



**Investment location decisions in the  
microelectronics industry**

**Executive Summary version**

Project Author: Zachary Emmett, Bath Business School

Project Sponsor: Derek Boyd, CEO, National Microelectronics Institute

**Abstract**

Over recent years there has been a shift in FDI inflows away from developed countries such as the UK and US towards developing countries such as China and India. Primary research in the microelectronics industry shows that China, SE Asia and the EU accession countries are attractive locations for efficiency-seeking manufacturing investments driven by low wage costs and government incentives.

The UK ranks well among the selected locations with key strengths in openness to trade, access to skilled labour and low levels of labour market regulation. The UK currently enjoys efficiency advantages over other developed countries and resource and asset based advantages over developing countries. However, the skills gap with developing countries is closing fast with low cost locations taking on progressively higher value activities.

It is suggested that the UK policy needs to focus on advanced manufacturing and design activities where the cost advantages of developing countries are less important. A range of policies is presented aimed at strengthening the location-specific determinants that are important to these target investors. It is recommended that UK policy develops from a liberalised open-door approach to a more proactive operational role working in close partnership with industry to secure future investment.

**Contents**

1. INTRODUCTION ..... 4

1.1 Project background .....4

1.2 Scope and definitions .....4

2. WHAT ARE THE RECENT TRENDS IN CAPITAL INVESTMENT FLOWS? ..... 5

3. WHAT ARE THE KEY DETERMINANTS OF INVESTMENT LOCATION DECISIONS? ..... 8

4. HOW ATTRACTIVE IS THE UK AS AN INVESTMENT OPTION? ..... 11

5. WHAT POLICIES WOULD MAKE COMPANIES MORE LIKELY TO INVEST IN THE UK IN THE FUTURE?... 13

5.1 Importance of public policy .....13

5.2 Ease of obtaining assistance in the UK .....14

5.3 EU State Aid .....14

5.4 Policy highlights from the selected locations .....15

5.5 Policy recommendations .....16

6. SUMMARY ..... 18

BIBLIOGRAPHY ..... 19

APPENDICES ..... 20

1: State aid decisions 2000-2004 - electrical and electronics manufactured products

2: Policy highlights from the selected locations

3: Policy suggestions from the microelectronics industry

## **1. Introduction**

### **1.1 Project background**

The NMI have raised the concern that in the modern era of globalisation there has been a dramatic shift in the location of capital investment in the microelectronics industry away from the UK toward developing countries such as China and India. In addition, that EU state aid rules are being interpreted more liberally in mainland Europe which may also be diverting investment away from the UK. The NMI believes that this problem will worsen unless counter-measures are taken to retain and attract investment to the UK. This project has been commissioned to investigate the following research questions:

- 1) What are the recent trends in capital investment flows?
- 2) What are the key determinants of capital investment location decisions?
- 3) How attractive is the UK as a capital investment option?
- 4) What policies would make companies more likely to invest in the UK in the future?

It is intended that the NMI will use the results of this project as part of an ongoing dialogue with the DTI aimed at increasing the level of investment in the industry. This would help prevent important jobs, skills and technical knowledge being lost overseas and would create positive multiplier effects in the UK economy as a whole.

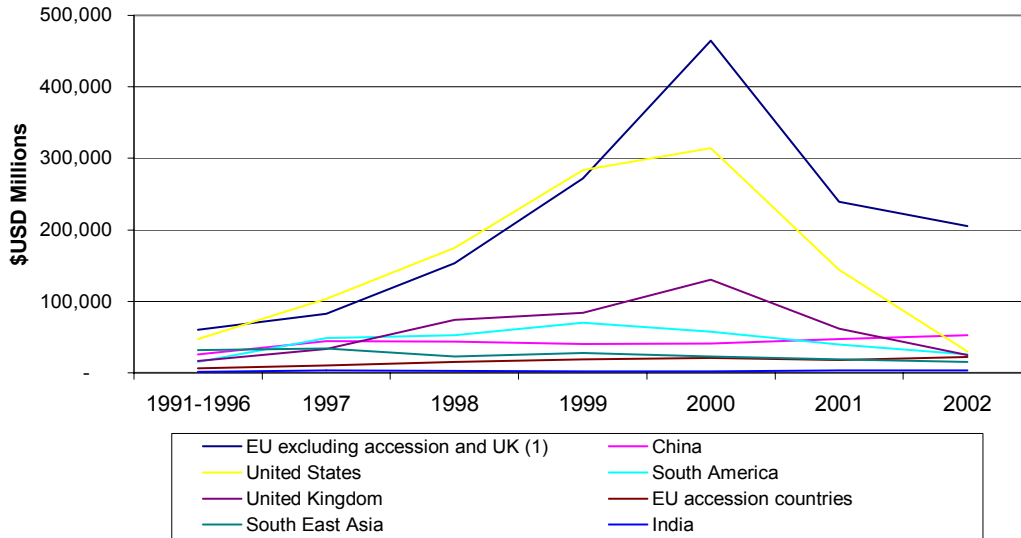
### **1.2 Scope and definitions**

- The project is only concerned with *capital* investment decisions. Capital is defined here as equipment and/or facilities involved in the production process, including the electronic hardware and software involved in the research and design phases. Investment includes the purchase of new capacity, the upgrade of existing capacity, or the acquisition of existing capacity from a supplier, competitor or customer. Any investment in headcount that does not involve additional capital investment is beyond the scope of this project.
- The project is concerned with how companies choose between countries rather than between alternative locations within a country.
- To measure a country's success in attracting FDI the "FDI inflow" metric will be used. FDI flows from the "source" country to the "host" country.

**2. What are the recent trends in capital investment flows?**

This research question is first addressed at a national level i.e. across industries (figure 2.1), to set the context for the microelectronics industry.

