Evaluation of Regional Incubator Profiles for Small and Medium Sized Enterprises

PETER NIJKAMP, RONALD VAN DER MARK and THEO ALSTERS

Department of Economics, Free University, P.O. Box 7161, 1007 MC Amsterdam, The Netherlands.

NIJKAMP P., VAN DER MARK R. and ALSTERS T. (1988) Evaluation of regional incubator profiles for small and medium sized enterprises, *Reg. Studies* **22,** 95–105. This paper presents an operational analytical framework for studying the indigenous development potential (supply profile) of various problem regions in the European Community from the viewpoint of incubator conditions favouring the development of various types of small and medium sized enterprises (SMEs). After a brief overview of recent findings and policy trends, an empirical analysis is carried in order to assess the SME incubator profile of various European areas, classify these areas, and confront the results with data on regional growth indicators.

Small and medium sized enterprises (SMEs)   Incubator profile   Indigenous growth potential
Regional development

NIJKAMP P., VAN DER MARK R. et ALSTERS T. (1988) L'évaluation des pépinières régionales pour les petites et moyennes entreprises, *Reg. Studies* **22,** 95–105. Cet article présente un cadre analytique opérationnel visant l'étude du potentiel autochtone (profile offre) de diverses régions défavorisées de la CEE du point de vue de l'équipement sous forme de pépinières qui favorise le développement de diverses catégories de petites et moyennes entreprise (PME). Une vue d'ensemble des derniers résultats et de l'orientation des politiques est suivie d'une analyse empirique pour évaluer le profil de diverses régions européennes quant à leurs pépinières, catégoriser ces régions-là, mettre côte à côte les résultats et les données sur les indices de la croissance régionale.

Petites et moyennes entreprises (PME)
Profil des pépinières
Potentiel de croissance autochtone
Développement régional

NIJKAMP P., VAN DER MARK R. und ALSTERS T. (1988) Bewertung regionaler 'Inkubatoren profile' für kleine und mittlere Unternehmen, *Reg. Studies* **22,** 95–105. Dieser Aufsatz stellt einen einsatzfähigen, analytischen Rahmen für Untersuchung des einheimischen Entwicklungspotentials (Profil der Bedarfsdeckung) verschiedener, mit Problemen kämpfender Regionen der EG vom Standpunkt der 'Inkubatorenbedingungen' dar, welche die Entwicklung verschiedener Typen kleiner und mittlerer Unternehmen (englisch: SME) begünstigen. Nach einem kurzen Überblick über Befunde und Bestrebungstendenzen wird eine empirische Analyse durchgefürt, um das SME 'Inkubatorenprofil' verschiedener europäischer Gebiete zu beurteilen, diese Gebiete zu klassifizieren und den Ergebnissen Angaben über Indikatoren regionalen Wachstums gegenüberzustellen.

Kleine und mittlere Unternehmen (SME)
Einheimisches Wachstumspotential
'Inkubatorenprofil'   Regionalentwicklung

INTRODUCTION

In recent years much attention has been devoted to industrial restructuring and technological innovations as necessary conditions for favouring new economic growth processes. Most discussions have taken place within the framework of the debate on the so-called 'depression trigger' hypothesis. In this context, it has been realized that, instead of relying on huge capital investments for large-scale industrialization programmes and government subsidies for lagging regions, the indigenous growth potential of areas themselves has to be exploited (see MEYER-KRAHMER, 1985). Instead of focusing attention mainly on encouraging firms outside of the Assisted Areas, much more emphasis has to be placed on inducing indigenous growth. In particular, it is frequently claimed that more attention should be given to stimulating new firm formation and to inducing small firms to expand (ARMSTRONG and TAYLOR, 1986).

In the recent past, new firm formation has become a focal point of scientific and planning interest (see KEEBLE and WEVER, 1986). In particular, small and medium sized enterprises (SMEs) are regarded as powerful engines for local and regional rejuvenation. SMEs are nowadays often seen as major seedbeds for industrial restructuring and innovative behaviour and are consequently considered as key 'niches' in a complex and dynamic spatial economic system, especially since they make up a significant part of the

total labour force in a country (GERSHUNY and
MILES, 1983; GIAOUTZI *et al.*, 1988; STOREY, 1982,
1983). In some European countries (e.g. Greece and
Portugal), SMEs contribute more than 90% of the
total volume of economic activity.

There is unfortunately a serious paucity of data
concerning small firms. In several countries many of
these firms belong to the informal sector, so that
hardly any reliable data can be obtained. In various
Western European countries the data situation is
slightly better, but here also it is almost impossible to
identify development patterns of SMEs on a cross-
national basis.

SMEs provide at first sight an interesting and
effective way of enhancing the development potential
of depressed regions. However, the birth and death
rates of SMEs and the growth rates of existing SMEs
appear to vary significantly between different regions
and between different types of SME (WEVER, 1984).
Apparently, the socio-economic and physical condi-
tions of a region are of decisive importance for the
regional growth perspectives of specific types of
SME. These conditions include *inter alia*: a strongly
integrated local economy; a diversified labour market
with various kinds of available skills; access to both
relevant business information and regional venture
capital; and flexible institutional arrangements
(PEDERSEN, 1986). Consequently, the emphasis of the
present paper will *not* be on a micro analysis of
locational requirements of SMEs (the 'demand pro-
file'), but on a meso analysis of regional conditions
that may act as stimuli for either new firm formation
or expansion of existing firms in the SME sector (the
'supply profile'). The main reason for choosing this
approach is that such supply conditions are of more
direct relevance for regional and sectoral policies.

