being at the forefront of electronics manufacture providing high levels of employment leading to further attraction of inward investment. The electronics industry in Scotland in 1985 employed 43,900 people in more than 300 companies (22% under foreign ownership, 42% English and 36% Scottish). However, previous research has shown that the largest employers and fastest growing firms are externally owned, and that their attraction to Scotland was heavily influenced by regional incentive schemes. (Firn, 1975; and Hood and Young, 1980).

The Foreign sector survey

This feature reports the main results from a survey of foreign-owned electronics companies with manufacturing plants in Scotland carried out during a four month period from July to October 1984. The three principal conclusions were:

- Foreign-owned electronics companies in Scotland buy only 15% of their production materials from indigenous Scottish suppliers;

- Managers within foreign firms regarded the increase of such linkages as an important factor for the development of the industry in Scotland. However, they felt that firm size and product quality in all but a few of the indigenous suppliers of which they had experienced had prevented this occurring;

- The creation of closer links with the foreign-owned sector present in Scotland might strengthen Scottish firms and provide them with experience to develop international trade.

As far as the development of electronics in Scotland is concerned, the role of the American manufacturers was crucial both in terms of employment and the growth of an indigenous sector. Location-specific factors influenced the arrival of the major American electronics firms to Scotland with the provision of regional aid being a key influence in attracting firms to the central belt. However, the desire to manufacture in Scotland was also influenced by other factors such as servicing British and European markets, the presence of a highly skilled, low cost labour supply, a strong academic infrastructure, and close cultural ties. Sayer and Morgan (1984) noted that as far as foreign firms in Scotland were concerned, "The overseas sector remains poorly integrated, with multiplier effects which afford little secondary employment and, perhaps more important for long-term prospects, a significant indigenous sector has not developed".

As regards the host economy, foreign direct investment theory suggests that there will be advantages to the host country other than those associated with direct employment creation. Of these, the creation of linkages with host economy firms, and the subsequent development of an indigenous electronics sector provided the main justification for the research work undertaken. The electronics industry in Scotland seems a likely candidate for analysis of the level of linkage created by MNEs for three reasons:

- The industry is characterised by a high level of foreign-owned enterprises which accounted for over 40% of employment. The majority of the over three hundred firms which made up the industry were small Scottish concerns and the assumption was made that these firms could act as "feeders" for the foreign-owned sector in the supply of component parts, given recent industry moves towards higher subcontracting roles (Firn and Roberts 1984);

- Analysis from previous research indicated that the more industrialised the host economy was the greater was the likelihood of strong backward linkages being formed and this, related to the large number of local firms, gave hope for a growth in the level of local linkages;

- However, a study undertaken on behalf of the Scottish Development Agency, (SDA) in 1979 raised serious doubts as to the ability of Scottish firms to supply the foreign-owned sector and highlighted serious levels of import penetration of electronics components. Only 12% of components were sourced locally in Scotland with 30% of subcontract work being dealt with by Scottish firms.

Research methodology

In 1984 there were 50 foreign-owned electronics firms in Scotland operating manufacturing plants throughout the country with the major concentration in the Strathclyde region. The names of all foreign-owned companies operating facilities in Scotland were taken from the SDA listing "Electronics Companies in Scotland" and nationality was confirmed by reference to a listing provided by the Scottish Council Development and Industry. Overall 30 foreign firms participated in the study, a response rate of 60%. The study reflected the dominance of the foreign-owned sector by American electronics companies. Of the 30 companies interviewed 25 were American. (Even so this still under-represents the proportion of American firms in the foreign-owned total.) Overall, the foreign sector accounted for 43% of electronics employment in Scotland with American firms responsible for 41% of total employment in the electronics industry in Scotland.

Survey results

Of the reasons for setting up manufacturing facilities in Scotland, rather than elsewhere, two fundamental factors became obvious. By far the most important locational determinant as far as American companies were concerned was British Government financial assistance in setting up and operating proposed plants in Scotland. Of the companies interviewed, 71% regarded the provision of British Government financial aid as a very important locational determinant (Table 1). Two other important reasons for setting up operations in Scotland was to obtain access either to the British or European market. Of the firms surveyed, 58% regarded access to the European market a very important factor, whilst 84% found access to British market an important determinant in setting up in Scotland. Of the other factors mentioned the availability of certain labour skills in Scotland, the establishment of the Scottish plant as a supporting role for the parent, and Britain being a preferential area for capital intensive projects, were all regarded as important locational determinants.

