



## **Forecasting and regional competencies**

### **- A note on forecasting in relation to identification and use of data on regional key competencies.**

#### **1. Forecasting in general**

*Background and perceived suitability of forecasting.*

Initially a few overview notes will be listed about the background and ambition of forecasting. The relevance of this for identification of regional key competencies will be treated below. Forecasting may be used for a range of different purposes. One purpose may be to get a description of the most likely development, - a crystal bowl. Another may be to forecast not so much to predict but rather to isolate key factors that drive the system. Forecasting particularly at a regional level is sometimes used to give an impression of likely effects of policy initiatives on production, income and labor markets. Finally forecasting may be used in the context of this project for isolating key aspects of the development of competencies in learning clusters. This may help focus initiatives of regional industry policy better. In the following text three of these approaches will be dealt with. The three approaches are forecasting for prediction, forecasting of the effects of policy initiatives on regional industry development and finally forecasting of the development of competencies in a region.

#### **2. Forecasting for prediction.**

The idea of forecasting particularly for prediction and especially for stabilization policy but also for growth had its prime time in the late nineteen sixties and early nineteen seventies with the development of extensive and almost unchallenged models for the purpose. The resulting forecasts were assumed to be very good descriptions of the most likely development 1-2 years ahead. If you were able to predict the development and if the behavior of the economic agents of the society were to some extent predictable, you could have a political ambition of choosing the best policy mix to secure stable, balanced growth at a high rate.

At a formal level forecasting meant distinguishing four sets of variables: controlled, uncontrolled, target and others. Using a mathematical description of the system and using statistical (econometric) techniques you could determine the relationship between these four types of variables. If the system is deterministic then certain values for controlled and uncontrolled variables would most likely lead to certain values for target and non target variables. If some of the controlled variables represents political instruments you would then seek to choose the levels for these instruments that are expected to provide the best possible development of the economy according to political objectives, as represented by levels of target variables.

During the seventies the optimism of using such predictive forecasting for policy design faded due to changes brought along by two major events, the inflation following the oil crisis and the development of theories of rational expectations. The minor of these obstacles was the oil crisis, which created major and unexpected inaccuracies in the predictions. The remedies to this problem were however soon found, or rather rediscovered from previous theory, so this was only a temporary obstacle. The major obstacle was the emergence of a new theoretical description of expectations. This meant that the whole attitude and the ambition of using forecasting for policy design were threatened. The fact that agents in the economy were not passively adapting to changes



in the system in an almost deterministic way but rather foreseeing the changes and reacting strategically (rationally) to events not yet experienced changed the way forecasting systems were used. It also led to a quite different focus. The focus of the previous models was on fine tuning of demand, while the new attitude suggested that more focus should be put on general supply conditions and structural aspects, e.g. labor market mobility.

This is why policy has changed so that the structural conditions for business development now are much more at the top of the agenda. One of the conditions being investigated is the general environment which companies with growth potential operate in. In a traditional economy with manufacturing industry cost competition was in focus and the presence of competitors locally was seen as a disadvantage. With a change to knowledge based production and reductions in transport costs the presence of companies belonging to the same sector is now seen as an advantage, i.e. something to support. Technically this is named external economies, since the cost of the individual company is reduced by the presence of favorable external conditions. Thus public support for industry development now is linked with the identification of such clusters of related activity which appear to be founded on long term development of specialized knowledge, named key competencies.

### 3. Forecasting of regional industry development

Along with the development of instruments for short term forecasting of business activity for stabilization purposes other instruments for prediction of the development of industry sectors and inter industry relationships progressed and are now main stream tools for analysis of the economic development and the suitability of applied policy tools.

These tools have a focus on consistent economic behavior. The behavior of consumers, producers, the public sector and other agents in the economy are described and constraints such as budgets are added. Based on strict assumptions of behavior clear cut results may be obtained. These results often are used as guidelines for the principles of applied industry policy. The results also clearly influence international negotiations on matters such as trade policy. The choice of focus in industry policy gradually changed from stabilization to the structural aspects of industry development.

One structural aspect of the potential for growth obviously is the industry structure. Therefore most of these models contain some sort of inter industry relationship. Some even carry a full economy wide and detailed input output sector sub model. In the tradition of the Norwegian economist Leif Johansen, who developed the first such full scale and detailed general equilibrium model in 1959, such models are called Multisector Growth Models and later Computable General Equilibrium models. Regional versions of these models are available for analysis of regional development issues.