It is therefore important to analyse the regional
'incubator' profiles of SMEs (see also DAVELAAR and
NIJKAMP, 1986). By such a profile we mean the set of
regional *supply* conditions that provide a potentially
favourable seedbed for the establishment and expan-
sion of SMEs. This would imply that regions with a
relatively favourable incubator profile for specific
types of SME are expected to have a better perform-
ance of the SME sector.

The present paper provides a general analytical
framework for investigating the potential supply
profile of a set of designated regions within the
European Community from the viewpoint of seedbed
conditions that are favourable for the development of
various branches in the SME sector. The paper is
organized as follows. The next section discusses
briefly the relevance of the SME sector for regional
development policy. In the third section, the role of
the SME sector in the context of the regional policy of
the Common Market is outlined. Section four
presents the methodology for assessing the multi-
dimensional incubator profile of a set of regions

vis-à-vis the SME sector. In the fifth section, the
regional incubator profiles of eighteen regions in the
European Community are described, followed by an
integration of regional incubator and specific SME
class profiles in section six. The empirical results for
each region are finally compared with (general)
regional performance indicators, followed by some
policy conclusions.

RELEVANCE OF SMEs FOR REGIONAL DEVELOPMENT

In recent years the SME sector has become a focal
point of regional and sectoral policy interest. It is
generally assumed that the SME sector has consider-
able potential as a job-creator, and hence may act as a
vehicle for revitalizing the industrial and service sector
in our stagnant economies. The role of SMEs as
triggers of new development therefore warrants the
current interest in this sector, not only at a local-
regional level but also at a national-international level.
Consequently, the potential of the SME sector (in
terms of job creation) has induced various policies for
improving the position of backward areas by means of
specific SME development strategies.

An influential study on the employment potential of
small firms has been undertaken by BIRCH, 1979. He
concluded that, in the USA, firms with less than
twenty employees generated 66% of net new jobs in
the period 1969–76. His results, however, evoked
great controversy. A summary of this discussion can
be found in STOREY and JOHNSTON, 1987. These
authors come to the conclusion that the SME sector
can become a very important job-creator, but due to
its diversity it is almost impossible to formulate
general policy strategies. It is thus necessary to make a
more detailed subdivision of the SME sector.

The interest in the SME sector, especially in lagging
regions, was strongly stimulated by recent structural
changes in the industrial base of more developed
regions, especially the decline in industrial employ-
ment in old-line sectors (BLUESTONE and HARRISON,
1982). The resulting industrial restructuring process
(including the emergence of high-tech industries) has
in many countries in Europe sharpened regional
inequalities (see ROBERT, 1982). Hence it is no
surprise that the SME sector, which is often dominant
in many lagging and peripheral regions, is sometimes
regarded as a regional lifeboat.

Now the question is: which SME features contri-
bute to new growth processes in a backward area? In
other words, what is the positive impact of an increase
of the SME sector on regional development? The
following effects, which of course do not hold equally
for all SME activities, are usually distinguished
(PIATIER, 1984).

1. *An increase in employment* or an improvement in
    employment growth potential either directly in

SME firms or indirectly via derived spin-offs (ALCANATARA *et al.*, 1984).

2. *New firm creation* resulting from the flexibility present in a small scale production environment (BAROIN and FRACHEBOUD, 1982).

3. *High innovation potential* resulting from the internal structure of SMEs (e.g. the 'human scale') or the incubator facilities (e.g. knowledge and R & D infrastructure) in a less stable industrial climate (ZEGVELD and ROTHWELL, 1985).

4. *Managerial and production flexibility* resulting from less bureaucratic decision procedures and by a relatively high adjustment capability with respect to technological and marketing changes.

5. *Orientation toward specialized market 'niches'* so that SMEs can profitably cover market slots which are of no interest to large firms, or which can only be reached by subcontracting via SME firms (VON DEWALL *et al.*, 1985).

However, some words of warning are in order. Despite the supposedly favourable role of the SME sector in industrial restructuring strategies, it is by no means evident that all SME activities are equally appealing from a regional development perspectives. Some of these activities belong to a conventional sector and do not contribute to industrial innovations at all. Therefore, a careful scrutiny of regional incubator profiles for SMEs is necessary.

Furthermore, in a European context, it is necessary to make a clear distinction between at least two types of problem region. First, in Central and Northern Europe we observe many lagging areas facing a downward spiral movement due to the economic decline (or inertia) of traditional large-scale industries. On the other hand, in the peripheral countries of the European Community (notably Greece, Southern Italy, Southern France, Spain, Portugal, and Ireland) we observe various traditionally-oriented small branch plant SMEs or weakly innovative independent SMEs. The relatively lower number of SMEs in the Central and Northern regions are largely geared to a relatively highly developed industrial structure, mainly located in larger agglomerations, whereas the relatively higher number of SMEs in the peripheral countries are more oriented towards local and regional markets and are therefore less sensitive to export fluctuations or a market penetration by NICs. In general, the latter type of SMEs tend to have a higher degree of flexibility and adaptability to new circumstances (ALSTERS and VAN DER MARK, 1986).

The position of SMEs appears to depend strongly on general de-industrialization and re-industrialization processes (i.e. the new *esprit industrielle*) in Europe, and this in turn determines the competitive position of Europe's problem regions. A major point here is whether a certain problem region is able to revitalize itself by means of creation or adoption of new technologies in such a way that the indigenous

development potential is improved by favouring the SME sector.

