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An interaction-cost approach on cross-border cooperation. The case of Mid-Scandinavia

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An interaction-cost approach on cross-border co-operation: The case of Mid-Scandinavia.

Paper prepared for the 39th European Congress of the Regional
Science Association, Dublin, Ireland, August, 22-27, 1999.

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ABSTRACT:

The paper presents an analysis of factors generating interaction costs and these factors are grouped after their potential for change, from a group of rapidly changing technical-logistical factors to a group of very slowly changing geographical and biological factors. In the empirical analysis these interaction-cost generating factors are applied on Mid-Scandinavia, i.e. the central parts of Sweden and Norway. Some of the conclusions are that Mid-Scandinavia has many factors promoting an increased interaction (common culture, similar language, high level of economic development, etc) but that low population density affects diversity and thus sets a limit to potential fields of interaction. The paper ends with a hypothesis for further research, saying that the European cross-border cooperation can be divided in three levels: a) A small number of frontier regions with large populations and separated by natural geographical obstacles can receive powerful dynamic impulses via a bridge or tunnel. b) A number of border regions in the most densely populated parts of the EU may, despite the language problem, come to be developed into integrated labour market regions. c) The majority of border regions, like Mid-Scandinavia, will probably experience considerably more expansion of exchange in global networks than intensification of their internal integration.

1. Introduction

During the 1990s research on borders and border regions has been one of the fastest-growing topics at European regional research conferences. Generally speaking boundaries may be said to have two distinct effects. On the one hand they restrict the various network flows in one or more directions, which has an inhibiting effect on economic and other interaction across the boundaries (Karlsson, 1994). Every discontinuity in the various flows therefore indicates the presence of a boundary (Nijkamp, Rietveld & Salomon, 1990). In Figure 1 and 2, the continuous line shows how the intensity of interaction, which normally diminishes continually with distance, is sharply reduced by the presence of a boundary.

Figure 1. Example of how the boundary increases interaction intensity in a demarcated area (left-hand part of the continuous line) compared with interaction intensity in the same area without a boundary (dashed line)

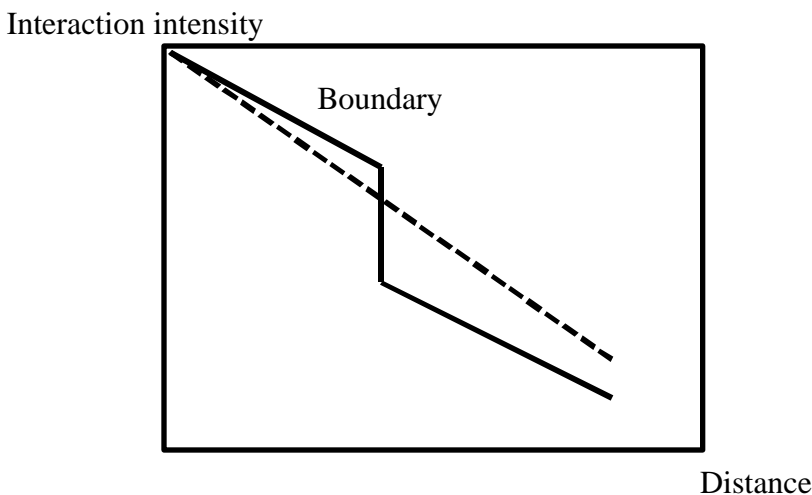
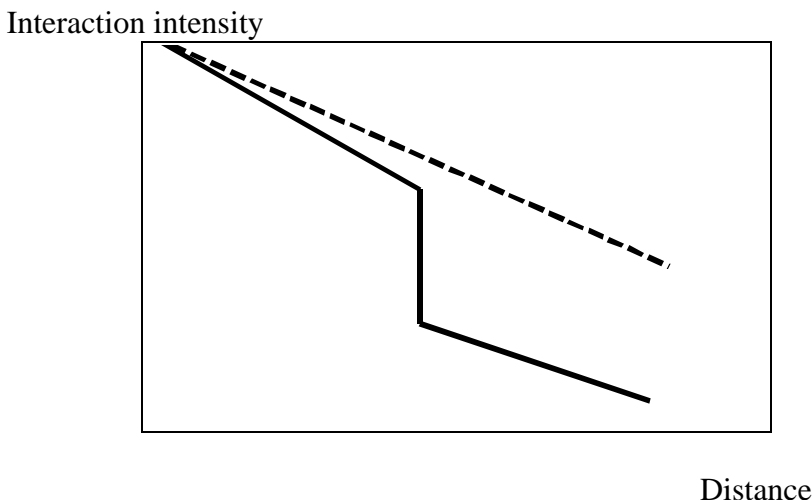


Figure 2. Example of how the boundary has such an inhibiting effect on (potential) network flows that the interaction intensity in a demarcated area (left-hand part of the continuous line) is lower than it would be without a boundary (dashed line).



If boundaries restrict network flows in this way, causing discontinuities in them at a certain point, it can be argued on the other hand that in many cases boundaries *increase* network flows *within* the zone that includes the boundary and that this effect will be stronger the more and "higher" the boundary-obstacles marked by the boundary. One reason may be that the boundary conduces to low, equalised interaction costs within the area so demarcated. Another reason may be that if cross-boundary links of a (potential) network are restricted or do not come into existence at all, the pressure on other links, within the area so marked off, becomes greater. However, this presupposes that the aggregate interaction within the network is unchanged or at any rate not repressed so severely by the boundary that the flows within the demarcated area are less than they would be without the boundary. Figure 1 and 2 shows these two types of case graphically.

From this perspective the intensified drive for integration which has characterised the EU since the middle of the 1980s can be described as resulting from a shift of perception on the part of member countries, so that, having previously judged their situation to correspond to Figure 1, they now consider it to be more in accordance with Figure 2. The reason for this change of attitude is probably to be found in the profound social changes which have characterised the Western world since 1970, with increasing internationalisation, forced on by new technology and coinciding with a severe decline of the nationally-linked parts of the industrial sector. Whereas national borders had formerly been thought to be means of stable national growth, during the 1980s they came to be perceived increasingly as preservers of stagnation and hindrances to improved competitiveness in international markets. In step with this change of attitude, the dismantling of border obstacles has been regarded as a method of making possible what Dahmén (1970) calls "new combinations of factors of production" and, not least, of generating productivity profits as a consequence of increased competition (cf. e.g. Cecchini, 1988).