Figure 2.1: FDI inflow into selected locations 1991 – 2002 (\$USD Millions)



Host Region / Country	1991-1996 (1)	1997	1998	1999	2000	2001	2002
EU excluding accession and UK (2)	60,614	82,661	152,919	271,611	464,732	239,271	205,522
China	25,476	44,237	43,751	40,319	40,772	46,846	52,700
United States	46,834	103,398	174,434	283,376	314,007	143,978	30,030
South America	14,982	48,228	52,424	70,346	57,428	39,693	25,836
United Kingdom	16,463	33,229	74,324	84,238	130,422	61,958	24,945
EU accession countries (3)	6,418	10,630	15,403	18,692	20,616	17,972	21,901
South East Asia (4)	31,823	34,099	22,762	27,774	23,176	18,488	15,480
India	1,085	3,619	2,633	2,168	2,319	3,403	3,449

- (1) Annual average from 1991 to 1996 inclusive
- (2) Excludes Belgium and Luxembourg due to reporting inconsistencies causing distortion to figures.
- (3) Malta, Cyprus, Czech Republic, Hungary, Slovakia, Estonia, Latvia, Lithuania, Poland, Slovenia.
- (4) Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Phillipines, Singapore, Thailand, Vietnam

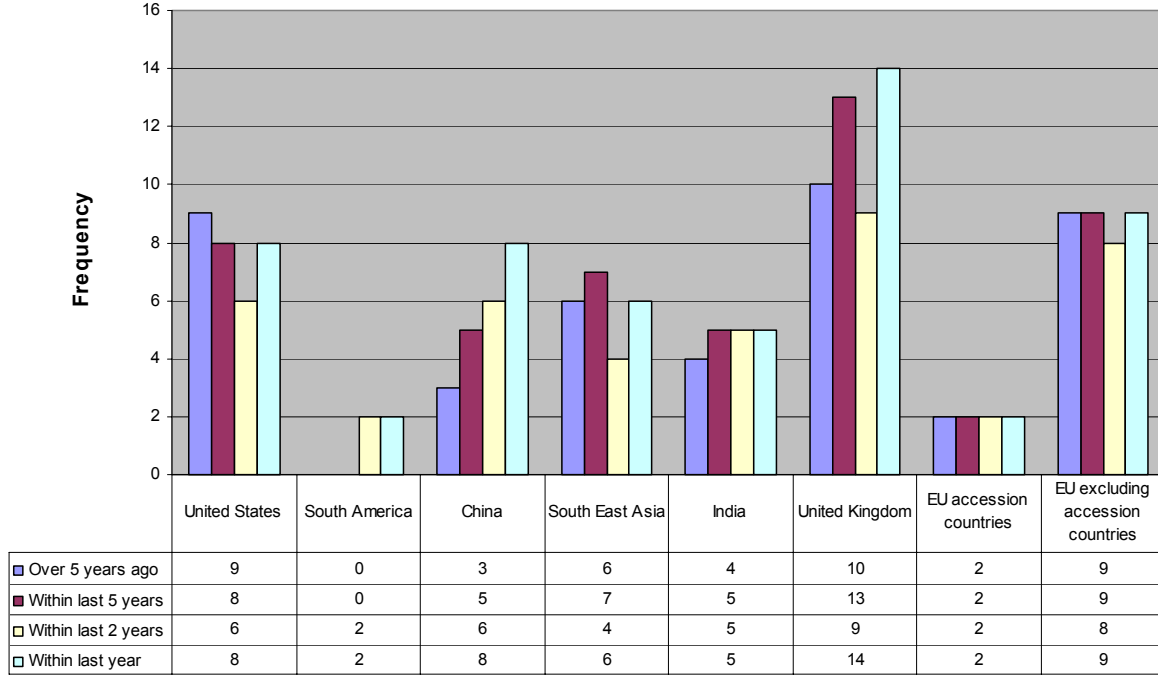
Source UNCTAD World Investment Report 2003

China has seen a considerable increase in FDI inflows since 2000 and was actually the world’s largest single recipient of FDI in 2002 with a further increase expected in the 2003 figures (OECD 2003). Inflows also increased in India and the EU accession countries. In contrast, there have been dramatic falls in the UK and US between 2001 and 2002. The remainder of the EU and SE Asia have also seen a reduction in 2002 but this is far less significant in proportional terms than in the UK.

This high level evidence is supported by evidence from within the NMI membership. Respondents were asked for their level of capital investment in each of the same locations over the last five years

and how this was expected to change over the next two years. The results are shown in figures 2.2 and 2.3.

Figure 2.2: Capital investment over the last five years in selected locations

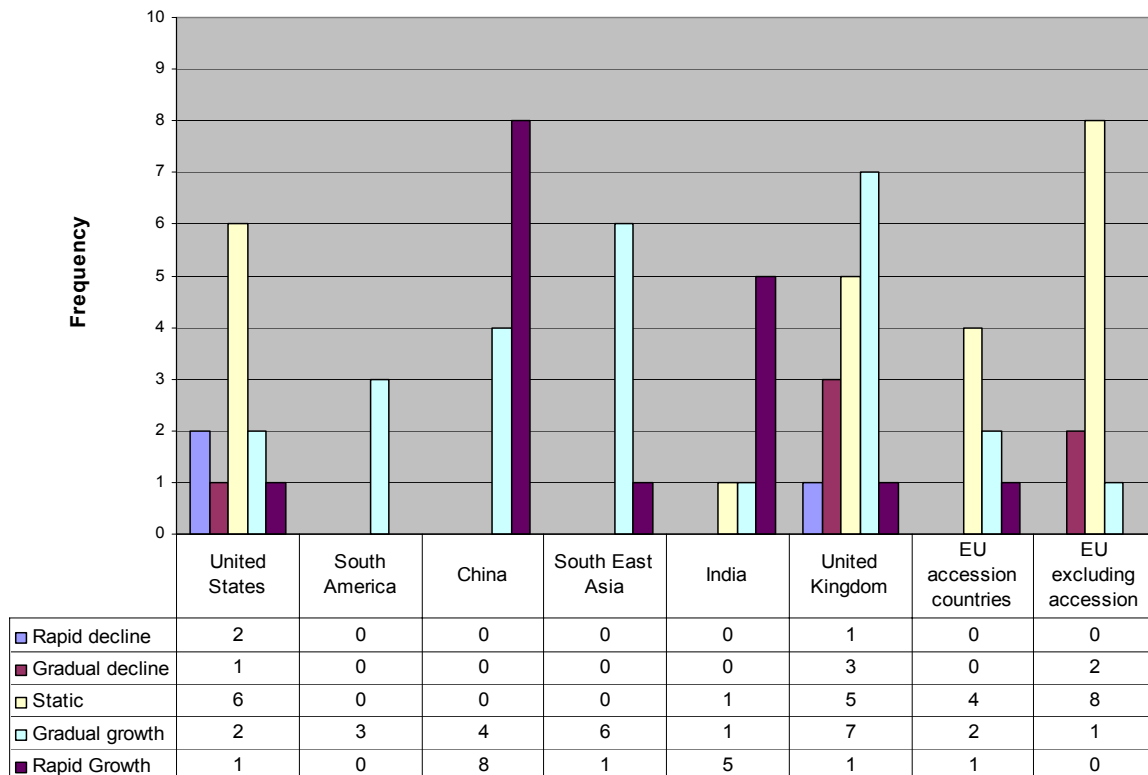


Number of respondents = 17

China shows an increasing trend over the last five years with 8 out of 17 respondents investing in last year. India also shows a slight increasing trend while the US shows a slight decreasing trend i.e. the bulk of the investment took place over 5 years ago. The UK appears to show a slight increasing trend with 14 out of the 17 respondents having made investments in the last year, which actually presents quite a healthy picture for the UK.