Current SME policies usually take it for granted that the SME sector plays an important role as a new development trigger. Unfortunately, empirical facts are relatively scarce so that in the view of some researchers the term SME seems to correspond more to a 'state of mind' than to an 'actual fact' (COMMISSION OF THE EUROPEAN COMMUNITY, 1984), its charm being determined by independence, simple organizational structures, rapid decision-making, and quality tailored to clients' requirements. Before turning to the empirical evidence, we will first briefly discuss the Common Market's SME policy.

REGIONAL GROWTH POTENTIAL AND THE ROLE OF SMEs IN THE EUROPEAN COMMUNITY

The importance of the SME sector was also recently realized by the Common Market. In August 1986, the European Commission submitted to the European Council an interesting draft resolution concerning a new Community action programme for SMEs (COMMISSION OF THE EUROPEAN COMMUNITIES, doc. COM 1986 445 def.). This action programme, which was also accepted, seeks to form an important part of the Community's growth and employment strategy in which SMEs can provide an important contribution to the creation of new jobs. Although many national policies for the development of the SME sector already exist which have to some extent generated positive results, there is some scope for expanding SME policies towards a European level in order to give this often locally-oriented sector a more international (i.e. European) dimension. In addition, SME policy has to be seen against the background of the Community's regional policy aiming at improving the regional development potential of lagging regions.

In the light of the widening gap in terms of income and employment between prosperous and less developed regions, the Community's regional development policy may take two alternative directions (WETTMANN and CICIOTTI, 1981):

1. *Fostering exogenous regional development potential*, i.e. a selective deconcentration by attracting outside investment into those problem regions which have the most favourable cost advantages (e.g. cheap unskilled labour, low cost natural resources); at present this policy is likely to be less successful due to a lower mobility of firms, tighter public budgets and the reconcentration tendencies of many large-scale innovative enterprises (see OECD, 1985);

2. *Mobilizing indigenous regional development potential*, i.e. a selective development of those regional resources that offer a relatively strong incubation

potential for the region at hand (involving *inter alia* import substitution and export growth). This 'self-reliance' policy is closely tied in with intra-regional socio-economic characteristics and may induce a fuller use of a (latent) regional growth potential.

It is clear that the current interest of the Common Market in the SME sector means essentially a choice in favour of the second regional development strategy. The focus of the Community's regional employment policy has accordingly been shifted from conventional material conditions such as physical infrastructure investment (coined 'hardware') toward improvements of the indigenous growth and innovation potential such as educational facilities, entrepreneurial capacity, R & D centres of technical assistance (coined 'software'). Software policies are aimed at a recognition and exploitation of the indigenous potential of a given area or locality. Such new policies are especially favourable for SMEs since such firms, which are usually rooted in a local or regional economy, do not often have the necessary software for a new economic or technological 'take off'. Consequently, policy support for those SMEs which are able to enhance the indigenous development potential may be an important vehicle for improving the competitive position of both types of problem regions discussed above.

At present the Community's regional policy has specific measures for improving the regional development potential (see article 15 in the Regulation European Regional Development Fund), including an encouragement of the SME sector. Much attention will be given to the role of venture capital and the co-ordination with regional financial institutions. Furthermore, financial support for attracting R & D staff to problem regions and for feasibility studies may be considered. Finally, information on technological innovations and R & D results has to be disseminated to SMEs.

A new element in the Community's regional policy is to stimulate the establishment of business centres acting as incubators for potential entrepreneurs (the so-called 'European Business and Innovation Centres'). This real incentive, which is comparable to science parks for technological incubation, seeks to initiate new firms and to facilitate access to new technologies. Transnational collaboration and transfer of relevant information is fostered via the 'European Business Centres Network' (EBN).

The Community's action programme for SMEs ties in with the above mentioned software policy, as it seeks to provide a favourable administrative and institutional environment for SMEs. In addition, this action programme seeks to stimulate flexibility by providing up-to-date information systems and training schemes tailored to the need of staff members in the SME sector. In regions with a high unemploy-

ment rate the European Social Fund may also provide some support.

Having discussed briefly the relevance and the European policy context of the SME sector, we turn in the next section to a methodology for evaluating regional incubator profiles for SMEs.

MULTIDIMENSIONAL REGIONAL INCUBATOR PROFILES FOR SMEs

A regional incubator profile is a multi-dimensional set of regional supply factors that provide a potentially favourable seedbed for new economic activities (either new firms or new growth impulses for existing firms). In the context of our study focusing on SMEs, a literature search has shown that, in general at least, the following eleven particular elements may be assumed as relevant components of a regional incubator profile for SMEs (for details, see ALSTERS and VAN DER MARK, 1986; and NIJKAMP, 1988): 1. accessibility (internal); 2. centrality (external); 3. degree of urbanization; 4. institutional and policy climate; 5. technical educational level; 6. residential quality; 7. energy cost advantages; 8. labour cost advantages; 9. availability prospects; 10. employment prospects; 11. share of promising economic activities. Clearly, several other relevant elements might no doubt be distinguished, but the selection of these indicators is to a large extent determined by their availability across eighteen European regions.

It is worth mentioning that these eleven profile elements do not always have the same relevance for new firm formation and for expansion of already existing firms. But since we are dealing with a supply profile at a meso (regional and branch) level, we may assume that a more favourable incubator profile will enhance the competitive position of SMEs in the region at hand (either on the basis of higher birth rates of new firms or on the basis of higher growth rates of existing firms). The main question is here the higher efficiency potential of specific types of SME.

The way these eleven incubator elements are defined and measured can be found in ALSTERS and VAN DER MARK, 1986, and will not be discussed any further here. We take for granted the availability of reliable data on this set of regional incubator profiles. We also assume that these data have been properly standardized for each profile element over all regions on a scale ranging from 0 to 100 (the 'European' maximum for all regions); thus all values are related to the highest value (= 100) for each corresponding element of the incubator profile.