Based on an analysis of factors that generate interaction costs in and between networks and these factors' potential for change, the aim of this paper is to analyse the potential for and obstacles to cross-border cooperation in one of the European border regions, viz Mid-Scandinavia, the central parts of Norway and Sweden.

Section 2 defines two distinct types of collaboration over borders: interaction on a wide area of fields between neighbour regions and specified network interaction between regions, which not necessarily are adjacent to each other. Section 3 defines the concept of interaction costs and presents the theoretical framework for the empirical analysis: a scheme of factors, which generate interaction-costs in and between networks and these factors' potential for change. In section 4 an empirical analysis of the opportunities for and obstacles to cross-border interaction in the case of Mid-Scandinavia is carried out. Section 5 contains some concluding remarks on the results and based on them, a hypothesis about developmental tendencies at work among the European border regions.

2. Border-regional cooperation *versus* network cooperation

Border-regional cooperation in Europe is not a new phenomenon, but it is plain that a dramatic increase, both qualitatively and quantitatively, has taken place in it during the 1990s. This applies both to co-operation within the European Union and to projects across the Union's external border. The driving forces behind these forms of collaboration have been both economic and political.

Another form of collaboration has increased very vigorously alongside border-regional interaction, viz. *networks between regions* which do not adjoin one another but may be located in entirely different parts of Europe. By comparison with interaction between border regions, network cooperation may be concentrated on fewer issues, perhaps only a single one (Westlund & Johansson, 1997).

The two forms of cooperation are reflections of the influence of space on human activities. The interaction between regions on different sides of national borders which at present is enjoying strong growth is a variant of the interaction which also occurs between neighbouring regions within a country and which, historically speaking, led to the enlargement of functional regions and to amalgamation of several regions into one. It is improved transport facilities, along with the dismantling of administrative border obstacles, that have made this process possible in the countries concerned, caused the towns to enlarge their trading areas, and united large expanses of these trading areas with the town to form functional urban regions. The spatial interaction between town and country has changed step by step into spatial integration - an integration founded on spatial enlargement of the influence of towns and embracing both economic, social and cultural conditions.

Interaction in networks is based on factors other than spatial proximity (See Johansson, Karlsson and Westin 1994). To begin with, networks are often constructed only for cooperation centred upon one or a few specific functions. This - sometimes extreme - specialisation makes the networks independent of distance to a certain extent and constitutes the explanation of the fact that their links may connect nodes far distant from one another. At the same time this network specialisation implies a large measure of uncertainty as regards continuity, in comparison with the numerous wide areas of cooperation which often characterise the interaction between regions in close proximity to one another. Networks are dissolved and re-formed, while the functional regions exhibit considerable inertia and as a rule are changed only in accordance with long-term trends.

This distinction, between extensive interaction of neighbouring/border regions with one another on the one hand and specialised network cooperation between spatially separate nodes on the other, may be regarded as a basic starting point for elaboration of the regional development strategies which, in principle, stand on the agenda for every European region. Cooperation between neighbouring regions - in the same country or on opposite sides of a national border - requires one type of strategy and poses certain vital questions. Network interaction between spatially separate regions requires quite a different strategy and puts quite different questions at the top of the agenda. In the former case it is often a matter of fostering a broad spectrum of cooperation in different areas whose growth in the long run leads to *integration* of the regions in functional respects. In the latter case, cooperation in so many areas of activity that a functionally integrated region emerges is inconceivable. A deliberate strategy of encouraging network interaction between spatially separate regions

ought therefore to be focused on a few relatively distance-independent spheres of cooperation in order to be fruitful.

The distinction between neighbouring/border regions and spatially separate regions may be thought simple in theory. In practice, however, problems of definition may arise which crucially affect the choice of strategy. For natural geographical or other reasons, two (or more) regions adjoining one another may have their population centres at a proper distance from one another while the zone around the border is virtually uninhabited. In such a case are the prerequisites in place for the broad cooperation which is possible in densely populated border areas, or should a strategy for network cooperation between the distance-separated urban regions be selected? Section 4 illuminates this question in the case of Mid-Scandinavia.

3. Interaction costs as a measure of the importance of border obstacles

According to economic terminology, all activities are associated with some kind of cost. Borders may be said to mark special types of costs which have effects on the extent of interaction across borders.

The definitions of different types of cost concept are far from uniform. *Transaction cost* is a term frequently used to denote those costs which are not directly linked to production (cf. e.g. Andersson, 1995). However, there are many contexts in which the concept of transaction costs is kept distinct from *transport costs*, being reserved mainly for negotiation and contract costs. *Transfer costs* are usually defined as the sum of transaction costs and transport costs, thus being distinguished from *production and development costs*. The sum of transfer, production and development costs has been denominated as *supply costs* by Johansson and Westin (1994).

In a strict economic analysis these are relevant and serviceable definitions. However, in an analysis which also embraces non-economic aspects of border-regional cooperation, a more general expression than supply costs ought to be used. Since exchange in various forms can be summed up in the expression interaction, the term *interaction costs* is proposed here as a summarising term for costs associated with cross-border cooperation.