Figure 2.3 shows that China and India have rapid growth as the modal forecast for the next 2 years, with gradual growth in SE Asia. Investment in the EU and US is predominantly forecast to be static with gradual growth the modal forecast for the UK. This typically relates to expansion or upgrade of existing capacity with one large multinational describing themselves as being in a holding pattern waiting for improvements in the UK industry before any further investments could be made.

Figure 2.3: Capital investment forecast over the next two years in selected locations



Number of respondents = 17

There is evidence of both manufacturing and design activities being attracted away from the UK. Note that the UK and US are the only locations to have forecasts of rapid decline (1 in the UK and 2 in the US). Of these three respondents, two are exclusively involved in design and all three are involved in design to some extent.

Despite the picture of gradual investment growth in the UK, the headcount employed in the UK industry appears to be in a period of decline. The absolute headcount among the respondents reduced by a third between 2002-2003 and is forecast to reduce by a further 16% between 2003 and 2004. This driven by the transfer of some large-scale manufacturing operations overseas which is outweighing the gains made elsewhere.

### **3. What are the key determinants of investment location decisions?**

Respondents were asked to rate a series of location-specific determinants from 1-4, with 1 representing not important at all and 4 representing extremely important. The importance of the determinants to manufacturing and design activities was rated separately and the mean ratings are shown in table 3.1. The determinants are also arranged into the different forms of investment (Dunning 1980). This approach helps to formulate policy targeted at specific types of investors.

*Table 3.1: Importance of location-specific determinants in the microelectronics industry*

Form of investment	Location-specific determinant	Manufacturing	Design
Market seeking	Market size in host	2.15	2.00
	Access to new markets	2.92	2.50
	Openness to trade	3.46	3.00
	Variability of exchange rate in host	2.69	2.43
	Political stability in host	3.15	3.21
	Political relations	2.85	2.93
	Cultural similarity	1.85	2.43
	Market growth in host country	2.77	2.57
Resource seeking	Access to pool of skilled labour	3.00	3.79
	Natural resources	1.85	1.64
Efficiency seeking	Wage costs in host country	3.23	2.71
	Government incentives	3.23	3.00
	Openness of host country to FDI	3.00	3.36
	Geographical distance	1.46	1.79
	Level of labour market regulation	2.92	2.29
Asset seeking	Transport infrastructure	2.85	2.14
	Communications infrastructure	3.38	3.36
	Clusters of related incumbent companies	2.38	2.50
	Competitors already there	2.15	2.00
	Strength of IPR legislation	2.31	3.07
	R&D expenditure by host government	2.08	3.07
	Education infrastructure	2.08	3.43
	Access to supplier networks	3.23	2.21

Number of respondents = 17

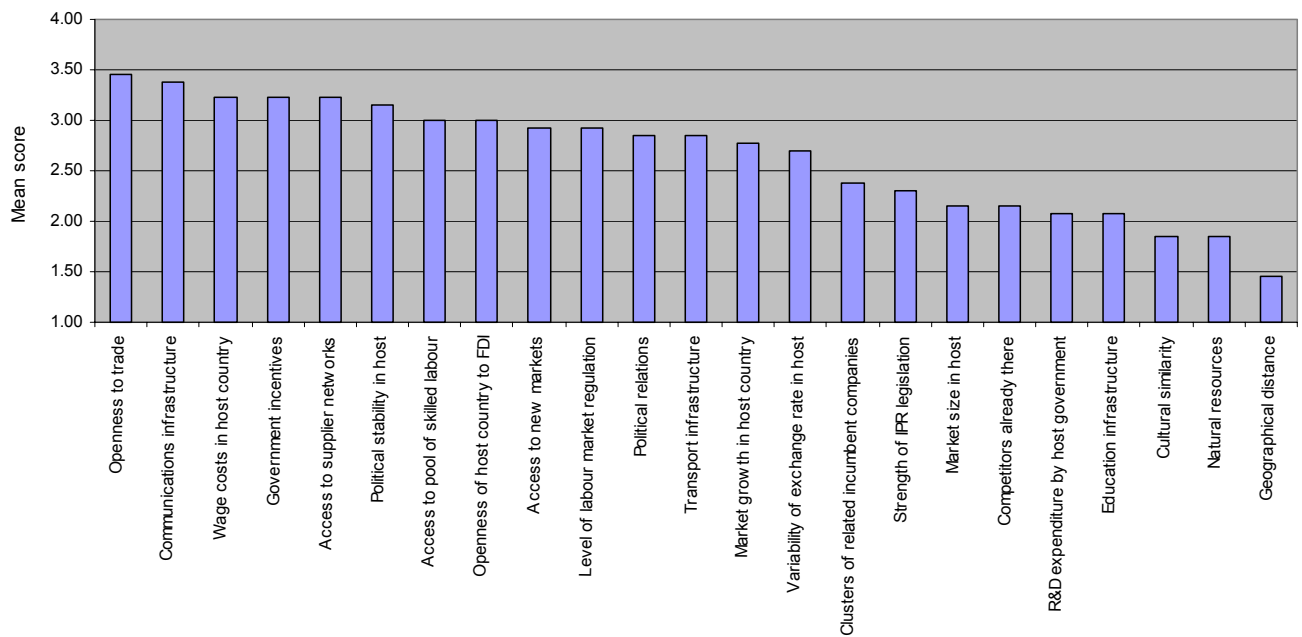
The determinants are shown in order of importance for manufacturing and design in figures 3.1 and 3.2. For manufacturing, openness to trade is the most important determinant (3.46) suggesting that investment is made with the intention of using the host country as a base to export to neighbouring countries rather than just meeting demand in local markets. This is confirmed by the high importance attached to access to new markets (2.92) and the relatively low importance attached to market size in the host country (2.15).

Communications infrastructure is the next most important determinant for manufacturing (3.38) and also rates highly for design (3.36). This suggests that improving the communications infrastructure would be a good general policy aimed at increasing investment in both activities.

Several respondents quoted low wage costs (3.23) as the main benefit of moving manufacturing to developing countries such as China and India. Even though wages make up a smaller proportion of total costs than in some less technologically advanced industries, this is still believed to be the area where the most dramatic costs savings can be achieved.

Government incentives are rated highly for manufacturing (3.23) with the tax benefits of locating in China quoted as being particularly attractive. Although another respondent made the point that all the financial incentives in the world are of little value if you cannot get hold of the right people.