For R regions and eleven profile elements, we may now define an $R \times 11$ incubator profile matrix $E = \{e_{ri}\}$ ($r = 1, \ldots, R; i = 1, \ldots, 11$), in which each element e_{ri} represents the value of the ith profile element in region r.

It is noteworthy, however, that these profile

elements are not equally relevant for the whole SME sector; the SME sector is essentially a very heterogeneous set of activities, which may be typified by the following eleven classes of distinct activities (*ibid.*):

i. Final market oriented
ii. Final market *and* export oriented
iii. Final market *and* export *and* innovation oriented
iv. Final market *and* innovation oriented
v. Intermediate *and* export oriented
vi. Intermediate *and* export *and* innovation oriented
vii. Intermediate *and* export *and* innovation *and* high-tech oriented
viii. Intermediate *and* innovation oriented
ix. Intermediate *and* high-tech oriented
x. Intermediate *and* innovation *and* high-tech oriented
xi. Intermediate oriented

This is a fairly detailed typology of SME branches, but in view of a cross-comparative analysis of SME incubator profiles across different regions in different countries, it is necessary to take into consideration a variety of SME branches which are influenced by the supply profiles in various countries.

Given the heterogeneity of the SME sector, each specific class (or branch) of this sector may attach different degrees of importance (weights) to the above mentioned eleven incubator elements. In order to assess the relative weights for each class, an expert view approach is the most appropriate one. This means that a set of weights for the eleven SME classes with regard to the eleven incubator factors may be gauged on the basis of information collected from scientists, policy makers and SME experts. This information may then be included in an 11 × 11 SME class priority matrix $S = \{s_{ji}\}$, where s_{ji} represents the relative weight attached from the viewpoint of the *j*th SME class to incubator element *i*. It is clear that these weights satisfy the following additivity condition:

$$\sum_{i=1}^{11} = s_{ji} \, 1, V_j \tag{1}$$

On the basis of the previous information, there are now various ways for assessing the incubator potential for SMEs in a given region *r*.

Firstly, we may calculate the unweighted (or average) incubator profile c_r as follows:

$$c_r = \frac{1}{11} \sum_{i=1}^{11} e_{ri} \tag{2}$$

Secondly, we may calculate the weighted incubator profile for the *j*th SME in region *r* as follows:

$$c_{rj} = \sum_{i=1}^{11} e_{ri} \, s_{ji} \tag{3}$$

Finally, it is also possible to calculate the overall weighted incubator profile (over all SME classes and all incubator elements):

$$\bar{c}_r = \frac{1}{11} \sum_{j=1}^{11} c_{rj} \tag{4}$$

It should be noted that the previous method is essentially a (simple) application of multi-criteria analysis, based on a weighted summation method. Clearly, more sophisticated approaches (such as concordance analysis or regime analysis) could have been used, but in the framework of the present problem it is sufficient to employ a simple technique.

Given the information required by equations (2)–(4), it is possible to rank regions in terms of their most promising potential for the SME sector. The way this has been done in our empirical research is described in the next two sections.

DESCRIPTION OF REGIONAL INCUBATOR PROFILES

In our empirical study eighteen regions from the European Community are considered (see Table 1); seven belong to the above mentioned class of peripheral areas, and eleven to the class of restructuring areas. These are standard EC-regions (so-called level II areas), except for Greece (level I) and Twente (level III).

Data on the eleven incubator elements defined earlier for each region in Table 1 have been collected (for a detailed description, see ALSTERS and VAN DER MARK, 1986). The choice of these elements was limited by data availability: for a meaningful cross-regional comparative study, data for *all* regions had to be available. These relevant regional incubator data are presented in standardized form in Table 2 (which is matrix *E* discussed below).

The data from this table demonstrate that, on average, peripheral regions score extremely low for

Table 1. The eighteen EC regions under study classified into peripheral areas and restructuring areas

Peripheral areas	Restructuring areas
Greece	Northern Ireland
Sicily	North (Cleveland, Durham, Cumbria,
Puglia	and Tyne and Wear)
Ireland	Yorkshire and Humberside
Midi-Pyrénées	Lorraine
Aquitaine	Luxembourg
Languedoc-Roussillon	Saarland
	Twente
	Liège
	Limburg (Netherlands)
	East-Flanders
	Nord-Pas-de-Calais

Table 2. The multiregional incubator profile matrix

Regions	Incubator elements										
	1	2	3	4	5	6	7	8	9	10	11
Peripheral regions	7	22	38	100	40	9	87	100	78	52	20
Greece	15	33	46	79	84	23	77	64	88	44	20
Sicily	16	36	31	80	79	21	77	67	89	46	13
Puglia	25	37	46	89	47	25	81	67	94	30	43
Ireland	29	41	15	82	72	49	87	50	84	84	34
Midi-Pyrénées	27	45	69	75	74	71	87	50	85	88	32
Aquitaine	15	47	61	75	68	52	87	50	89	100	29
Languedoc-Roussillon											
Restructuring regions											
Northern Ireland	30	35	23	74	24	11	99	64	89	31	39
North (Cleveland, Durham, Cumbria, and Tyne and Wear)	27	56	61	87	74	34	99	57	87	59	100
Yorkshire and Humberside	35	78	85	79	71	21	99	59	86	56	43
Lorraine	24	79	69	72	95	69	85	50	95	55	22
Luxembourg	38	80	0	67	100	53	87	48	96	99	11
Saarland	51	84	38	83	95	53	100	41	90	52	18
Twente	58	84	61	69	50	39	94	47	95	25	46
Liège	78	86	38	74	27	100	82	41	92	34	11
Limburg (Netherlands)	69	98	38	68	43	39	94	45	100	26	69
East-Flanders	100	99	31	74	79	46	82	43	93	50	20
Nord-Pas-de-Calais	40	100	100	70	97	16	87	51	94	44	24