In the work of the OECD on cluster identification the use of inter industry tables is also one of the suggested tools. This tool may provide an overview of interrelated business activities. Natural candidates for competence clusters usually share suppliers of inputs. Therefore it is to be expected that inter industry relationships are dense in such clusters. Therefore by analyzing inter industry linkages in a suitable table it is possible to get an indication of likely cluster patterns as a supplement to inspection through interviews.

When regions want a forecast of the likely effect of policy initiatives such as investment projects on the regional income tax generation and employment models with an inter





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industry module often can be used. To use it at the regional rather than national level some adjustments have to be made.

It is interesting that the adjustments procedure shares some of the elements of identification of key competencies. The adjustment uses so called localization coefficients and cross industry coefficients. The localization coefficients are the same as the localization coefficients used in identifying local competencies. Localisation coefficients are numbers that show if an industry is over represented in a certain location compared to its representation at the national level. An industry which is over represented is likely to contain a cluster of competence. At the same time an industry which is over represented will have more capacity to supply the other local industries with inputs. Therefore when studying inter industry supply it is natural to use the information from localization coefficients to correct the coefficients in the inter industry description. This is what is done in practice.

The method implies that the technical coefficients for domestic supply to the other industry sectors and to final demand are split in a regional coefficient and a coefficient for supply from other domestic regions. The calculation of the regional coefficient is based on the localisation coefficients, which show the regional industry share of the total production compared to the same industry share at the national level. Beside localisation coefficients so called cross industry coefficients, which for deliveries from one sector to another compare the supplying sectors position in the regional economy with the receiving sectors position. If the supplying sector is relatively small in the region while the receiving sector is large, a larger part of the deliveries must come from other regions or from foreign sources. The input output coefficients are adjusted accordingly.

In peripheral regions such as the area in the southern part of Jutland the primary and secondary manufacturing industries are typically well represented, while the tertiary service sectors as a rule are less well represented. This has consequences for the detailed inter industry structure linkages of the model. For the computations it means that when output from the service sectors are used, they will be supplied to a higher extent from other regions while output from the manufacturing sectors are supplied mainly from local sources, since these sectors are well represented in the region.

Calculations of the change in employment and income due to a physical investment project may show by how much employment and income potentially will increase. If the region is competitive and has a sufficient capacity in the industries that are to supply to the project, growth in employment will follow, provided that the necessary workforce is available or can be attracted from other regions. If not, the investment project may just cause a reduction in other activities. Typically a region of the kind in focus in this project fortunately is well represented in the industries that are to deliver to a physical investment projects. Projects with more focus on services may have more problems in supplying form local sources.

A specific calculation involves the following steps: First the increase in activity, which the project directly causes, is calculated. This is done by looking at the cost items and considering these as expenditures for goods and services bought from the relevant business sectors. Then indirect effects are calculated based on inter industry relationships. The third step is to compute the effect of increased income spent on consumer commodities. Based on these calculations employment and tax generation may be calculated if requested. Other aspects such as environmental effects will be in focus from time to time.

The studies of regional development often shows that peripheral regions have a disadvantage in their industry structure for the present globalisation process. As





described above localisation coefficient show that the sectors with an over representation are typically primary and secondary sectors. At the same time the secondary sectors are the sectors most likely to be challenged by globalisation. Further the tertiary sectors which have higher growth are under represented and growth in these sectors is not likely in periferal regions since they depend on learning capacity and clusters which tend to prefer to locate in the central parts of the economy. There is thus a particular issue in the periferality as a challenge to development in regions. This has been known before the present global liberalisation process took off. The Biomes project of the South West of England was particularly interesting in this respect since its focus and employment generation are in sectors not very well represented in typical periferal regions and therefore the more attractive.

### *Periferality and development.*

In general reductions in transport and trade costs tend to further agglomeration and centralisation of business activity, whereas increased transport and trade costs tend to benefit dispersion of production in regions. Fujita et al (1999). The present globalisation process may be seen as a representation of this.