Figure 3.1: The key location-specific determinants for manufacturing investments

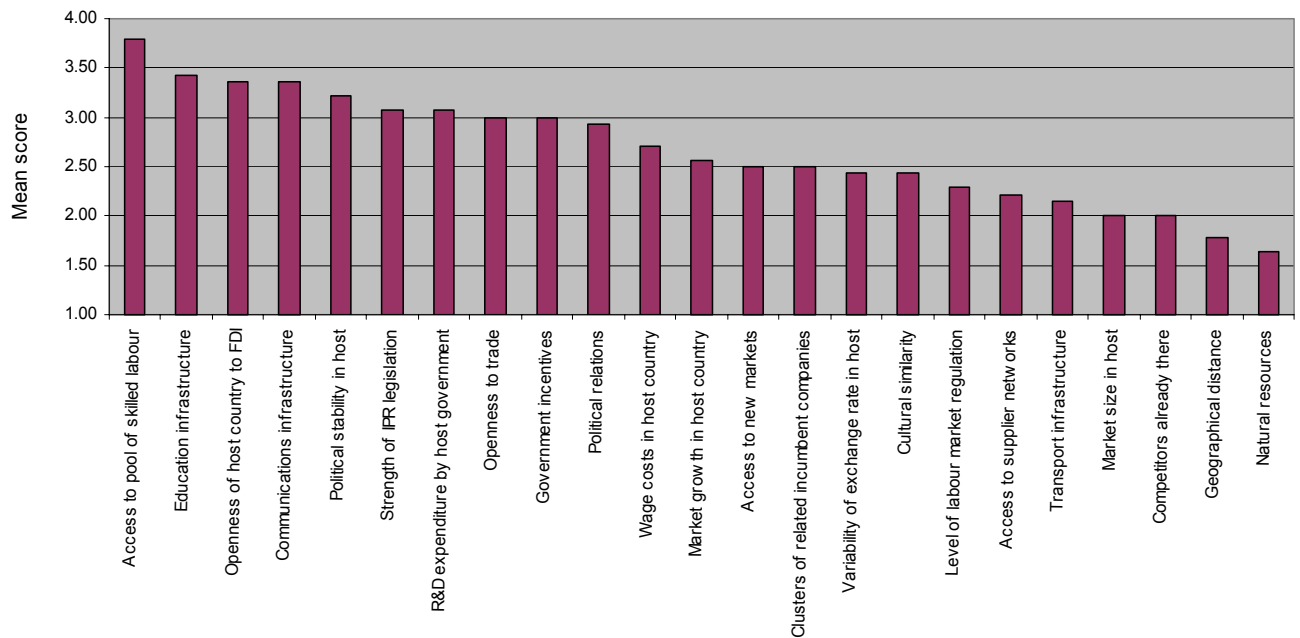


Number of respondents = 13

For design (figure 3.2), having access to a pool of skilled labour is the most important determinant (3.79). Several respondents discussed the quality of designers available in India who are willing to accept relatively junior positions. Education infrastructure is closely linked to the pool of skilled labour and receives the second highest rating (3.43). The importance of forming links between industry and education was also felt to be important in order to meet changing industry requirements.

The openness of the host country to FDI was also considered very important for design (3.36) and relates not just to lowering restrictions on foreign investment but actually working proactively with investors to secure investment.

Figure 3.2: The key location-specific determinants for design investments



Number of respondents = 13

Much is made in the literature of the importance of locating within a cluster of similar activity and benefiting from agglomeration economies. This was tested by asking the importance of “locating in a cluster of related incumbent companies”, “locating near to competitors” and having “access to supplier networks”. The results suggest that the key benefit from locating in a cluster is being able to organise an efficient supply network and is more important to investment in manufacturing than design.

Overall, it appears that manufacturing investment tends to be more market-seeking e.g. openness to trade, access to new markets, and efficiency-seeking e.g. wage costs and government incentives. Whereas design investments appear more resource-seeking e.g. access to pool of skilled labour, and asset-seeking e.g. education infrastructure, strong IPR legislation and level of R&D spending.

#### **4. How attractive is the UK as an investment option?**

Each respondent was then asked to consider the ratings they had given to the above determinants and rank the selected locations from 1 to 8, with 1 being the most attractive. The UK is ranked fourth out of the selected locations for manufacturing and first for design with mean rankings of 4.12 and 2.75 respectively.

*Table 4.1: The mean attractiveness ranking of selected locations*

Location	Manufacturing ranking
China	2.04
South East Asia	3.63
EU accession countries	4.04
United Kingdom	4.12
United States	4.42
India	4.96
EU excluding accession countries	5.19
South America	6.63

Location	Design ranking
United Kingdom	2.75
United States	3.18
China	3.57
EU excluding accession countries	3.64
India	3.82
EU accession countries	4.04
South East Asia	5.04
South America	6.96

For manufacturing, the UK is ranked below China, SE Asia and the EU accession countries primarily because of the low wage costs (table 4.2) and generous incentives available in these locations.

*Table 4.2: Wage costs in SE Asia and China in the electronics industry*

\$USD per month	Unskilled	Skilled	Technical	Management
Malaysia	152	321	612	1,122
Phillipines	126	295	312	901
Thailand	118	162	315	889
Vietnam	84	135	206	303
Indonesia	77	116	277	540
China	82	130	200	300

Note:

Unskilled: General worker, caretaker, driver, clerk, receptionist

Skilled: Skilled workers

Technical: engineer, programmer, designer, system analyst

Management: entry-level, middle, senior managers

Source: MIGA 2003

Table 4.3 shows that the UK's key strengths include openness to trade and low levels of labour market regulation. These determinants are particularly important to manufacturing investors and give the UK an advantage. While the US shares these strengths, the wage costs are higher in the US and government incentives are perceived to be lower.

*Table 4.3: Key strengths and weaknesses analysis for the United Kingdom*

Position		Mean rank		Strengths and weaknesses	Form of investment	Importance	
Mfg	R/D	Mfg	R/D			Mfg	R/D
4	1	4.12	2.75	<b>Key strengths</b>			
				Openness to trade	Market seeking	3.46	3.00
				Access to pool of skilled labour	Resource seeking	3.00	3.79
				Level of labour market regulation	Efficiency seeking	2.92	2.29
				<b>Key weaknesses</b>			
				Government incentives	Efficiency seeking	3.23	3.00
				Wage costs in host country	Efficiency seeking	3.23	3.00
R&D expenditure by host government	Asset seeking	2.08	3.07				

For design, the number 1 ranking is due to a perceived skills advantage over low cost locations while maintaining a cost advantage over the other developed countries. Although the point was made several times that this skills gap is closing fast with many believing it has already closed. Another source of concern is the low level of R&D investment compared to other developing countries. In 2002, the UK invested 1.84% of GDP on R&D compared to 2.20% in France, 2.49% in Germany, 2.80% in the US and 2.98% in Japan ([www.europa.com](http://www.europa.com)).