These results tend to reinforce previous work on locational determinants (Booze Allen and Hamilton, 1979). American electronics companies seeking manufacturing operations in Europe, were attracted to Scotland by regional aid policies. It is worth noting that gaining access to the Scottish market and local sources of supply were unimportant factors. It would be safe to assume that being able to develop links with firms in the Scottish economy did not influence the decision to set up in Scotland. As an addition to the locational determinants already mentioned, several executives of American firms mentioned the ability of Scots to speak English "adequately" and the large number of golf courses as major reasons for coming to Scotland!

Table 1 Locational determinants of US electronics firms with facilities in Scotland

Locational determinants	**Average firm rating (a)**
Access to Scottish market	3.81
Access to UK market	1.88
Access to European market	1.62
Match competitors' investment	2.81
Certain labour skills	1.99
General labour skills	1.87
Low labour costs	2.39
Local sources of supply	3.86
UK tax structure	2.50
UK Government assistance	1.33
Support role for parent company	1.65
Educational infrastructure	2.26

(a) Response categories:

1 = Very important
2 = Important
3 = Fairly important
4 = Unimportant
5 = Not applicable

One of the main concerns of this study was to test the view that material input purchases by foreign-owned firms from Scottish companies would increase with time. The view was that as the plant began to secure more autonomy from the parent organisation, and as its experience of local suppliers increased over time there would be a tendency for it to source locally where possible for two reasons. Firstly, where local suppliers with adequate quality, price and delivery standards could be found it would be to the plant's benefit to source locally avoiding transport costs. Secondly, it would improve the plant's public image to be seen to be actively supporting local industry. Table 2 gives an indication that the amount of time the firm has been in the local economy did not play a significant role in determining the level of linkages created with Scottish companies.

The firms surveyed divided themselves neatly into two distinct entry periods. Fourteen arrived in Scotland in the pre-1970 period, mainly during the 1950s and early 1960s. The second entry period, post 1970, saw the arrival of another sixteen firms, with twelve arriving during the 1970s and four in the 1980s.

Table 2 Material input purchases from Scotland by plant date of establishment (DOE)

	% input purchases from Scotland (1984)					
DOE	**0**	**1-10**	**11-25**	**26-50**	**51-70**	
Pre-1970 No of firms	2	7	2	3	0	(14)
Post-1970 No of firms	3	6	3	3	1	(16)

These figures give an indication that the length of time the firm had been established in the host economy did not affect its ability to instigate purchasing linkages with domestic companies. Foreign-owned firms which had set up facilities during the 1970s were just as likely to purchase from local firms as those companies which had been operating in Scotland since the 1950s.

The sourcing of material inputs other than those purchased from the parent reflected the importance of suppliers based in England, and especially the south-east. Of those firms surveyed, the average amount of purchases made from outside the organisation was 50%.

Table 3 details percentage inputs by geographical location. This showed that Scotland had not managed to achieve a significant proportion of the input purchases of foreign-owned firms when compared to those purchased from south of the border, although the level of purchases was higher than those from the other European countries and America. In fact, these figures, when compared with those of the Makrotest survey on electronic subcontracting and component supply industries undertaken on behalf of the SDA in 1979 reflected a fall, in total purchases in Scotland from 19% (SDA, 1979) to 15%

The importance of linkage creation cannot be over-estimated. The survey showed that foreign-owned firms had moved away from reliance upon the parent organisation. Figures for inputs coming from the parent at date of establishment show that 89% of materials were supplied from the parent. At the time of the survey this figure had fallen to 53%. This indicated that there were opportunities for firms willing and able to supply foreign-owned firms.

Table 3 Production input purchases (other than from the parent organisation) by geographical location

Location	% production input purchases
Scotland	15
England	38
European Community	13
USA	14
Rest of the World	20
Total	**100**

The general opinion gauged from interviewees was that although there was an overall desire to increase the level of local content in their production inputs, the lack of indigenous firms in specific product areas hindered this development. Several purchasing managers commented upon the small scale nature of Scottish operations, viewing this as one of the major reasons that contracts were not offered to Scottish firms.

The survey also indicated that a high degree of purchasing responsibility did rest with the Scottish location for the vast majority of firms. Interviewees were asked a number of questions regarding purchasing autonomy and Table 4 summarises the responses. Responsibility for purchasing had for the most part been devolved to the plant.

Table 4 Purchasing responsibility for Scottish operations

		Number of firms		Number of firms
Central purchasing	Yes	9	No	20
Plant purchasing department	Yes	28	No	2
Plant purchasing department responsible for all purchases	Yes	23	No	7

This would tend to confirm that the locus of decision making power as far as purchasing was concerned had been devolved to the MNE subsidiary.

The survey also sought to guage the opinions of managers as to the performance of Scottish suppliers when compared to suppliers from elsewhere in Britain, America and Europe in similar categories. The responses are detailed in Table 5.