Lessons on the effects of the present liberalisation process in the global economy may be drawn from studies of the EU integration process through the 1990ties. In EU European Economy 1990 there were considerations on the effects of the integration process in Europe, the single market and EMU. There were also a reference to an index of periferality. The index for the area of the county of Ribe was 74. The contour line through Europe for this index also crossed the Scottish border, the western part of Cornwall, through southern France and through central Italy. The effects of the single market and EMU processes were expected to be parallel. "As far as the EC is concerned the construction of economic union and monetary union will be parallel." The expected effects of this process are described in the following citation:

"The neoclassical view is that the process of integration would cause the reallocation of production with resources moving from region to region. This would lead to the adjustment of factor costs and changes in regional disparities. However, the experience at the member state and international levels suggests that the process of market integration would probably exacerbate regional disparities by benefiting more the core regions of the community and the centrally located agglomerations. The internal market may favour structural change in large enterprises located in a smaller number of places where cost reductions and scale savings are used to the best advantage." Hitiris 1994 p.235, Further elaborated in the text.

Foreseeing this effect and not accepting it to impede the integration process, the EC took steps to double structural funds from 1988. The present global integration process is a process in which there is no comparable involvement of structural funds. Regions therefore are left on their own if globalisation requires structural adjustments.

A similar view as the above by Hitiris is expressed in Nello (2005). Evidence from recent research suggests that the regional disparities in EU is narrowed down between countries but increases within countries i.e. between regions. The latter is also confirmed in a Danish Study. Norstrand and A. Kaag (2001).

## **4. Forecasting of competence development**



The use of knowledge on Clusters of competence in the development of a local business development strategy.

This section deals shortly with a more qualitative forecast of the development of clusters of competence with the purpose of assessing its suitability for use in a local business development strategy. It is therefore the purpose to use the particular parts of the theory which have relevance in terms of its use for revealing how knowledge on clusters can be used practically at the regional and local level. The section is written on the basis of international trade theory, economic geography, OECD reports on cluster analysis and on learning in addition to papers by M Lorenzen and P. Maskell who also participated in the work for the OECD reports on the matter.

Often the approach of clusters of competence has been used in national industry policy thinking, e.g. in analysis of national competitiveness and export performance. Since the Regional Key Competencies project deals with possibilities at the regional and local levels it was chosen to focus on those parts of the theory which are particularly relevant in the regional setting: What can you do and what is not likely to result in success if you use the competence cluster approach as a basis for development of a pro-active regional strategy? If you can clarify what is not likely to result in success hopefully you can focus the effort on initiatives which have proved more productive.

### *Basis*

The departure for the cluster of competencies approach often is stated to be the Marshallian industrial districts. The success of these districts was ascribed by economists to the presence of external economies. As mentioned above these arise wherever the costs of a firm are reduced if other similar companies are close by so that it is possible to share certain suppliers of specialized inputs. Each individual company in the localized industry gains from this sharing of suppliers and other facilities with other companies in the industry. It is not the size of the individual firm that brings lower costs but the size of the total industry in the local area. A company in the particular industry will gain an advantage by moving close to the other similar companies in the industry. Technically factor prices of a firm are lower if the firm locates within the cluster than if it locates at a distance from the cluster. Firms may share suppliers, certain resources such as skilled labour and infrastructure. Infrastructure obviously may include organizational as well as physical infrastructure. Some forms of public service such as training facilities may also be shared by members of the cluster.

You may say that knowledge of the clusters constitutes the static basis for the clusters and therefore may still enter into the approach as a kernel, even though other more dynamic explanations were added later. When looking at Ribe county, Liege and probably also areas in Cornwall, however the infrastructure which a set of companies draw upon are not related to clusters as much as to a more traditional resource based explanation. The regions have through natural conditions and public investments gained resource based production in the first place. Later perhaps, clusters of suppliers and users were attracted.

A cluster by nature is not based on local resources as such and could therefore be situated in any other place. This flexibility in the positive sense and sensitivity in the negative of clusters in their pure form means that local communities with clusters may be threatened if the cluster suddenly is moved to another location since location is important but not a specific location. Workers in car manufacturing clusters have felt this. On the other hand there is a first mover advantage of a local cluster competitive strategy. At the same time as soon as the production in the cluster passes from the innovative phase to a more routine production stadium there is no rationale of keeping the production in the



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cluster. Therefore continual shelling of production is a condition for continued success of the cluster. Production in clusters therefore are characterized by short life span and routine outsourcing of production in later stages of the product cycle.