Note: See text for definition of the incubator elements.
Source: ALSTERS and VAN DER MARK, 1986.

accessibility, centrality, urbanization, residential quality, energy cost advantages, availability of young labour force, and employment prospects. On the other hand, they appear to perform relatively well for the following incubator elements: institutional and policy climate; technical educational level; and cost advantages for labour. Furthermore, most restructuring areas appear to have high scores of accessibility, centrality, technical educational level, cost advantages for energy, and availability of young labour force, but low scores for urbanization, institutional and policy climate, residential quality, cost advantages for labour, employment prospects, and share of promising economic activities.

Correlation analysis has been used to test whether the outcomes for the eleven profile elements were strongly correlated. In general, these correlations appeared to be relatively low. In a few cases, however, there was a relatively high correlation, such as between accessibility and centrality (0·78). The latter result indicates that regions close to the European economic heartland enjoy a better infrastructure provision. The correlation between centrality and availability of young labour force (0·69) and centrality and low labour costs (0·72) was also quite high. The latter results are in agreement with the general geographical pattern in a European context, exhibiting a relative concentration of young employees and highly paid employees in large agglomerations.

From the point of view of individual countries, it is noteworthy that problem regions in the UK have a favourable incubator profile for institutional and

policy climate and for low labour costs. Technical education facilities appear to be well represented in French and Italian problem areas, while employment perspectives are relatively favourable in French and English regions. In terms of a high proportion of jobs in promising sectors, the English and Dutch problem areas are doing reasonably well. On the other hand, the poor accessibility of English problem areas is noteworthy. Finally, a relatively favourable residential climate is to be found in French and Belgian problem areas and in Luxembourg.

On the basis of the information from Table 2 it is now possible to assess an average (i.e. unweighted) regional incubator profile c_r $(r = 1, \ldots, 18)$ on the basis of equation (2). The results are presented in Table 3. These results only represent the overall incubator potential without regard to the specific relevance of these factors for any type of SME sub-sector (branch or class).

A first observation to make regarding Table 3 is that there is no absolutely dominant region with regard to *all* criteria separately; otherwise such a region would have had a (standardized) score of 100 for each profile element and hence for all criteria together. The overall picture from Table 3 is, however, very clear: peripheral regions score much worse than restructuring regions in terms of incubator potential. From the peripheral areas, only Aquitaine and Languedoc-Roussillon have a higher than average value for the incubator profile. On the other hand, from the restructuring areas only Northern Ireland is below average, but in this case one could even doubt whether

Table 3. Unweighted incubator profile of eighteen European regions

Values of incubator profile	
Greece	50
Sicily	52
Puglia	50
Ireland	53
Midi-Pyrénées	57
Aquitaine	64
Languedoc-Roussillon	61
Northern Ireland	47
North (Cleveland, Durham, Cumbria, and Tyne and Wear)	67
Yorkshire and Humberside	65
Lorraine	65
Luxembourg	62
Saarland	64
Twente	61
Liège	60
Limburg (Netherlands)	63
East-Flanders	65
Nord-Pas-de-Calais	66

Note: See equations (1) to (4) in text for the calculation of the incubator profile.

Northern Ireland is a typical case of a restructuring area or whether it also has many features of a peripheral area in a European context. In the next section, we will pay more attention to the specific role of the above mentioned incubator profiles for SMEs.

REGIONAL INCUBATOR PROFILES AND SOME CLASS PROFILES

It has been demonstrated that—in view of the diversity in the SME sector—a more appropriate analysis of the regional incubator potential for the SME sector would require the assessment of an SME class priority matrix *S*. In the framework of the present research project for the Common Market, this matrix has been gauged on the basis of expert assessment with participants from different countries and backgrounds. For each type of SME activity, a different priority may be attached to the incubator elements. For example, an export-oriented SME will attach a high value to infrastucture and accessibility, while an innovative and high-tech oriented SME will judge technical education facilities as very important. The results of this investigation are given in Table 4.

Using equation (3), the SME class weights can be multiplied by the corresponding incubator profile element to provide a weighted incubator profile for each region and each SME class. The results are presented in Table 5. The overall weighted incubator profile (see equation 4) is also included in Table 5.

Table 5 can be interpreted both horizontally and vertically. The vertical profiles provide a cross-section of a certain weighted incubator element across all regions. For instance, Table 5 shows that all restructuring areas (except Northern Ireland) have a relatively favourable (i.e. above average) incubator potential for the SME class of intermediate and export-oriented activities.

The horizontal profiles give a cross sectional picture of the incubator potential for each region. For example, the region Midi-Pyrénées has the most favourable incubator potential for the following SME classes: intermediate *and* innovation oriented, intermediate *and* high-tech oriented, intermediate *and* innovation *and* high-tech *and* export oriented; and intermediate *and* export *and* innovation oriented.