The reasons given for the pessimism expressed about Scottish suppliers fell into three areas:

1. A lack of firms with the required technical knowledge in specific areas;
2. A lack of Scottish firms of sufficient capacity to be able to handle demand from foreign-owned plants;
3. An unwillingness on the part of Scottish firms to become heavily committed to supplying foreign companies.

Table 5 The performance of Scottish suppliers compared to other suppliers elsewhere in Britain, America and Europe

	Performance when compared with:		
Specific areas	**Other UK**	**USA**	**Europe (a)**
Price competitiveness	2.34	2.84	3.30
Sales aggression	3.03	3.59	3.50
After sales work	2.51	3.11	3.42
Delivery times	2.44	2.88	3.42
Product quality	2.34	3.15	3.46
Ability to work to specification	2.31	2.77	3.46
Ability to alter production	2.41	2.92	3.25
Technological competence	2.42	3.15	4.55

(a) Response categories:

1 = above average; 2 = average;
3 = below average; 4 = well below average;
5 = not applicable

As far as the the lack of Scottish companies in specific product areas was concerned, the survey highlighted the products/components that foreign firms required that they believed could not be sourced locally. Table 6 indicates these particular products.

The Scottish Development Agency has recently recognised the need for a strong indigenous electronics sector by changing its primary concern away from the pursuit of inward investment, which had been its major policy concern, towards the strengthening of Scottish electronics firms, although the former is likely to remain an attractive option (SDA, 1986).

Table 6 Input materials perceived as not being available from Scottish suppliers

Specific materials	**Number of firms**
General electronic components (including integrated circuits)	7
Electro-mechanical components	4
Silicon	4
Metals	2
Others	6

It would appear that recent comments from the SDA confirm that they realise that the development of the indigenous sector is essential both to take advantage of opportunities provided by the presence of such a large number of foreign-owned electronics manufacturers, and to move indigenous firms to an international trading level. The SDA felt that, "in many ways the indigenous electronics community in Scotland does not exhibit the cohesion shown by dynamic economic groupings elsewhere and the consequent isolation can be a cause of opportunities passing unnoticed or threats emerging unexpectedly." This article indicates that the level of interaction between the foreign and indigenous sectors is particularly weak with the exception of a few Scottish success stories, and that these firms - Prestwick Circuits, Rodime, etc - have moved towards international markets as a result of their success. Previous authors have highlighted the need for indigenous firms to expand outside Britain to main competitive positions. Sayer and Morgan (1984) claimed that, "What is notable about indigenous firms (eg Rodime) is that they feel obliged to expand outside Britain (in the US in this case) soon after birth." Analysis of the major indigenous successes may go a long way to confirming the division between foreign-owned manufacturers present in Scotland which supply the European market and are willing to source locally if suitable suppliers were available, and major indigenous firms that started out supplying foreign firms in Scotland and used this as a base from which to build international reputations.

The survey of thirty foreign-owned firms in Scotland has revealed some interesting comments on the performance of the indigenous electronics sector. These comments, and figures on the amount of production materials sourced locally raise interesting questions on the ability of indigenous companies to support and learn from the foreign sector. Four key points emerge from analysis of the foreign-owned electronics sector:

- The level of interaction between the foreign-owned and indigenous sectors was low with only 15% of production input materials being sourced from indigenous Scottish firms. This compared with total purchases in Scotland of sub-contracts and components of 19% in 1979;
- The major reasons for this were that foreign-owned firms felt that Scottish companies were not of sufficient size to deal with major sourcing orders. It was perceived that many electronics components and materials could not be sourced locally because suppliers in these product areas did not exist, and Scottish firms faired badly in comparison with firms from America and Europe over a range of performance factors;
- Foreign-owned firms were willing to adopt local sourcing where they found Scottish firms with appropriate technical and quality expertise;
- The purchasing responsibility for most foreign firms in Scotland rested at the local plant level, and only on a few occasions was purchasing dealt with by the parent organisation. One important point associated with this was the fact that the length of time the foreign-owned organisation had been in the Scottish economy was of no significance in determining the degree of local plant autonomy in purchasing nor the level of local sourcing. American firms that had set up facilities in Scotland in the late 1970s and early 1980s were just as likely to source locally as firms that had been present since the 1950s.

The policy emphasis of government agencies, such as the SDA, needs to be channelled into improving and strengthening the performance of Scottish firms. Closer links with the foreign-owned sector in terms of a higher level of local sourcing would not only improve the performance of Sscottish firms but provide them with the experience with which to move towards international markets.

One note of warning here is that closer ties with the foreign sector might lead to a level of dependence that Scottish firms would find difficult to break away from. Similarly, indigenous firms cannot be expected to develop and compete in the provision of specialist components where efficient manufacture is based upon large scale plant operations.