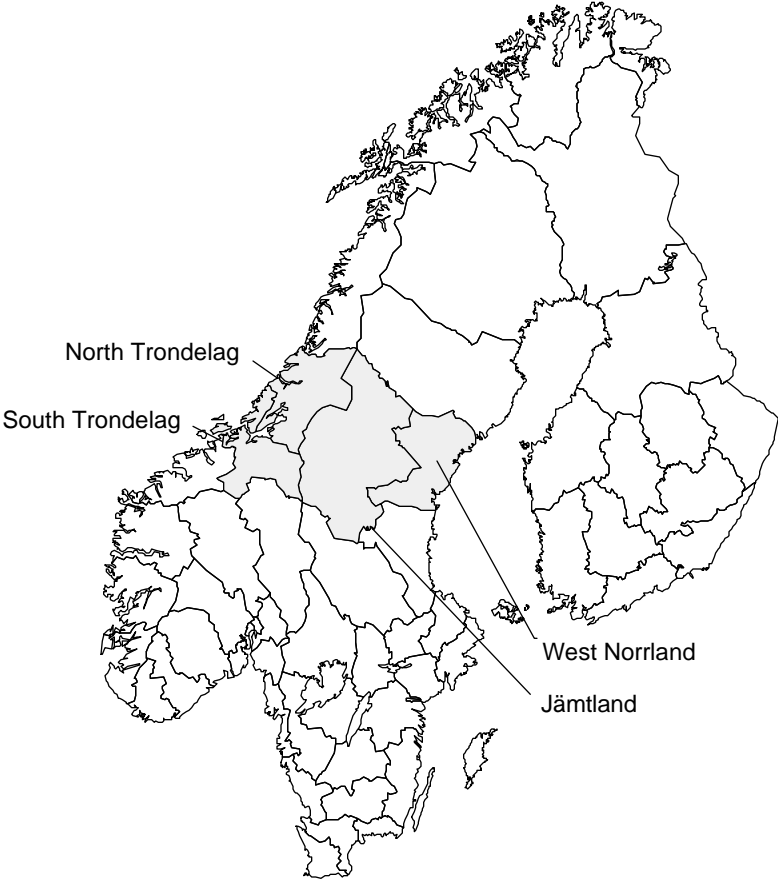
Interaction costs consist of a number of different component costs generated by a number of different factors. In Figure 4 a group of such factors are deployed according to potential for change from rapid to very slow. The factors' impact on the emergence, the stability and the transformation of economic and social networks in general is discussed in detail in Westlund (1999). In this paper we limit the analysis to the factors' impact on cross-border networks.

Figure 4. Factors which generate interaction costs in and between networks, grouped by potential for change.

Very Rapid				Very slow
Technical-Logistical Factors	Political-Administrative Factors	Economic-Structural Factors	Cultural-Historical Factors	Geographical and Biological Factors
-----	-----	-----	-----	-----
Costs of production and transport of goods	National/regional rules and regulations	Economic development level / demand patterns for goods and services	Language	Physical distance
Costs of transport of persons	Customs duties, etc	Economic structure	Religion	Geographical obstacles (e.g. rivers)
Costs of capital and capital transfer	Tariff zones	Educational level	Mentality	Time zones
Costs of information and information transfer		Compatibility and standard of infrastructure	Ethnicity	Human biology
			Population density	
			Power structure and property rights	

Source: Westlund (1999)

Map 1. The Mid-Scandinavian Counties.



4. Interaction-costs on various levels in the case of Mid-Scandinavia.

In the previous section we presented a theoretical approach for analysing the opportunities for and obstacles to cross-border interaction between regions. In the present section this approach will be tested in the case of Mid-Scandinavia. Mid-Scandinavia consists of Central Norway and Central Sweden, i.e. the Norwegian counties of North and South Trøndelag, along with the Swedish counties of Jämtland and Western Norrland. The region extends from the Norwegian Sea to the Gulf of Bothnia and comprises both agricultural areas, large forested tracts and extensive fell districts above the limit of cultivation. The EU's external border cuts through Mid-Scandinavia.

a. Technical-logistical factors

In technical-logistical respects Mid-Scandinavia, like large parts of Western Europe, is a very homogeneous region. The differences in production, transport, information and capital costs are very small. Thus it might easily be discovered that the interaction costs arising as a result of technical-logistical differences are usually non-existent or so small and temporary as to lack significance.

But it is necessary not only to evaluate the *absolute* costs associated with technical-logistical obstacles. Even though Mid-Scandinavia's technical-logistical level does not differ appreciably from that of other parts of Western Europe and the Western world, the *opportunities* for use and application differ in many respects. This means that the dimensions of other interaction-creating and inhibiting factors decide the degree to which technical-logistical factors have stronger or weaker influence on interaction in Mid-Scandinavia relative to other border regions.

Some vital factors of this kind are population numbers and the density and distribution of population. One of the achievements of the central-place theory was that it demonstrated that there is a proportional relationship, *ceteris paribus*, between the population of functional regions and the degree of diversification of the supply of services. In other words there are, in principle, threshold values for every type of production selling its wares in the local/regional market, but these threshold values may be lowered by means of subsidies or other defrayals of cost outside the market. In technical-logistical respects this means that certain interaction-reinforcing applications only come about in regions where the market potential is large, while other applications are disseminated rapidly even in markets which are small and sparse in terms of population.

Table 1. Population density in selected European areas (inhabitants/km²)

Jämtland county	3
West Norrland county	12
Trøndelag counties (together)	10
Sweden	20
Denmark	120
United Kingdom	239
The Netherlands	380

These circumstances may be illustrated by means of some simple examples from the field

of transport and communications. Different forms of transport and communications have very different requirements in terms of market size and density. When compared with its predecessor the railway as a form of public transport, private motoring signifies an extreme lowering of the threshold value for the supply of rapid overland transport. Relatively speaking it can be argued that compared with public transport, motoring favours regions which are smaller in terms of population since they escape the traffic problems which plague metropolitan regions. On the other hand the new types of high-speed train networks being constructed all over Europe today require large markets with high purchasing power in order to achieve profitability and good departure frequencies. This trend of development may be contrasted with the rapid expansion of telecommunications technology based on very low threshold values for making use of e-mail and other Internet services.

The conclusion is that certain tendencies in technical-logistical developments benefit certain regions relatively speaking and other tendencies give other region relative advantages. In Mid-Scandinavia, with its low population density and urban regions which are small in European terms, it means for example that at present cost levels, high-speed trains are hardly likely to be introduced in the foreseeable future and become a factor strengthening internal interaction - unless subsidised on a large scale. On the other hand developments in telecommunications technology are rendering Mid-Scandinavian interaction easier, but its distance-independent attributes, unlike the technology of personal transport for example, bring no advantage specific to interaction between regions in close proximity. Therefore the influence of telecommunications technology on interaction in Mid-Scandinavia becomes wholly dependent on how other interaction-creating and inhibiting factors evolve.