Overall, it is interesting to note that the UK has key strengths in determinants relating to three different forms of investment. While this could be considered as a positive trait, it may also suggest a lack of focus. A potential issue for policy makers is in attempting to define a clearer direction on the type of investment that the UK wishes to attract and developing focussed policies on achieving this.

## **5. What policies would make companies more likely to invest in the UK in the future?**

Before making policy recommendations this section analyses the importance of the role of public policy in the location decision, the ease of obtaining assistance in the UK, the role of EU state aid and some policy highlights from the selected locations.

### **5.1 Importance of public policy**

Research carried out during this project shows that public policy has an important role to play in location decisions. This was evidenced in three areas.

Firstly, the literature on this topic makes a key distinction between the systemic and operational roles of public policy (Dunning 1999). The UK has a history of systemic policies e.g. liberalising exchange controls, deregulating labour markets, opening up to competition. These market driven policies resulted in the UK receiving the largest share of FDI from US and Japan during the 1980s. However, it is argued that when economies reach a certain level of development then a more operational role is required to achieved further growth Dunning (1999). This is especially the case in the UK where there is little additional benefit to be gained from further liberalisation while other countries have the opportunity to catch up.

Secondly, the primary research rated government incentives as a very important location-specific determinant with a mean rating of 3.23 for manufacturing and 3.00 for design. Incentives are also cited as a key reason why China, SE Asia and the EU accession countries are more attractive location options for efficiency-seeking manufacturing investment than the UK.

Thirdly, there is evidence from the primary research that public policy is widely used where it is available with national government being the main source of assistance (table 5.1). Of the 17 respondents, 14 have benefited from policy assistance with several companies using more than one source.

*Table 5.1: Sources of public policy assistance*

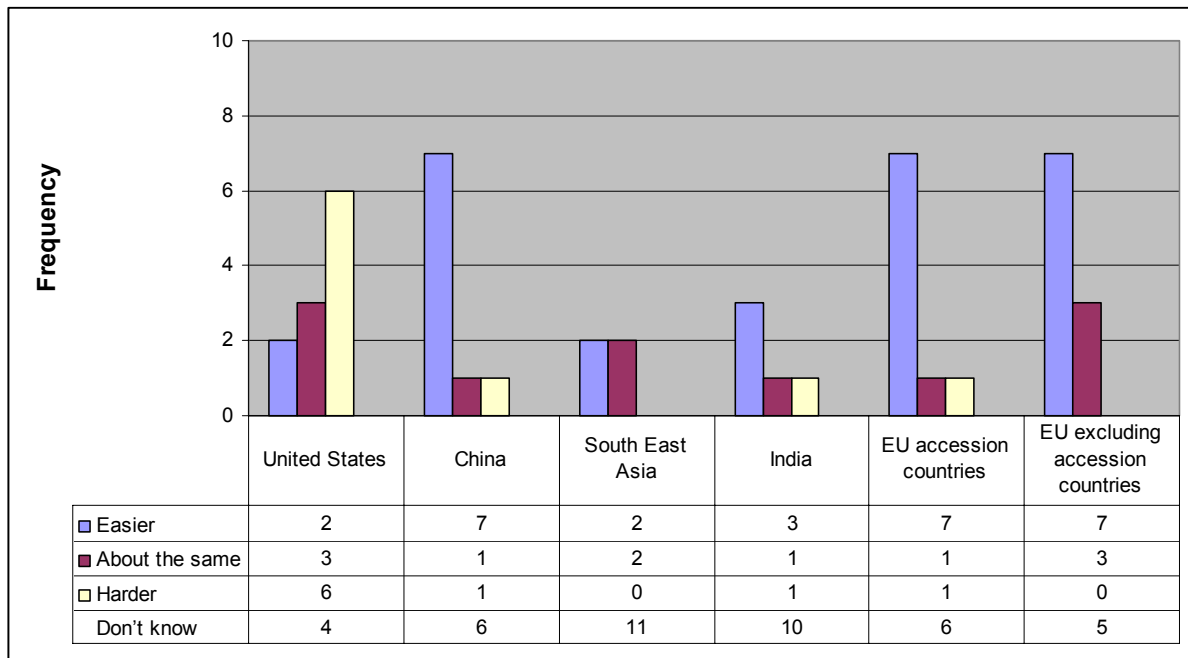
<b>Source of assistance</b>	<b>Number of companies</b>
National Government	9
Regional Authority	6
Local Authority	1
EU State aid.	2

Number of respondents = 14

### 5.2 Ease of obtaining assistance in the UK

Given the importance of public policy assistance it is of concern that assistance is perceived to be easier to obtain in China, SE Asia and across the EU than in the UK (figure 5.1). Within the EU respondents mentioned that both Germany and France were more flexible than in the UK and have a less criteria-driven approach. It is widely felt that EU state aid is easier to obtain in mainland Europe than in the UK. This will now be discussed further.

Figure 5.1: Ease of obtaining public policy assistance in selected locations relative to the UK.



Number of respondents = 15

### 5.3 EU State Aid

The EC treaty (article 87) prohibits state aid that distorts competition except where the proposed schemes may have “a beneficial impact in overall Union terms”. Officially, the EC has the authority to scrutinise the state aid schemes of various governments with powers to require that awards are repaid. However, it remains unclear whether the EC actually has authority to implement such rules rather than just negotiate them with each country (Wishlade 1998).

The state aid framework is partly designed to prevent outbidding behaviour by member countries but it is far from clear that this is being achieved. Hood and Young (1995) point out that monitoring and enforcement of state aid rules vary between countries and that the true level of aid is disguised by the topping up of aid with additional subsidies and infrastructure improvements.

The UK has certain location-based advantages over other EU countries and it is in the UK's interests to have strong and consistent EC legislation that limits the ability of other countries to offer financial incentives that outweigh these advantages. The UK approach has been to lead by example by being strict on state aid while calling for tighter controls over other countries e.g. in 1995 the UK claimed that the EC has backed down in the face of pressure from some national governments (Financial Times 16/3/95).

This approach is reflected in the pattern of state aid awards over recent years. Within the "electrical and electronic manufactured products" sector there have been 47 state aid awards with only 2 in the UK (table 5.2 – further detail in appendix 1). The UK also has among the lowest state aid as a % of GDP, and the lowest state aid to manufacturing as a % of value added.