## *Competence og learning*

Another aspect of competence clusters which has gained importance are theories of learning. Here formally unit costs drop as the accumulated production. It is thus not the annual production level which is important but the total production over several years, since it takes time to learn how to reduce costs. The more units you have produced over time the lower costs per unit are. Part of this learning is available for all. As an example some Asiatic countries were able to narrow the difference in the education level and thereby take over production of products with advanced technology. Part of the learning however it is not possible to imitate outside the cluster since it is tied to the internal function of the cluster. Obviously it is this part which is attractive since it constitutes the foundation of the continuation of the competitiveness of the cluster. It is said in this connection that the advantage of the cluster consists in a complex pattern of daily routines and practice gained through a long term learning process which is created more efficiently by belonging to a cluster. The reason may be that you are in interaction with suppliers which learn and from whom you may learn. The reason may also be that the firms have access to a labor force which has better access to learning and which can adapt quicker to new conditions.

## *Coordination and social capital.*

In a wider perspective importance is attached to social capital as an explanation to the ability of a cluster to remain competitive. It is said that what particularly constitutes the basis of success of clusters is that they represent a condensation of coordinated economic competence and activity. The firms are integrated in supply chains with attached labor force and cooperation with private and public institutions. It is the interaction in these local networks which creates the ability to learn. Therefore it is more adequate to talk about interaction and cooperation while still competing at the same time. So learning is promoted both by being close to competitors and at the same time cooperating on solutions to common problems, and in an interplay between private companies and public institutions.

An important aspect in terms of using the clusters approach in active industry policy is that the typical situation is that the ability to coordinate is created through a long term bottom up process. It is therefore difficult to start the coordination process from the top. Companies work together in daily activities building routines and knowledge of each other. This knowledge can facilitate the solution of problems in the production in a more efficient way than they would be able to do if they were far from each other. The knowledge therefore is a collective competence, which you may call social capital. Contrary to what is often expressed concerning clusters there is no easy bet on the winners approach for previously appointed winners. In stead it may be better to put funding on providing conditions so that the those which may in the future show to be winners will have as good as possible conditions for taking advantage of the clusters and thereby growing. The clusters are dynamic and you cannot ex ante determine which companies will be winners in the game of competition that goes on..

What characterizes successful clusters is that they are good at adapting to changed market conditions and good at coordinating own activities as well as the activity which is demanded by private and public institutions in interaction with the cluster.





## 5. Conclusions regarding development of competencies and regional practice.

Based on this one can attempt to give a suggestion as to what may be extracted from cluster theory for proactive intervention

1. Since the companies that are part of the cluster are small dynamic companies the market in itself is an efficient instrument for pointing out which are the winners. The market conditions are typically quite dynamic in markets where clusters are important. It will therefore be difficult to determine who will be surviving and growing. It is therefore not so important on beforehand to try to identify who are strong in competition. It may be better to focus on supporting the conditions that makes the cluster function well.

2. The strength of the cluster is based on its coordination and learning and that it can adapt and change fast, i.e. what could be supported are activities that make it easier to coordinate and easier to learn

3. Coordination has appeared through a bottom up process and is therefore best supported by respecting and supporting the routines in this field. There is already a lot of coordination and this coordination can be supported by focusing on what makes coordination a key function in the clusters (know how, know who and confidence building in addition to the formation of cultural bridges).

4. You may further the incentives for coordination by demanding cooperation between companies when they ask for public service.

5. You may further knowledge which may be transferred between different business environments

6. You may focus on the agents who have experience in contacts between the environments and on institutional arrangements and meetings where there is cross over interaction. From there you may then extract experience with the elements of coordination.

7. You may support learning processes and knowledge of organizational conditions for unions, clubs etc. How you build organizational units, how organizations function through the set of formal rules etc. This may be useful in civic society as well as in business companies and may be transferred both ways between these two during the process of building social competences. A point of strength for rural societies often are that they contain a rich set of clubs and other organizations which use democratic rules of game at least in principle.

8. From knowledge of the business development in the USA there is indication that the most dynamic environments are characterized by inter cultural interaction. To build creative environments therefore may be associated with building cultural bridges

9. Knowledge of how externalities work may provide a guideline for when intervention is advisable and when the market functions as the best allocation mechanism. Where there are possibilities in creating positive externalities – or reduce negative – intervention is suggestable while in it is not if such externalities or market failures are not present. This goes for so called public goods as well.

10. It is necessary in cases where clusters are relevant to focus attention on production of the kind where cost minimization is not the central competitive strategy





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