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The transformation and integration of innovation systems in the Baltic Sea region: the cases of telecommunications and electricity in Sweden and Estonia.

1. Purpose and theoretical framework.

The proposed project addresses the integration and transformation of innovative activities in the Baltic Sea region through the period 1980-2000. More precisely, it explores to what extent and in which ways *innovation systems* in the Baltic Sea region are being integrated and transformed, what the determinants of integration and transformation are and what the implications have been so far for firms' innovative activities.

An innovation system is here broadly defined as a network of agents involved in the generation, diffusion and utilisation of technology, plus the institutional environment (i.e. laws, rules, norms, routines, etc.) in which these activities take place. Innovation system approaches stress the interactive aspects of innovation, i.e. that firms do not innovate in isolation.

Political relevance. The integration of the innovation system in a country with foreign systems is crucial to domestic development and competitiveness. Therefore, we need to know how the process of integration actually takes place, and what its determinants and consequences are. In the Baltic Sea region, innovation systems in East and West were almost perfectly isolated from each other until the end of the 1980s, and the development of linkages between the systems may therefore serve to strengthen the whole region. However, innovation systems do not necessarily integrate with each other spontaneously, and integration should therefore be supported in suitable ways. This cannot be accomplished effectively without knowledge of the nature of the process by which systems integration takes place.

Theoretical relevance. The integration of Eastern Europe with the West European economy resembles in many ways the integration of late industrialising countries (such as the Asian tigers) with the more advanced industrialised countries. There are numerous theoretical models in the latter field of research with respect to the role of technology and innovation. However, there are also major differences between Eastern Europe and the late industrialising countries, mainly because East European countries already have an industrial history and thus do not build their innovation systems from scratch after 1989. This makes the problem of transformation and integration with the West more complex.

The proposed theoretical solution is to use an *evolutionary* approach, since evolutionary theories deal explicitly with the problem of path-dependencies and the cumulateness of technological change. This allows us to take into account Soviet heritage as well as the effects of new linkages with the Western world. An evolutionary approach implies an analysis of technology, supporting institutions and the structure of the sectors as *co-evolving* with each other, instead of viewing technology and industry structure simply as a response to institutional reform. This also highlights the important point that policy makers are subject to learning, i.e. 'policy capabilities' have to be developed. These policy capabilities do not necessarily *precede* radical changes in the innovation system. It is argued that this view lies closer to reality than other theoretical alternatives.

Policy significance. The project will point both at the opportunities and at the limits of achieving increased competitiveness through public policy-making in the field of innovation and technological change. The use of the systems of innovation concept enables a 'diagnostic analysis' of the innovative economy, which means that it will be possible to point at the weaknesses in the process of establishing linkages between two integrating innovation systems.

2. Methodology and empirical material

A critical case-study methodology is applied in order to show that the reality contradicts traditional theoretical approaches. In transition economics, it has often been stated that it is necessary to establish the right institutional framework and that catch-up and integration of Eastern with Western Europe will then follow more or less automatically. However, there are clear signs that the integration of innovation systems in the Baltic Sea region does not follow in any spontaneous way, although the institutional frameworks in most of the Eastern Baltic Sea countries have been transformed successfully. There are thus important potential benefits from integration which have not yet been realised, in spite of great advances in institutional reform. In order to show that this is so, the project studies two specific sectors in depth: telecommunications and electricity. These are interesting to compare, because telecommunications was a seriously underdeveloped sector in Estonia during the Soviet era, whereas the electricity sector was very well developed, with considerable exports of electricity to other Soviet republics, as well as an impressive sectoral knowledge base.

Sample. For each of the two sectors, the project studies one Estonian and one Swedish firm which play key roles in the process of transformation and integration. These have been selected with the help of a preliminary empirical study. The time period stretches from 1980 to 2000, thereby enabling the analysis of the continuing role of Soviet history in the post-socialist Baltic Sea region. The selected firms are the large network utilities Vattenfall and Eesti Energia (for energy), and Televerket/Telia and Eesti Telekom (for telecommunications). However, the *units of analysis* are not these organisations themselves, but their (changing) relationships to other elements of the sectoral innovation systems, such as policy makers and manufacturers of equipment.

Data sources. The main empirical material will consist of semi-structured interviews that are carried out with representatives of firms and other organisations. As described above, the units of analysis in the study are inter-organisational relationships, and interviews with both of the interacting organisations are in this connection used to map why linkages have been created and destroyed, what the contents of interaction are and what the consequences of interacting have been. Additional data will be collected in the form of firm-specific written material, as well as policy documents from different levels of policy making.