*Table 5.2 State aid decisions 2000-2004 in electrical and electronic manufactured products*

Member state	Number of awards 2000-2004	State aid as %age of GDP 2002 *	State aid to manufacturing as %age of value added 2002**
Germany	16	0.56%	1.7%
France	8	0.42%	1.4%
Netherlands	5	0.19%	1.2%
Italy	4	0.38%	1.9%
Spain	4	0.55%	0.7%
Portugal	4	0.55%	1.3%
UK	2	0.17%	0.6%
Denmark	1	0.72%	4.7%
Sweden	1	0.16%	0.7%
Luxembourg	1	0.26%	2.3%
Finland	1	0.17%	0.7%

Source: Europa website

\* Excludes agriculture, fisheries, transport

\*\* value added = value generated by the manufacturing sector

#### **5.4 Policy highlights from the selected locations**

All the selected locations have Investment Promotion Agencies (IPAs) that promise to act as a point of contact for potential investors and facilitate the investment process. Appendix 2 contains a list of the policy highlights from the respective IPA websites, including the UK.

Fiscal incentives are common in less developed countries especially in China and SE Asia. It seems clear that a large microelectronics firm could avoid corporation tax altogether for many years in the right location within these countries.

Cluster-based policies are a sign of more sophisticated policy-making. Malaysia aims to provide complete westernised “townships” to help companies to relocate their workforce. France is also very focussed on cluster policies with claims that the Grenoble cluster is receiving billions of Euros in R&D funding over the next few years and generating 1,000 electronics graduates each year.

The EU countries offer incentives, all officially within the EU state aid framework, but with a tone of flexibility in several areas. For example, in Italy a “negotiating planning tool” can be used whereby firms can request new infrastructure and more flexible labour conditions. In contrast the new UK Selective Finance for Investment (SFI) has quite an extensive list of published criteria that need to be satisfied. However, the UK does also show evidence of several progressive policies e.g. knowledge networks, R&D tax credits and cluster-based policies led by the Regional Development Agencies.

### **5.5 Policy recommendations.**

During the primary research respondents were asked for their policy suggestions and the responses are summarised in appendix 3. These suggestions were combined with the learning points from other countries and with the primary research on identifying the most important location-specific determinants. The resulting policy recommendations are shown in table 5.5.

The policies are aimed at making the UK more attractive in the location-specific determinants that are most important to investors in advanced manufacturing and design. Note that the policies do not attempt to compete on an equal cost basis with developing countries e.g. the tax concessions made in developing countries. Instead the policies are aimed at maintaining a skills and infrastructure advantage over developing countries while maintaining a cost and flexibility advantage over other developed countries.

There are some excellent forthcoming opportunities to implement these policies e.g. the national ID card project or RF tagging. Through a flexible and proactive partnership between industry and government, clusters of activity could be developed around these opportunities to help to secure the UK’s position as an attractive location option for the microelectronics industry.

Table 5.5: Summary of policy recommendations

Type of investment	Key determinants	Target activity	Policy response
Asset seeking	R&D expenditure by host government	Research/design	<p><b>Increased R&amp;D spend targeted at emerging technologies.</b></p> <p>Prioritise meeting EU targets for % of GDP spend on R&amp;D. Develop platform for working with industry on applications for funding e.g. clarify criteria, advice on constructing a successful application, provide feedback on reasons for failure.</p>
	Access to supplier networks	Manufacturing	<p><b>Cluster based polices aimed at facilitating supply networks.</b></p> <p>Promote / fund business mentoring and incubation projects. Incentivise potential suppliers to locate in related clusters. Use enhanced cluster upgrade methodology to build on previous experiences e.g. Project Alba. Benchmark successful clusters in other countries e.g. Grenoble, Hinschu.</p>
	Communication infrastructure	Manufacturing & research/design	<p><b>Focus infrastructure spend on upgrading communication networks</b></p> <p>Support specialised local communication infrastructure based on industry needs. Continued development of virtual networks and knowledge transfer schemes.</p>
	Education infrastructure	Research/design	<p><b>Strengthen links between education and industry.</b></p> <p>Facilitate interaction to achieve greater skills match Improve commercialisation rate through discussion and testing of new ideas. Benchmark innovation pipeline polices in other countries e.g. Taiwan, Singapore</p>
Resource seeking	Access to pool of skilled labour	Research/design	<p><b>Develop curricula and training programmes relevant to target investors.</b></p> <p>Promote geographical concentration of relevant training and skills</p>
Efficiency seeking	Government incentives	Manufacturing & research/design	<p><b>Target incentives at the "right kind of investment".</b></p> <p>Ensure SFI leads to increased funding for right kinds of investment rather than just reduces total funding. Step up pressure on EC to prevent outbidding behaviour from other EU countries. Consider shift from balanced development polices e.g.in underdeveloped regions, to cluster based strategy focussed on exploiting existing strengths. Empower RDAs to offer more flexible funding for certain investment. Offer variable funding within SFI based on the value of the job creates for the future economy. Broadly match phasing of SFI with the typical cash flow cycle.</p>
	Openness of host country to FDI	Manufacturing & research/design	<p><b>Introduce greater flexibility in incentives schemes</b></p> <p>Shift from criteria setting to increased negotiation to instil greater sense of partnership with potential investors.</p> <p><b>Proactive marketing campaigns</b></p> <p>Sending out more delegates to promote benefits of UK to targeted industries. Construct bespoke offerings to certain multinationals.</p>

## **6. Summary**

There has been a shift in FDI inflow away from the UK toward low cost locations such as China and India. The evidence suggests that the current imbalance in EU state aid is also diverting investment away from the UK. Manufacturing investments are typically efficiency or market-seeking with design investments more likely to be resource or asset-seeking. The UK is now less attractive to manufacturing than lower cost locations who offering generous incentive packages but is still more attractive than other developed countries. The UK is the most attractive of the selected locations for design but this position is under severe threat from developing countries whose skills are developing rapidly.

Policy must be aimed at understanding the locational determinants that are important to the target investors in advanced manufacturing and design and then developing proactive policies to attract them. The policies recommended above should make these companies more likely to invest in the UK in the future. The UK has an excellent opportunity to implement these policies to coincide with forthcoming projects such as the national ID card and RF tagging and use this as a basis for attracting future investment.

**BIBLIOGRAPHY**

Dunning, J.H., (1980), Toward and eclectic theory of international production: some empirical tests, Journal of International Business Studies, 11:1.

Dunning, J.H., (1999), Governments, globalisation and international business, Oxford University Press.

Financial Times, 16th March 1995, Quantity but not enough quality.

Hood, N., and Young, S. (1995), The locational decision making process, Module 3 in Analytical skills for case officers, Locate in Scotland; Glasgow: Scottish Enterprise.