The interaction costs which are based on technical-logistical factors thus lie at a low level in absolute terms in the case of Mid-Scandinavia. However, current developmental tendencies in the transport and communications fields seem to signify certain relative disadvantages for Mid-Scandinavian interaction compared with interaction between more densely populated border regions in other parts of Europe.

b. Political-administrative factors

Abolition of the political and administrative barriers to interaction has been central to the European Union's activities for the last ten years or so. The introduction of the four freedoms in 1992, along with adoption of the Maastricht treaty and the EMU, means that the vast majority of political-administrative interaction obstacles controlled by national states are to vanish in the EU. Certain indirect national obstacles to e.g. the mobility of labour remain. Examples of such obstacles are tax rules relating to housing sales, which indirectly form a tax on migration, and labour-market agreements which regulate security of employment and have an inhibiting effect on the propensity to change jobs.

Sweden's decision to join the EU and Norway's to stay outside it have caused the EU's external border to cut through Mid-Scandinavia. However, Norway is a member of the European Economic Sphere (EES). What effects emerge from the Swedish and Norwegian counties' finding themselves on opposite sides of the EU border? Table 2 shows which fields of activity are covered by various forms of association.

Table 2. Fields of activity covered by Trade Agreement (TA), European Economic Sphere (EES) and membership of the European Union (EU) respectively.

CATEGORY OF ACTIVITY	TA	EES	EU	Comments on (x)
COMMODITIES				
Exemption from duty on industrial commodities	x	x	x	
Abolition of technical trade barriers		x	x	Safeguard clause in EES
Free trade in fish products		(x)	x	Partial free trade in EES
Open tender for government purchases		x	x	EES regulates government subsidies which distort competition
Common rules for government subsidies		x	x	Simplification in EES
Rules concerning countries of origin abolished		(x)	x	
Abolition of anti-dumping regulations		x	x	Fish excepted
Free trade in agricultural produce		(x)	x	Enlarged trade in certain products in EES
Abolition of border controls		(x)	x	Simplifications in EES
CAPITAL				
Free movement of capital	x	x	x	
Harmonisation of dues (including excise duties)		x	x	
Link to EMU	(x)	(x)	x	Unilateral linking possible
Non-discriminatory establishment rules		x	x	Simplifications in EES
SERVICES				
Transport. Cabotage permitted		x	x	
Financial services		(x)	x	Certain transitional provisions
Telecommunications services		x	x	
PRIVATE INDIVIDUALS				
Common labour market		x	x	
Recognition of foreign examinations etc.		x	x	
Social entitlements		x	x	National rules retained
OTHER ECONOMIC POLICIES				
Common rules of competition		x	x	
Common rules of regional policy		(x)	x	Priority to low-density population in EES
Common trade policy			x	
Common energy policy			(x)	Under development in EU
Common agricultural policy			x	
Common fishery policy			x	
Access to EU funds			x	
Contributions to EU budget			x	
Contributions to EFTA funds		x		
Financing of infrastructure			x	
COOPERATION IN OTHER FIELDS				
Coordinated foreign and security policy			x	
Monetary and economic coordination			x	
Common central bank and currency			x	
Environmental protection cooperation		(x)	x	Cooperation in EES, but continued national policy (also in EU)
Research cooperation	(x)	x	x	
Education and training cooperation	(x)	x	x	
Social dimension		(x)	x	Common goals
Consumer protection		(x)	x	Common goals
Company legislation		(x)	x	
Statistical cooperation		x	x	

As Table 2 shows, it is chiefly with respect to long-term political cooperation "over and above" the four freedoms that the EU is more far-reaching than the EES. In the commodities category, certain barriers which do not exist in the EU still remain in the EES. This applies chiefly to fish and agricultural produce and the border controls necessary to maintain these barriers. In Mid-Scandinavia the latter have caused cross-border transit of live domestic animals to be restricted to only one customs post.

Apart from these restrictions, the political-administrative obstacles have very little *direct* effect on interaction across the EU border in Mid-Scandinavia. Norway's decision to take a full part, using its own funds, alongside EU countries, in such activities as Interreg cooperation and research cooperation, also means that from the subsidy standpoint there are no special financial hindrances to cooperation in Mid-Scandinavia compared with other European border regions. An eventual Swedish membership of the EMU will not make any difference *vis-à-vis* Norway compared with today, merely a simplification in terms of currency transactions with other EMU countries. In relation to these countries the *relative* interaction costs between Sweden and Norway will accordingly rise somewhat with Swedish membership of the EMU.

Nevertheless, from a more developmentally-focused perspective it is possible to identify problems which are caused by the existing political-administrative borders between Sweden and Norway. This applies for example to the transport subsidy to North Sweden's industry which was introduced as one of the first measures of regional policy in Sweden. The subsidy applies only to transport within Sweden, which means that exports via the harbour of Trondheim are at a disadvantage.

c. Economic-structural interaction obstacles

It ought to be possible to bring about increased cross-border exchanges in two diametrically opposing ways. When stressing comparative advantages the classical theory of trade explicitly states that it is the *differences* between regions that constitute the driving force of trade and other exchanges between them. However, when modern trade theory seeks to explain the growth of so-called intra-industry trade (i.e. the fact that trade in apparently similar products increases most), it is rather the *similarities* between counties and regions in terms of level of economic development, economic structure etc. that are emphasised as fundamental to exchange (see Westlund 1999). Both these explanations can be tested in the case of Mid-Scandinavia. Is it the differences that can give rise to increased cross-border interaction and increased interplay between periphery and centre - or is it the similarities?