The final column of Table 5 represents the overall weighted average incubator profile of each region for SME activities. This result corresponds to a large extent with that of Table 3, although the variation is somewhat higher. The main conclusion from this column is evident: restructuring areas provide a higher incubator potential for SMEs than do peripheral areas. From the restructuring areas, only Liège, Luxembourg and Northern Ireland fall below aver-

Table 4. Expert assessment of SME class priorities

SME class	Incubator elements										
	1	2	3	4	5	6	7	8	9	10	11
i	0·2	0·03	0·3	0·03	0·1	0·04	0·04	0·1	0·1	0·04	0·02
ii	0·2	0·2	0·2	0·03	0·06	0·0	0·05	0·1	0·1	0·03	0·03
iii	0·2	0·2	0·1	0·06	0·1	0·02	0·04	0·04	0·1	0·04	0·1
iv	0·1	0·02	0·2	0·03	0·2	0·02	0·03	0·05	0·1	0·06	0·2
v	0·2	0·2	0·1	0·04	0·05	0·04	0·07	0·1	0·1	0·03	0·07
vi	0·1	0·1	0·09	0·06	0·2	0·0	0·04	0·1	0·1	0·1	0·1
vii	0·06	0·08	0·06	0·08	0·2	0·0	0·03	0·02	0·2	0·06	0·2
viii	0·08	0·03	0·1	0·1	0·2	0·1	0·06	0·08	0·1	0·04	0·1
ix	0·08	0·04	0·1	0·06	0·2	0·01	0·03	0·04	0·2	0·06	0·2
x	0·08	0·1	0·08	0·06	0·2	0·04	0·04	0·04	0·1	0·05	0·2
xi	0·2	0·1	0·2	0·05	0·08	0·03	0·08	0·1	0·1	0·0	0·05

Note: See text for definition of SME classes and incubator elements.
Source: Calculated from ALSTERS and VAN DER MARK, 1986.

Table 5. Weighted incubator profile for each SME class and each region

	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	Average
SME class												
Peripheral regions												
Greece	46	43	36	42	40	47	48	48	49	40	45	44
Sicily	51	47	43	52	43	53	57	55	58	50	49	51
Puglia	47	45	41	47	42	51	55	53	55	47	46	48
Ireland	49	48	43	46	46	45	52	48	53	44	50	48
Midi-Pyrénées	46	45	45	50	45	55	59	56	59	52	46	51
Aquitaine	64	56	51	61	52	59	62	63	64	57	58	59
Languedoc-Roussillon	58	53	48	58	49	58	61	59	62	54	53	56
Restructuring regions												
Northern Ireland	42	44	40	40	43	42	48	43	49	40	45	43
North (Cleveland, Durham, Cumbria, and Tyne and Wear)	61	60	60	72	58	66	77	67	77	70	62	66
Yorkshire and Humberside	68	69	61	66	62	64	67	62	69	62	67	65
Lorraine	65	63	58	63	59	63	67	66	68	61	62	63
Luxembourg	49	54	55	51	54	63	65	59	63	57	50	56
Saarland	60	63	61	58	61	63	66	64	66	61	62	62
Twente	63	67	62	58	63	57	63	57	64	57	65	61
Liège	59	63	58	45	63	49	51	54	52	48	61	55
Limburg (Netherlands)	58	68	67	58	67	59	67	58	67	61	65	64
East-Flanders	62	71	68	52	70	59	60	56	60	55	66	62
Nord-Pas-de-Calais	75	77	68	70	67	69	71	66	73	66	72	70

Note: See for definition of SME classes.

age, while from the peripheral regions only Aquitaine scores above average.

It is also possible to carry out a cluster analysis on the data contained in Table 5 in order to identify clusters of regions which are more or less similar in structure regarding the SME incubator profile. Here a non-hierarchical cluster procedure for identifying five clusters has been used. This procedure aims at identifying clusters of regions with a minimum intra-cluster homogeneity and a maximum inter-cluster homogeneity. It turns out that five fairly homogeneous clusters can be found. The following results are then obtained (Table 6).

Now it is easily seen on the basis of the data of Table 5 that the regions in cluster 1 from Table 6 have an above average incubator potential for all SME classes. Analogously, one may conclude that cluster 2 is mainly favourable for intermediate, innovation and high-tech activities; cluster 3 mainly for final-market and export oriented activities; cluster 4 (very moderately) for intermediate activities; and cluster 5 (very marginally) for intermediate and final-market oriented activities.

It is evident that the patterns from Tables 5 and 6 do not imply the policy conclusion that only the most favourable regions, in terms of SME incubator potential, should be supported. In terms of efficiency, it is no doubt true that the highest ranking restructuring areas could most easily benefit from their SME incubator potential, but in terms of equity the lowest ranking peripheral areas may also be given due attention. This is of course a matter of political trade-off, but in this respect it may also be wise to examine the broader growth perspectives of the regions concerned. This will be done in the next section.

Table 6. Results of a cluster analysis for regions on the basis of their SME incubator potential

Cluster	Regions
1	Saarland, Nord-Pas-de-Calais, Lorraine, North, Yorkshire
2	Aquitaine, Languedoc-Roussillon, Luxembourg
3	Limburg, Liège, East-Flanders, Twente
4	Midi-Pyrénées, Puglia, Sicily
5	Northern Ireland, Ireland, Greece

Note: This standard SPSS non-hierarchical clustering procedure uses the data from Table 5 in order to identify five mutually discriminating sets of regions on the basis of a variance criterion.

ANALYSIS OF REGIONAL GROWTH PERFORMANCE

It is interesting to examine whether a relationship between the regional incubator profile of SMEs and some regional growth indicators can be identified. In the context of our study, five different indicators are distinguished, based on average figures for the years 1980–85:

1. Change in gross regional product
2. Change in gross value added
3. Change in unemployment rate
4. Employment growth by main sector: industry and services

5. Employment share in secondary sector by size class: 1–9 employees; 10–49 employees; 50–499 employees; ⩾ 500 employees.