OECD (2003), Trends and recent developments in FDI, Directorate for Financial, fiscal and enterprise affairs

United Nations Conference on Trade and Development, (2003), World Investment Report 2003.

Wishlade, F., (1998), RAGS and LIPS: new weapons in the EC's regional aid control armoury, University of Strathclyde.

**Appendices**

- 1: State aid decisions 2000-2004 - electrical and electronics manufactured products.
- 2: Policy highlights from the selected locations
- 3: Policy suggestions from the microelectronics industry.

## Appendix 1

State Aid Decisions 2000-2004 in Electrical and Electronic Manufactured Products						
Name	Decision date	Member state	Region	Objective	Amount (M Euros)	Aid intensity
NG Bailey & Co Ltd - Centre of Vocational Excellence Programme	2004	UK	Yorkshire and the Humber	Aid for Training	-	-
Placement de malades et handicapés mentaux au chômage-Menuiserie	2003	Germany	Bayern	Aid for Training	-	-
Grupo Innovalia S.L. - Pais Vasco	2003	Spain	Pais Vasco	Aid to SMEs	-	-
Aides aux projets de commerce électronique	2003	Spain	Murcia	Aid to SMEs	-	-
Subventions pour les PME de la région de Murcia	2001	Spain	Murcia	Aid to SMEs	-	-
Rescue aid to Zehdenick Electronique Gruppe	2004	Germany	Ostprignitz-Rupin	Rescue aid	-	-
Mesures en faveur de Zentrum Mikroelektronik GmbH	2001	Germany	Dresden	Restructuring aid	-	-
Aide à la formation à Finmek	2004	Italy	-	Aid for Training	-	-
Training aid in favour of Infineon Technologies - Portugal	2004	Portugal	Grande Porto	Aid for Training	10	46%
Programme Medea + Eureka 2365: projet T207, '65nm CMOS 300mm	2004	France	-	Aid for R&D	-	-
MSF 98 - ST Microelectronics - aide en faveur du site de Rousset	2003	France	Provence Alpes Cote d'Azur	Regional Aid	120	12.6%
MSF 98 - European Optic Media Technology	2003	Germany	Erfurt	Investment Aid	-	-
Individual R&D case on imagery methodology for nanoelectronic components	2003	Germany	-	Aid for R&D	-	-
Rescue aid for STP	2003	Germany	Stuttgart	Rescue aid	-	-
Aid in favour of Grundig AG - Rescue Aid	2002	Germany	Nuernberg	Rescue aid	-	-
Aides à la formation en faveur de EPCOS, S.A	2003	Portugal	Alentejo	Aid for raining	-	-
MSF 98 - State aid in favour of Fibre Ottiche sud SpA, Battipaglia (Salerno)	2002	Italy	Campania	Investment aid	-	-
MSF 98 - Investment aid to Schott Lithotec AG (MSF)	2003	Germany	Thuringen	Investment Aid	-	-
MSF 98 - Communicant Semiconductor Technologies AG (MSF)	2002	Germany	Berlin	Investment Aid	371	23.9%
Ad-hoc investment aid in favour of tuboplast Hispania SA	2002	Spain	Pais Vasco	Investment Aid	-	-
MSF 98 - ST Microelectronics, Catania (MSF)	2002	Italy	Sicilia	Aid for Training	542	26.3%
Promotion of Telematic - Saxony	2002	Germany	-	Aid for R&D	-	-
Cas individuels relatifs au régime MEDEA+: projets T201, T301 et 304	2002	France	-	Aid for R&D	-	-
Aide dans le secteur de l'automobile en faveur de Ford Electronica Visteon	2001	Portugal	Peninsula de Setubal	Regional Aid	-	-
MSF 98 - Atmel Rousset SA (MSF)	2001	France	Provence Alpes Cote d'Azur	Investment Aid	75	11.8%
Fluor - Lithography	2001	Netherlands	-	Aid for R&D	-	-
Extatic Lithography	2001	Netherlands	-	Aid for R&D	-	-
Medea Plus	2001	France	-	Aid for R&D	-	-
Eureka Project Medea PLus	2001	Netherlands	-	Aid for R&D	-	-
Microelectronic centre (MIC)	2001	Denmark	-	Aid for R&D	7	25.0%
MSF 98 - Motorola Semiconductor project	2000	UK	Scotland	Aid for R&D	172	5.8%
Programme ITEA Eureka 2023	2000	France	-	Aid for R&D	-	-
ST Microelectronics - Technologies pour mémoires flash à haut niveau d'intégration	2001	Italy	-	Aid for R&D	-	31.6%
Small scale electricity production	2000	Sweden	-	Environmental aid	-	-
R&D aid to Institut für Solare Technologien GmbH	2000	Germany	Frankfurt	Aid for R&D	-	-
Restructuring aid in favour of BULL	2004	France	-	Restructuring aid	-	-
Aid in favour of Infineon Technologies - Fabrico de semiconductores, Portugal, S.A. (MSF)	2004	Portugal	Grande Porto	Investment aid	-	-
Fonds de compensation dans le cadre de l'organisation du marché de l'électricité	2002	Luxembourg	-	Environmental aid	-	-
Avance de trésorerie par l'Etat français à Bull	2003	France	-	Rescue aid	-	-
MSF 98 - Infineon - State aid in favour of Infineon	2002	Germany	Dresden	Investment Aid	219	19.8%
Investment aid to Ojala-Yhtymä Oy in Haapajarvi	2001	Finland	Pohjois-Pohjanmaa	Regional Aid	-	-
Investment aid in favour of Hewlett Packard - SCI systems	2001	Netherlands	Friesland	Investment Aid	-	-
CDA Compact disc Albrechts GmbH, Albrechts	1998	Germany	Thuringen	Restructuring aid	-	-
Aid to the SICAN group and partners and project partners for R&D in microelectronics	2000	Germany	-	Aid for Training	-	-
OCE - Development of colour ink-jet printers	2000	Netherlands	-	Aid for R&D	-	-
Aid for Elpro AG (Berlin)	2000	Germany	Berlin	Restructuring aid	-	-
System Microelectronic Innovation GmbH, Frankfurt (Oder)	2000	Germany	Brandenburg	Restructuring aid	-	-