Economic-structural interaction obstacles too are at a low level in Mid-Scandinavia, generally speaking. The Swedish and Norwegian parts have very similar developmental levels. However, as reflected in Table 7, the educational level is higher in South Trøndelag than in the rest of Mid-Scandinavia. Of course it is difficult to find anything to suggest that this difference entails any actual interaction obstacle other than to R&D cooperation, but it is probable that this is the very type of cooperation which has a strategic effect on interaction in other areas as well. In many cases the research environments at NTNU (The Norwegian Institute of Technology and Science) and SINTEF (a national foundation for applied technology) in Trondheim quite simply do not have equal potential partners to cooperate with on the Swedish side.

There are no real interaction obstacles in infrastructural respects. The standard of transport and communications infrastructure is in principle equal and there are no compatibility problems. The only exception is that the railway on the Norwegian side is not electrified.

The occupational and industrial structure is somewhat less homogeneous than other economic-structural variables. Agriculture is declining generally speaking, although higher agricultural subsidies in Norway are reflected in larger numbers employed in agriculture,

especially in North Trøndelag. One primary industry which has expanded vigorously in Trøndelag and the rest of Norway since 1970 is fish farming, whereas this occupation is almost non-existent on the Swedish side. Oil and gas extraction and services related thereto have also increased in Trøndelag. West Norrland has traditionally been dominated by industry based on forest raw materials, metalworking and engineering industries. Forest industries are larger than the national average both in North Trøndelag and Jämtland, though in the latter case the public sector is dominant. Tourism is important in Jämtland during the winter and in Trøndelag in summer. Jämtland has the area's largest reserves of forest raw materials.

The existing differences of occupational and industrial structure can be interpreted in two different ways on the basis of the affinity perspective discussed above. They may be regarded either as obstacles to or opportunities for interaction. The interaction across the national border which economically speaking is wholly predominant today is the export of forest raw materials from Jämtland county to the pulp industry of North Trøndelag. In fact there are some cases of firms being established and purchased across the border, as well as of R & D cooperation, notably between the Mid-Sweden University and NTNU, and also between other research and development bodies. But the main impression is that by far the major bulk of the economy is integrated into the country concerned and that Mid-Scandinavia's exporting firms have their markets in places other than the area on the other side of the national border.

This impression is reinforced by an examination of the EU-assisted INTERREG project and a scrutiny based on the Trøndelag regional business directory. None of the biggest firms of Trøndelag has committed itself to INTERREG cooperation. The following facts emerge from the information in the index of companies:

- Of the total of 1074 North and South Trøndelag firms in the directory, there are 150 which export to Sweden.
- Most of the firms send the goods to southern Sweden prior to possible forwarding northwards to Jämtland county.
- The firms have little knowledge of Swedish industry generally. What they know are the firms they cooperate with.
- Interest in cross-border contacts is not particularly great. Sweden is not the primary market for exporting firms, and no emphasis at all is laid on Jämtland by exporters.
- The majority of Trøndelag firms have no strategy for intensifying their focus on Jämtland.
- The contact between firms on the two sides of the border has remained stationary or dwindled.
- Imports of processed wood products into Trøndelag, which were formerly considerable, are very small.

Only three points on the positive side can be picked out from the information contained in the directory:

- Jämtland is interesting when Norwegian firms have problems on the home market.
- Sweden's membership of the EU has had no negative effect on trade.
- Transport obstacles are negligible or non-existent.

The *integration-by-differentiation* perspective requires not only that central Sweden be detached to a certain extent from national structures in this way but also that the various parts of Mid-Scandinavia, and most of all the proposed "motor" of Trondheim, find roles which suit

each other. In other words it will not be merely a matter of the various parts of Mid-Scandinavia exploiting their comparative advantages on the market in a general sense but of these comparative advantages also fitting in with conditions in other parts of the Mid-Scandinavian region. In the ideal case, each part-region would find its place in a functional division of labour, that is to say each part of Mid-Scandinavia would develop its specialism which would not compete with that of any other part.

The realism of any such scenario must be called into question of course. It is true that specialisation has been a route to success for many regions throughout history (see e.g. Krugman 1991) - and also a long-term trap.¹ But in these cases it has been a matter of specialisation for expansion on a continental or world market. In conditions of increasing globalisation of society it must be considered entirely unrealistic in general terms to expect increased differences within Mid-Scandinavia to lead to greater integration. In so far as Mid-Scandinavia's parts may be able to specialise, they must do so for considerably wider markets. However, the exception here is the markets where physical distance still has considerable importance, for example the labour market and locally/regionally tied service functions. With regard to the latter, both public service agencies and private firms have opportunities of changing their organisational structures and for example of making Trondheim a centre for certain activities in the region and closing down these activities in other localities. Such a reorganisation of both public and private activity is in progress today in Sweden and is evidently leading to increased interaction - but at the price of weakening certain localities and regions.

The other perspective on increased Mid-Scandinavian interaction, is founded on the *similarities* and their importance for exchange. World trade during the post-war period has enjoyed its biggest increase not only between countries which in terms of level of economic development can be described as very similar: to a large extent the increasing trade has also been internal to sectors, that is to say it has taken place between units within the same sector. What, then, can be the point of importing products which one already possesses?

The explanation probably lies in the fact that goods which are produced in different places are not really alike but differ from each other in price or quality at least to some extent (cf. Armington, 1969). In other words exchange takes place between regions because they produce goods which are not really alike. But then why emphasise similarities as conditions of exchange?

The answer to this question can be divided into two steps. It should be emphasised that even if the products which have been the object of the growing trade have not been *entirely* alike, they have still often had great resemblances or strong kinship. This in turn probably results from the fact that even though demand in the various regions is not alike to the tiniest detail, it does have strong structural similarities based on such factors as the level of GDP and community of culture. In other words it seems to be the case that optimal affinity is attained by "great resemblances" between regions but not by "identically alike" regions.

Johansson (1993) has shown how a strong economic and cultural affinity has led to a disproportionately large trade between the Nordic countries and especially between Sweden and Norway. It may therefore seem contradictory that the exchanges between the Swedish

¹ The American "rust belt", the Ruhr region and northern England's derelict industrial towns constitute a telling proof of the latter.

and Norwegian segments of Mid-Scandinavia lie at such a low level. One explanation, obviously, is that trade across national borders often takes place via national agencies, which has caused trade between Sweden and Norway to be channelled via Stockholm/Gothenburg and Oslo.