What appears to be the case is that most indigenous firms have allowed closer relationships with foreign-owned firms to by-pass them and in doing so have reduced the likelihood of moving into international markets where firms, such as Rodime and Prestwick Circuits have found profitable returns.

The SDA having recognised that American company sourcing policies do not explain the low levels of Scottish inputs continue to identify a number of product areas where Scottish firms could take advantage of the opportunities that exist. However, their role in attempting to improve the level of local sourcing seems to have been fairly restricted. Having recognised the low levels of local sourcing since, at least, 1979 they have attempted little in the way of fostering closer relationships between Scottish and foreign firms present in Scotland, other than to stress the presence of a large manufacturing and supply base in its advertising material.

It would appear that there is the need for a stronger level of commitment on the part of the SDA in forging closer sourcing ties. Similarly, Buxton (1986) suggests that to make Scottish firms more export oriented, development aid should be linked to export performance indicators. However, the electronics industry itself seems to be moving in a direction which will involve closer local sourcing ties, and one in which the SDA itself is beginning to take a more active role.

The adoption of Japanese style Just-in-Time (JIT) Manufacturing techniques by American electronics firms based in Scotland offers opportunities of increased and closer sourcing relationships between US firms and Scottish suppliers. One of the main identified advantages of JIT is the development of fewer suppliers who have a longer term association with the buyer. These suppliers tend to be located as near to the buying firm as possible, thus stregthening the hopes of Scottish firms that they should be able to adopt such roles.

If the SDA seek to improve the local supplier base through offering a competitive edge on the part of Scottish firms, particularly over competitors outside Scotland, then the plethora of small concerns may have to be sacrificed for a leaner, more efficient home base. JIT techniques will mean fewer suppliers and Young (1986) has argued that one possible route that Scottish firms could take to remain at the forefront is merger to create stronger firms. The SDA's role would appear to be to encourage the development of larger local suppliers at the expense of small concerns. What appears to be needed is a positive and dynamic approach which tackles the divide between Scottish and foreign-owned electronics firms which still exists. The basis of Just-in-Time Sourcing techniques have to be taught to Scottish suppliers as one road to achieve increased contact, and this is a role which the SDA must continue to sponsor and promote if the next few years are to bring about a reversal in the decline of Scottish sourcing by foreign electronics firms.

References

Buxton, N K (1986) "Performance and problems of Scotland's industrial economy, **Scottish Council Development and Industry**, The International Forum, December 1986.

Firn, J (1975) "External control and regional development: the case of Scotland", **Environment and Planning A**, Vol 7 No 4.

Firn, J and D Roberts, (1984) "High technology industries", in N Hood and S Young (eds), **Industry, Policy and the Scottish Economy.**

Hirschman, A O (1958) "Industrial linkages and the dual economy: the case of Northern Ireland", **Regional Studies**, Vol 12, pp167-180.

Hood, N and S Young (1979) **The Economics of Multinational Enterprise**, Longman Publishers.

Hood, N and S Young (1980) "European development stragegies of US owned manufacturing companies located in Scotland", HMSO.

Lall, S (1980) "The indirect employment effects of multinational enterprises in developing countries", **International Labour Office**, Working Paper No 3.

Lim L Y C and P E Fong (1982) "Vertical linkages and multinational enterprises in developing countries", **World Development** Vol 10, No 7.

McAleese, D and D McDonald (1978) "Employment growth and the development of linkages in foreign-owned and domestic manufacturing enterprises", **Oxford Bulletin of Economics and Statistics**, 40, pp321-340.

Marshall, J N (1979) "Ownership, organisation and industrial linkage: a case study of the northern region of England", **Regional Studies**, Vol 13, pp531-557.

Sayer, A and K Morgan (1984) "The electronics industry and regional development in Britain", in A Amin, J B Goddard (eds), **Technological Change, Industrial Restructuring and Regional Development.**

Scottish Development Agency (SDA) (1979) "The Scottish electronics sub-contracting and components supply industries", Working Paper by **Makrotest Ltd.**

SDA (1980) "The electronics industry in Scotland: a proposed strategy", prepared for the SDA by **Booze, Allen and Hamilton** , Management Consultants.

SDA (1986) "Electronics Scotland", Newsletter of the **Electronics Division of the SDA.**

Steward, J C (1976) "Linkages and foreign direct investment", **Regional Studies**, Vol 10, pp245-258.

Watanabe, S 1982 "Subcontracting, industrialisation and employment creation", **International Labour Office**, Vol 10, No 7.

Young, S (1986) "Scottish multinationals and the Scottish economy" Position paper for **Scotland and the Multinationals**, Conference organised by the Institute for Research and Information on Multinationals and Strathclyde International Business Unit, City Chambers, Glasgow, September 1986.