As it was difficult to find completely reliable data for all regions, the results of the growth performance are only presented in an indicative (i.e. binary way) in Table 7. The last column of this table represents the average (weighted) incubator profile (see Table 7), while the remaining columns represent the above mentioned indicators (1)–(5). The elements of columns 1, 2, 3, 7, 8, 9, 10 and 11 have the following meaning: a plus sign means 'more than the regional average', and a minus sign means 'less than the regional average'. For columns 4, 5 and 6 the plus and minus signs mean, respectively, growth and decline (in absolute terms) for each region concerned.

Table 7 offers various interesting results. The peripheral regions appear to perform reasonably well in terms of growth in gross regional product, change in unemployment rate and rise in industrial employment. These results contrast with restructuring areas which have, with few exceptions, a fairly poor performance regarding the indicators (1) to (4). It is

interesting to see that the service sector is increasing in both peripheral and restructuring areas.

Next, the development of the SME sector according to size classes deserves close attention. The share of industrial employment in small firms (1–9 employees) has a much higher growth rate in peripheral areas than in restructuring areas. However, for the remaining three size classes the restructuring areas appear to score much better (see also ABT-FORSCHUNG, 1984).

The overall results from Table 7 lead to the interesting conclusion that, despite the relatively low incubator potential, the peripheral areas have managed to achieve a relatively favourable growth in terms of regional product and value added, especially for the industrial and service sector. In this respect, small and medium-sized industrial activities appear to provide a relatively favourable performance for these areas concerned. The restructuring areas appear to score relatively higher in terms of a more rapid rise in employment rates, which may be caused by a large share of the service sector and in general of large scale firms.

Table 7. Growth performance indicators for eighteen regions

	Change in:			Employment growth by main sector (4)			Employment share in secondary sector by size (employees) (5)				Average incubator index (c_r)
	Gross regional product (1)	Gross value added (2)	Unemployment rate (3)	Agriculture	Industry	Services	1–9	10–49	50–499	500+	
Peripheral regions											
Greece	−	−	−	−	+	+	+	−	+		−
Sicily	+	+	−	−	+	+	−	+	+	−	−
Puglia	+	+	−	−	+	+	−	+	−	+	−
Ireland	+	+	−	−	+	+	+	+	+	−	−
Midi-Pyrénées	+	+	−	−	+	+	+	−	+	−	−
Aquitaine	−	+	−	−	+	−	+	−	+	−	+
Languedoc-Roussillon	+	−	−	−	+	+	+	−	−	−	−
Restructuring regions											
Northern Ireland	+	+	+	−	−	+	−	+	−	+	−
North (Cleveland, Durham, Cumbria, and Tyne and Wear)	+	+	+	−	−	−	−	+	−	+	+
Yorkshire and Humberside	+	+	+	−	−	−	−	+	−	+	+
Lorraine	−	−	−	−	−	−	+	−	+	−	+
Luxembourg	−	−	+	−	+	+	−	+	+	+	−
Saarland	−	−	−	−	+	+	−	−	+	−	+
Twente	−	−	+	−	−	+	+	−	+	−	+
Liège	−	−	−	−	−	+	+	+	−	+	−
Limburg (Netherlands)	−	−	+	−	−	+	−	+	+	−	+
East-Flanders	−	−	−	−	−	+	+	+	−	+	+
Nord-Pas-de-Calais	−	−	−	−	−	−	−	+	−	+	+

Source: Calculated from ALSTERS and VAN DER MARK, 1986.

CONCLUSION

This paper dealt with the question of how, in the light of the current industrial restructuring and its accompanying technological innovation, certain European problem regions may be able to revitalize themselves.

In the light of the specific incubator profile of these regions, the major question is whether the indigenous development potential can be improved by favouring the SME seedbed conditions. In the methodological part of our approach, a multi-dimensional regional supply profile was proposed that could provide insight into favourable seedbed conditions for new economic activities (i.e. birth of new firms and accelerated growth of existing firms)—the so-called multi-dimensional regional incubator profile for SMEs. It was also claimed that the SME sector is far from uniform and, therefore, within the heterogeneous SME sector various classes (or branches) were distinguished. Each type of the selected SME categories was expected to attain different degrees of importance (or weights) to the successive incubator elements (i.e. the locational seedbed conditions for a certain SME activity).

This exercise has been carried out for eighteen European problem regions: seven peripheral regions (mostly located in the Southern part of Europe) and eleven restructuring regions. Two types of information are provided by this exercise:

1. The incubator scores for each criterion and each region (e.g. the relative importance of the technical educational level per region), and the overall incubator score of all eleven criteria for each individual region (viz. an index indicating whether a certain region has an overall favourable availability of seedbed factors, or incubator elements, such as the technical educational level, locational centrality and so on).
2. The weighted regional incubator score for all eleven criteria (weighted by a specific type, or branch of SME) together (i.e. the weighted regional sum of seedbed factors or incubator elements).

On average, one may conclude that *peripheral* regions score worse than restructuring regions in terms of incubator potential. Only Aquitaine and Languedoc-Rousillon have a higher than average value for the incubator profile. From the *restructuring* areas only Northern Ireland is below the European average, but this region also has many features of a peripheral area.

The overall weighted average regional incubator profile for all selected SME sectors showed a higher incubator potential for restructuring areas than for peripheral areas. Exceptions among the restructuring areas are Liège, Luxembourg and Northern Ireland, whereas for the peripheral regions Aquitaine scores above average.

One conclusion based on the results of this exercise and on the efficiency-equity options of regional policy seems clear: the best regional incubator profile for SMEs is to be found in the restructuring areas.