However, another explanation could be that even though the affinity between Sweden and Norway is very strong, the affinity between central Sweden and central Norway is weaker because the markets are too small and too few. Expressed more concretely, it is probably the case that the expanding industry and business of the Trondheim region seldom find the right trading and exchange partners in central Sweden but have to look to the Scandinavian capital city regions or even further. According to this reasoning the various parts of Mid-Scandinavia would be too dissimilar - in the sense that with the exception of South Trøndelag they are too weakly diversified - to be able to increase interaction.

Table 3 gives a rough measure of the degree of diversification of the economy in the Mid-Scandinavian counties: it shows that if we ignore sectors with less than 0.1% of employment, South Trøndelag with an index of 92.5 has a somewhat more diversified industrial and business structure than Norway as a whole. Other counties are considerably less diversified. Jämtland and North Trøndelag do not have higher values than 77.5, but West Norrland is not much better.

Table 3. Diversification of the Mid-Scandinavian industrial and business structure with 43 sectors as base. Index Sweden = 100.

Norway	South Trøndelag	North Trøndelag	Jämtland	West Norrland
92	92.5	77.5	77.5	80

Note: The values are based on the criterion that employment must be at least 0.1% of employment in the region for the sector to be represented.

Table 4 can likewise be interpreted as supporting this hypothesis. From analyses of industrial and business development in Sweden and Norway, the Mälars valley (i. e. the enlarged Stockholm region) can be termed a leading region in a Scandinavian perspective (Forslund-J, 1997). This means that there is a high presence of new and expansive sectors, while the proportion of contracting ones is low. Table 4 shows the Mid-Scandinavian counties' shares of employment in the sectors which have the largest growth and the highest shares in the Mälars valley. South Trøndelag is again the exception in Mid-Scandinavia. Thus it is not only the case that the economy of South Trøndelag is more differentiated. It also has almost twice as large a proportion of growth sectors as the other three counties.

Table 4. Growth sectors' (see note) employment share 1990.

	Employment share 1990 as percentage
South Trøndelag	17.5
North Trøndelag	9.8
Jämtland	8.4
West Norrland	9.4

Note: The branches in this group vary depending on sector aggregation. With relatively coarse aggregation the following branches emerge as expansive: Office machinery; Telecommunications products industry; Banking and financial services; Legal, accounting and bookkeeping, advertising and other bought-in services; Data processing and technical services; Instruments, photographic, optics, clocks and watches; Electric motors and electrical production material; Printing industry; Wholesale trade, distributive trades.

A more precise comparison of the industrial and business structure of the four counties is made in Tables 5-8, which show the employment shares of the industries in which the respective counties specialise, along with the corresponding shares of other counties. (Specialisation is defined here as an employment share exceeding the national average by at least 40%.) To the extent that Mid-Scandinavian interaction is to be based on similarities of industrial and business structure and on expanding industries, Tables 5-8 do not make encouraging reading. All four counties have a larger share of the declining primary sector than the national average for the respective country, with North Trøndelag as an extreme example of specialisation in a declining sector. For the rest, there are certain common elements of specialisation among some of the counties, mainly in declining industrial branches. The already cited strong position of South Trøndelag in training and research emerges clearly in Table 7.

Table 5. Specialised industries of Jämtland

	Employment share 1990, per cent					
	South Trøndelag	North Trøndelag	<i>Jämtland</i>	West Norrland	Sweden	Norway
TOTAL	11.4	20.8	<i>13.6</i>	7.8	7	9.9
Primary production, fruit and vegetables	7.79	16.40	<i>8.21</i>	4.42	3.86	6.13
Railway rolling stock and repairs	0.23	0.00	<i>0.26</i>	0.41	0.14	0.11
Mining and quarrying	0.29	0.43	<i>0.46</i>	0.07	0.26	0.93
Wood products excl. furniture	0.73	1.54	<i>2.30</i>	1.39	1.29	0.88
Electricity, gas, heating, water	1.23	1.09	<i>1.35</i>	1.12	0.76	1.03
Slaughtering and dairying	1.15	1.36	<i>1.01</i>	0.37	0.67	0.78

Table 6. Specialised industries of West Norrland

	Employment share 1990, per cent				Sweden	Norway
	South Trøndelag	North Trøndelag	Jämtland	West Norrland		
TOTAL	2.3	2.9	1.8	6.6	2.6	1.9
Wood pulp, paper and paper products industry	0.38	1.73	0.12	4.66	1.29	0.56
Railway rolling stock and repairs	0.23	0.00	0.26	0.41	0.14	0.11
Distilled spirits, beer, soft drinks and tobacco	0.42	0.06	0.10	0.38	0.16	0.23
Electricity, gas, heating, water	1.23	1.09	1.35	1.12	0.76	1.03

Table 7. Specialised industries of South Trøndelag

	Employment share 1990, per cent				Sweden	Norway
	South Trøndelag	North Trøndelag	Jämtland	West Norrland		
TOTAL	15.3	10.9	10.1	8.8	9.3	9.7
Chocolate & sugar	0.55	0.00	0.07	0.02	0.18	0.13
Feedstuffs	0.24	0.16	0.00	0.00	0.03	0.07
Railway rolling stock and repairs	0.23	0.00	0.26	0.41	0.14	0.11
Distilled spirits, soft drinks and tobacco	0.42	0.06	0.10	0.38	0.16	0.23
Department store trade	0.37	0.55	0.57	0.87	0.72	0.24
Telecommunications products	0.46	0.04	1.05	0.37	0.86	0.30
Education and research	11.87	8.71	7.00	6.38	6.50	7.88
Slaughtering and dairying	1.15	1.36	1.01	0.37	0.67	0.78