## Appendix 2: Policy highlights from the selected locations

Country / IPA / website	Policy	Comments
<b>China</b>  China Council for Promotion of International Trade  www.ccpit.org	Corporation tax at 25% or 15% in Special Economic Zones (SEZ).  Projects over 10 years are exempt from corporation tax for 2 years with 50% reduction over next 10 years.  Any profits re-invested in China are subject to further 40% reduction in tax.  Profits can be offset against losses at start of project for 5 years.  Royalties derived from patented scientific know-how are tax free.	Extended further for technologically advanced firms  Discourages exporting profits.  Target research and design.
<b>Malaysia</b>  Invest in Malaysia www.mids.gov.my	Industrial parks for technology intensive industry and R&D.  Self contained "townships" for foreign workers with westernised health, education and recreation facilities.	Cluster-based policy aimed at providing familiar culture to attract foreign investors.
<b>Thailand</b>  Board of Investment www.BOI.go.th	8 years exemption from corporation tax  Negotiable privileges based on location zone.	Flexibility in what can be offered.
<b>Philippines</b>  Board of Investment www.ey.com	8 years corporation tax holiday  Tax deductions for infrastructure investment and wages relating to new jobs.	Encourage local job creation.
<b>Vietnam</b>  Ministry of Planning and Investment www.vietnam-tourism.com	Local land funds for infrastructure investment  Skills council to link education and industry requirements	Policies still quite undeveloped and a history of poor FDI performance.
<b>Czech Republic</b>  Czech Invest www.czechinvest.org.	Partial corporate tax relief for 10 years based on location  Direct grants for activities connected with relation of cluster	Unclear how this is defined
<b>United Kingdom</b>  UK Trade and Investment  www.invest.uk.com	Selective Finance for Investment (SFI) based on location.  R&D tax credits - tax deductions relating to R&D spend.  Direct grants towards establishing "Knowledge Transfer Networks"  Electronics in schools programme  RDA led cluster based strategies based on learning provided by Project Alba.	Focussed on innovative knowledge based projects  Encourage R&D spend by industry.  Provide link between academia, RDAs, government and industry  e.g. Scottish Enterprise and South West RDA.
<b>India</b>  Foreign Investment Implementation Agency www.amb-inde.fr.	Localised incentive packages e.g. tax concessions, capital subsidies, reduced power tariffs.  Science parks e.g. Electronics Hardware Technology Parks, Software Technology Parks, aimed at export oriented units.	Exact benefits unclear, lack of central co-ordination.  Form of cluster based strategy.
<b>France</b>  Invest in France Agency www.afii.fr	Cluster based policies e.g. Crolles II at Grenoble. R&D funding and investment in engineering education.	Generates over 1,000 graduates specialised in electronics each year.
<b>Italy</b>  Invest in Italy www.investinitaly.com	Negotiated planning tool - firms negotiate for new infrastructure and more flexible labour conditions	Example of flexibility rather than criteria-driven approach.

### **Appendix 3: Policy suggestions from the microelectronics industry.**

This section is intended to share the knowledge that exists in the industry to help make policy recommendations. Responses have been categorised into distinct policy areas based on the common themes that emerged and are presented in bullet point format below.

#### **- General policy comments**

- UK should avoid attempting to compete with China on costs and should focus on becoming attractive to higher value activities.
- UK must maintain an edge in the skills and knowledge base of the economy.
- UK should not fall into the trap of believing it can let more basic R&D go in the belief that there is an automatic backfill of higher value jobs as numerous other countries are already actively competing for this space

#### **- Greater support for Research and Development**

- Concern over R&D following manufacturing to low cost locations.
- UK should attempt to retain the intellectual property and thus ownership of the revenue stream
- Policy assistance is required to help fund R&D because research may need to form part of a programme over several decades whereas business plans are far more short term and cost driven.
- In the development path from research to science to technology, policy should focus on assisting the research and the science while industry should focus on commercialising the technology.
- UK policy in this area so far has “made the right noises but has been weak on the nitty-gritty.
- Great majority of applications for nano-technology funding have been rejected with limited feedback made available, thus deterring further applications.

#### **- Flexible and proactive policies**

- UK policies felt to be inflexible with respondents not getting a feeling of support or partnership from the government.
- Need creative assistance and a more entrepreneurial approach in working with industry rather than a criteria-based approach to funding.
- Shift from open door policy to being more proactive and actually attempt to pull in investment rather than leaving it to market forces.
- Stronger lobbying of EU regulators either to secure more generous state aid packages for the UK or to limit the ability of other countries to outbid the UK.

- **Links with education**

- Maintaining a skills advantage depends on developing relevant skills in education system.
- Need closer links to ensure relevant skills are being developed.
- Innovation and entrepreneurship should form a larger part of educational curriculum.

- **Focus on commercialisation**

- UK needs to improve the ability to successfully commercialise new ideas.
- Shift academic focus from publishing research papers to actually developing technology.
- Cannot be rectified by just increasing R&D spend but by building links that will enable government, industry and education to work together to commercialise the ideas.
- Focus on managing the innovation pipeline as demonstrated by other countries e.g. Taiwan and France (Grenoble cluster).

- **Incubation policies**

- Incubation is an important part of the commercialisation process.
- Policies should include providing the necessary communications infrastructure, low cost leasing of space and ongoing training, support and advice.
- Need a stronger and more co-ordinated incubator structure involving universities and other educational institutions
- This is about spending smartly i.e. picking winners and working with them to develop future technology. This could include offering a “pot of gold” for companies who reach proof of concept stage which could then be used to fund the next stage of development.

- **Cluster strategies**

- Can be effective if they can provide communications infrastructure and access to supplier networks for manufacturing and access to pool of skilled labour and education infrastructure for design.
- Current concentrations of skills could be used as a basis for cluster development or upgrade
- Clusters are more likely to be successful in areas where skills are already at a high level rather than attracting investment with the intention that skills will develop and catch up.
- Science parks in the UK have enjoyed considerable success through offering potential cluster-related benefits e.g. sharing ideas and working within supplier and customer networks. Could be made more effective in attracting investment if seed funding was made available to support new companies and if the funding for each science park was made more consistent to prevent destructive competition between the parks.

- **Raising the profile of UK as an investment option**

- UK strengths are not strongly communicated to the rest of the world.
- Many US investors group the UK together with other EU countries in terms of the level of labour market regulation with Asian countries seen as far more liberal.
- Other countries felt to be more proactive in promoting their strengths e.g. delegates from China regularly visiting potential investors.

- **Suggestions for Regional Policy**

- Funding received should vary according to the type of job created e.g. skilled engineer should receive more funding than an unskilled labourer. This would help attract more investment in the higher value activities that the UK needs to retain a skills edge over developing countries.
- This is partly reflected in SFI which is focussed on providing skilled jobs. However, it remains to be seen if this results in more generous grants for companies creating skilled jobs or just less funding for those providing unskilled jobs.
- The phasing of funds should be weighted to start of project to help the project survive rather than the end of the project when the funds are less critical.

- **Interventionalist policy**

- UK should act with other developed nations in applying pressure to prevent unacceptable practices in developing countries e.g. lack of health and safety regulations, infringing patent regulations, that artificially drive down costs.