However, socio-economic dynamics of these regions in recent years shows relatively strong positive development tendencies for peripheral regions, in which relatively strongly SME-dominated economies exist despite a lower regional incubator potential. Consequently, an important policy implication of our research results seems to be a strategy that favours SMEs (mostly present in Europe's periphery, but also elsewhere) not in contrast to but as a complement to large firms (mostly present in the restructuring regions). Such a policy seems to be plausible, especially in view of the expected increase on intermediate supply and subcontracting. This conclusion was—from a different analytical angle—also reached by ZEGVELD and ROTHWELL, 1985. A necessary condition for such potential growth cells to boost the peripheral economies is a forging of links between SMEs and large companies. In this connection the European Commission has rightly stressed the absolute necessity of narrowing the current peripheral 'information and co-operation gap' so that these areas become more closely *integrated* in the economic development pattern of Europe. This kind of policy strategy is also in close agreement with the already mentioned more software-oriented, new regional policy for SMEs (see also BURGHELLE-VERNET, 1985).

Such a policy appears to be essential if the internal market is to be achieved by 1992. The development areas in Southern Europe could then produce new local dynamics which would ultimately benefit the economies of the more central regions as well. In this context, the establishment of decentralized technology and information transfer centres, which are tailor-made with respect to the specific needs of a diversity of SMEs (including data banks, market information etc.) would be a necessary condition to cope with the negative elements of regional incubator profiles inherent in an unfavourable geographical location.

REFERENCES

ABT-FORSCHUNG (1984) Employment in small and medium-sized establishments; comparative analysis for the EEC-regions, Final Report, ABT-Forschung, Bonn.
ALCANTARA B., ALTINCK T., CARRE D., DE BANDT O., LEMETTRE J. F., NICHON-ALTINCK C. and RONCIN A. (1984) L'analyse démographique des petites et moyennes entreprises dans les pays de la Communauté Européenne, Institut de Recherche en l'Économie de la Production, Nanterre.

ALSTERS T. F. A. and VAN DER MARK R. C. (1986) Giving way or putting up? The development potential of small and medium-sized industrial enterprises: a comparative analysis of structurally less developed areas in the European Community, report no. XVI/109/86, Commission of the European Communities, Brussels.

ARMSTRONG H. and TAYLOR J. (1986) *Regional Economics and Policy*. Philip Allan, Oxford.

BAROIN C. P. A. and FRACHEBOUD P. (1982) La contribution des petites et moyennes enterprises à l'emplois en Europe, Centre de Recherche Travail et Société, Paris.

BIRCH D. L. (1979) *The Job Generation Process*. MIT Program on Neighbourhood and Regional Change, Cambridge, MA.

BLUESTONE B. and HARRISON B. (1982) *Deindustrialisation of America*. Basic Books, New York.

BURGHELLE-VERNET P. (1985) La mobilisation du potentiel endogène et l'esprit des mesures dites 'software', DG XVI, Commission of the European Communities, Brussels.

COMMISSION OF THE EUROPEAN COMMUNITY (1984) Européenne, Livre blanc de l'année européenne des petites et moyennes entreprises et de l'artisanat, conclusions of ten conferences organized by the National Committees Brussels.

DAVELAAR E. J. and NIJKAMP P. (1986) The incubator hypothesis: revitalisation of metropolitan areas?, Research Memorandum 86–47, Department of Economics, Free University, Amsterdam.

GERSHUNY J. and MILES I. (1983) *The New Service Economy*. Frances Pinter, London.

GIAOUTZI M., NIJKAMP P. and STOREY D. (1988) *Small and Medium Sized Enterprises and Regional Development*. Croom Helm, London.

KEEBLE D. and WEVER E. (eds.) (1986) *New Firms and Regional Development in Europe*. Croom Helm, London.

MEYER-KRAHMER F. (1985) Innovation behaviour and regional indigenous potential, *Reg. Studies* **19**, 523–34.

NIJKAMP P. (1987) Revitalisation of regional resources, in GIAOUTZI M., NIJKAMP P. and STOREY D. (eds.) *Small and Medium Sized Enterprises and Regional Development*. Croom Helm, London.

OECD (1985) Project on the stimulation of indigenous regional economic potential, OECD, Paris.

PEDERSEN P. O. (1986) The role of business services in Regional Development—a new growth centre strategy, *Scand. Housing Plann. Res.* **3**, 167–82.

PIATIER A. (1984) *Barriers to Innovation*. Frances Pinter, London.

ROBERT J. (1982) Mobilising the indigenous potential of disadvantaged regions: a new dimension of regional planning, European Regional Planning Study Series no. 40, Council of Europe, Strasbourg.

STOREY D. J. (1982) *Entrepreneurship and the New Firm*. Croom Helm, London.

STOREY D. J. (1983) *The Small Firm: An International Survey*. Croom Helm, London.

STOREY D. J. and JOHNSTON S. (1987) *Job Generation and Labour Market Change*. Macmillan, London.

VON DEWALL F. A., KROEZEN C. W., SCHMIDT R. J. and VALK C. (1985) De Relatie tussen Grote en Kleine Bedrijven in de Industrie, Nederlandse Middenstands Bank, Amsterdam.

WETTMANN R. W. and CICIOTTI E. (1981) Die Moblisierung des Endogenen Potentials, DG XVI, Commission of the European Communities, Brussels.

WEVER E. (1984) *Nieuwe Bedrijven in Nederland*. Van Gorcum, Assen.

ZEGVELD W. and ROTHWELL R. (1985) *Herindustrialisatie en Technologie*. SMO, The Hague.