Table 8. Specialised industries of North Trøndelag

	Employment share 1990, per cent				Sweden	Norway
	South Trøndelag	North Trøndelag	Jämtland	West Norrland		
TOTAL	10.8	22.2	12.4	12.5	8.5	8.9
Wood pulp, paper and paper goods industry	0.38	1.73	0.12	4.66	1.29	0.56
Primary production, fruit and vegetables	7.79	16.40	8.21	4.42	3.86	6.13
Department store trade	0.37	0.55	0.57	0.87	0.72	0.24
Feedstuffs	0.24	0.16	0.00	0.00	0.03	0.07
Domestic electrical and other appliances	0.17	0.48	0.23	0.78	0.60	0.23
Wood products excluding furniture	0.73	1.54	2.30	1.39	1.29	0.88
Slaughtering and dairying	1.15	1.36	1.01	0.37	0.67	0.78

Along with facts already known the tables support the interpretation that North Trøndelag and Jämtland function as areally-producing "hinterlands" for their neighbours which are more integrated into the world economy, viz. South Trøndelag and West Norrland. The differences between these two counties are considerable, however. While South Trøndelag is enjoying an expansion of knowledge-intensive growth industries, for example, West Norrland is experiencing a steady decline of employment in the export-orientated timber, pulp and paper industries.

It is difficult to draw any other conclusion from this scrutiny than that the expanding parts of South Trøndelag's economy will have to find their partners for cooperation and exchange mainly outside Mid-Scandinavia. Viewed from this perspective, modernisation of the industrial and business structure seems to be a principal strategic task for the other Mid-Scandinavian counties.

d. Cultural-historical obstacles to interaction

The Scandinavian peoples have a long common history and a culture which is common to all in many respects. The differences of language would be described more as dialects in other parts of the world. In these respects the obstacles to cultural-historical interaction are very small over the whole of Scandinavia. As regards Mid-Scandinavia it may also be added that Jämtland and Härjedalen have been a part of Norway for longer than they have belonged to Sweden, a factor which is reflected most notably in the fact that the popular dialect of Jämtland can be considered in certain aspects to be "East-Trøndish".

In these ways Mid-Scandinavia enjoys exceedingly good conditions for increased interaction compared with many other border regions. However, there are two other types of cultural-historical factors which raise considerably larger obstacles to Mid-Scandinavian interaction. The first of these relates to the low population density, the smallness of urban centres and the distance between these, i.e. factors which were discussed in connection with the different regional opportunities for application of new technical-logistical solutions.

Settlement patterns and population density are inert factors which are products of history. The European settlement pattern at regional level is still marked in high degree by the conditions which applied to pre-industrial occupations. Climate and soil determined how large a population could make a livelihood from agriculture and fishing and how large a surplus could be appropriated by government. The industrial revolution meant that towns and other populated areas grew, but this was in high degree an intra-regional redistribution of population from countryside to town.

Historical economic conditions are reflected in the fact that Mid-Scandinavia's population is concentrated in the coastal belts adjoining the Norwegian Sea and Gulf of Bothnia and in central Jämtland. For the same reason population density is lowest in the extensive fell districts through which the Swedish-Norwegian border runs. Bearing in mind the distances between the concentrations of population - 180 km between the Gulf of Bothnia and central Jämtland and another 240 km between central Jämtland and the Norwegian Sea - this presents a big problem for interaction within Mid-Scandinavia. If we add to this the fact that with the exception of Trondheim the urban centres are relatively small, the

problem does not become any less.

The second type of cultural-historical factor constituting an important and intractable obstacle is the national state and its influence on the shaping of a national public sector and national economies. Although the differences of popular culture between Sweden and Norway are small, the national border cutting through Mid-Scandinavia has been unchanged for over 350 years. The fact that Norway was formally subject to the Swedish crown from 1815 to 1905 was a factor which if anything invigorated the nationalist movement in Norway. After the dissolution of the union both Sweden and Norway strengthened their national administrative and decision-making structures. This development culminated in the building up of an extensive public sector in each of the two countries during the late post-war period.

Trade between Sweden and Norway has been extensive, just as it can be expected to be between two small countries adjoining one another, but it should be underlined that it has still differed considerably in both nature and magnitude from trade within each respective country. Home market industries (with few exceptions) conquered only the national market, not a common Scandinavian market. Market networks were developed *within* each respective country, and trade between Sweden and Norway followed the traditional pattern of central national import/export agencies.

This means that the institutions built up by both private and public sectors were shaped strongly by the historical epoch of the national state. Sweden's entry into the EU is an important sign that these institutions are in process of being re-shaped, but not primarily in the direction of increased interaction with Norway.

The conclusion is that the "purely" cultural factors constitute one of the most important prerequisites for interaction across the national frontier in Mid-Scandinavia. Common history, especially between Jämtland/Härjedalen and Trøndelag, is a factor which is often stressed in current official co-operation, e.g. their Interreg IIA programme.

Other historically-influenced factors, however, such as the distances between population centres and the area's density of population and settlement structure, constitute problems for increased interaction. Nevertheless the historical phenomenon of the nation-state, which created the national frontier in Mid-Scandinavia with all its consequences, generally speaking seems to be diminishing in importance. This reduces the barriers to interaction in Mid-Scandinavia but also the obstacles to interaction in other directions. The possible diminution of the importance of the nation-state offers no special benefit to Mid-Scandinavian interaction in particular unless the forces driving this interaction are stronger than the forces making for cooperation with other regions.

e. Natural geographical and biological interaction obstacles

The low population density of Mid-Scandinavia discussed above is founded on the natural geographical conditions of the pre-industrial epoch. Today it can be argued that location factors of former times, such as raw materials and soil quality, lack importance for all expanding industries and also for many of the declining ones. The semi-Arctic position of Mid-Scandinavia is no longer a factor which limits population growth and thus the critical mass required for example for good supply of culture arrangements or public transport

facilities between the three concentrations of population. The development of information and telecommunications technology has meant that the natural geographical obstacles have disappeared in many sectors of the market. Opportunities for interaction, external as well as internal interaction, have increased dramatically for these activities.

In other words, natural geographical conditions are no longer problems impeding population growth. For a long time the tendency has been for access to markets and labour to take the place of access to raw materials as the most important location factor. This means that the interaction obstacles presented by sparse population were formerly caused by natural geographical factors but are now virtually a product of cultural-historical factors.

In this way, natural geographical factors still cast a long shadow over Mid-Scandinavia's prospects for interaction because of the historical distribution of population. In another respect, however, natural geographical factors form a direct and concrete interaction obstacle even today. The fell terrain makes the building of roads and railways for high-speed transport more difficult and expensive. The limited population base makes it hard for fund-granting authorities to justify such investment.

5. Concluding remarks

One conclusion from the above discussion is that the obstacles to Mid-Scandinavian interaction do not lie at the simple political-administrative level where political decisions on the abolition of frontier obstacles can be taken. The formal frontier obstacles which have traditionally existed between states are for the most part absent between Sweden and Norway. The linguistic and cultural barriers which often reinforce the formal frontier between two countries are also at a very low level between Sweden and Norway.

The obstacles lie instead at other levels, and like the cultural barriers these are very slow to change. It is primarily these low numbers and densities of population which cause certain market thresholds and marginal values not to be reached. This applies to the degree of diversification of the economy and thus to market size and the *number* of potential fields for interaction. It applies to the frequency of transport and travel services, or to the overall basis of collective personal transport, and thus to the *possibilities* for realising interaction in the existing potential fields. *In terms of broad, extended neighbour-cooperation, or narrow, specialised network cooperation, therefore, the latter seems to be the most realistic Mid-Scandinavian cooperation strategy.*

The second great obstacle consists of the national institutions and networks which have been built up in the respective countries and which reduce the need and opportunities for cross-border interaction in Mid-Scandinavia to a minimum. Both the public sector and firms with national and international markets have created *national* networks for production, administration and distribution. These networks have strong hierarchical features, one manifestation of which is the conduct of contacts with other countries at the highest national level, in spatial respects usually meaning the capital cities.

Of course the importance of these two groups of obstacles changes in step with current changes in society. The weakening of the nation-state seems to be a reality, at least in Western Europe. Satellite-TV and the Internet have brought a dramatic augmentation of the cross-

border supply of information and opportunities for contact cutting across the existing national hierarchies. It is also probable that the ongoing global shift of production away from similar standardised products and towards customised products will change the importance of size in local/regional market thresholds.

For border regions these evolutionary tendencies imply lowered barriers and therefore opportunities for increased interaction. But it should be underlined that this does not apply only to exchanges between regions directly adjacent to one another. The tendencies here cited increase above all the opportunities for interaction in networks which are more or less independent of distance. Thus they do not imply any special advantages for regions which adjoin one another. The changes which are in progress may be more likely to weaken the importance of distance as a factor underlying interaction - and yet a key factor in the hypothesis of increased interaction between adjacent regions is the importance of distance.

These concluding comments show clearly the need for more detailed research into the spatial effects of the current globalisation process. One hypothesis taking the results of this paper as its starting point might be that three distinct developmental tendencies are at work among the European border regions:

- a) A small number of frontier regions with large populations and separated by natural geographical obstacles can receive powerful dynamic impulses via a bridge or tunnel.²
- b. A number of border regions in the most densely-populated parts of the EU may, despite the language problem, come to be developed into integrated labour market regions.
- c. Most of the traditional border regions, having, like Mid-Scandinavia, small formal frontier obstacles, but lacking the opportunities for developing into integrated labour markets, will probably experience considerably more expansion of exchange in global networks than intensification of their cross-border interaction.

² The region of the Sound may become such a case. Cf Andersson and Matthiessen (1993).

REFERENCES

- Armington, P. S. (1969) A Theory of Demand for Products Distinguished by Place of Production. *IMF Staff Papers*, 16:159-178.
- Andersson, Å. E. and Matthiessen C. W. (1993) Øresundsregionen. Kreativitet, integration, (1995)
- Andersson, Å. E. (1995) Economic Network Synergetics. In Batten, D., Casti, J. and Thord, R. (1995)
- Batten, D., Casti, J. and Thord, R. (eds.) (1995) Networks in Action. Communication, Economics and Human Knowledge. Berlin/Heidelberg.
- Cappelin, R. och Batey, P.W.J. (eds) (1993) Regional Networks, Border regions and European Integration. London.
- Cecchini, P. (1988) The European Challenge 1992. The Benefits of a Single Market.
- Christaller, W. (1933) Die Zentralen Orte in Süddeutschland. Jena.
- Dahmén, E. (1970) Entrepreneurial activity and the development of Swedish industry, 1919-1939. Homewood, Ill.
- Johansson, B. (1993) Ekonomisk dynamik i Europa. Malmö.
- Johansson, B. (1995) The Dynamics of Economic Networks. In Batten, D., Casti, J. and Thord, R. (1995).
- Johansson, B., Karlsson, C. and Westin, L. (eds) (1994) Patterns of a Network Economy. Berlin/Heidelberg.
- Johansson, B. and Westin L.(1994) Affinities and frictions of trade networks. *Annals of Regional Science*, vol 28:243-261.
- Karlsson, C. and Westin, L. (1994) Patterns of a Network Economy - An Introduction. In Johansson, B., Karlsson, C. and Westin, L. (1994).
- Karlsson, C. (1994) Regioner och nätverk i Europa. En forskningsöversikt. Stockholm.
- Krugman, P. (1991) Geography and Trade. London.
- Nijkamp, P, Rietveld, P and Salomon, I. (1990) Barriers in spatial interactions and communications. A conceptual exploration. *Annals of Regional Science*, vol 24: 237-252.
- Nijkamp, P. (ed.) (1994a) New Borders and Old Barriers in Spatial Development. Avebury. Aldershot.
- Westlund, H. (1999) An Interaction-Cost Perspective on Networks and Territory. *Annals of Regional Science*, Vol 33, No 1, pp 93-121.
- Westlund, H. and Johansson, M. (1997) Opportunities and obstacles in Nordic cross-border cooperation - the Mid-Nordic case. *Nordisk Samhällsgeografisk Tidskrift*, No 24, April 1997.