

Technological lifecycles: regional clusters facing disruption

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The phenomenon of technological lifecycles is argued to be of great importance in the development of regional clusters. New 'disruptive' technologies may initiate the emergence of new regional industrial clusters and/or create new opportunities for further development of existing ones. However, they may also result in stagnation and decline of the latter. The term disruptive refers to such significant changes in the basic technologies that may change the industrial landscape, even in the shorter run.

The paper briefly examines the key features of some of the most outstanding examples of regional clusters, where the economic development patterns are quite closely related to the emergence of new key technologies. The major part of the paper will focus on the evolution of a fairly small cluster of wireless communication firms in North Jutland, Denmark - approximately 40 firms employing 4000 persons. The cluster is organised as an association, NorCOM, involving also Aalborg University and the related science park, NOVI and the authors are active in organising the NorCOM activities.

The cluster emerged in the late 1960s in the field of maritime radiotelephony, but took off with the advent of cellular mobile communication technology with the first generation (1G) Nordic Mobile Telephony technology from the early 1980 followed by the 2G GSM. In 1992 two local firms managed to develop a GSM terminal parallel to the large multinational giants of Motorola, Ericsson and Nokia. This resulted in fast growth during the 1990s. At the turn of the century the cluster is, however, facing disruption caused by the emergence of 3G (UMTS). Due to the general crisis of the telecommunications hardware industry from 2001 and the specific features of the enormous costs for the telecom service providers to acquire 3G licences, the entire mobile communications industry is facing severe difficulties at the moment. These features of the international industry have obvious implications for the NorCOM cluster, which will be analysed as directly related to the lifecycles of the various generations of mobile communications technologies.

The paper digs into the threats and opportunities of 4G, which basically focus on convergence between the wired Internet with the wireless communications technologies. 4G will apparently be a mix of a series of technology standards, such as 3G mobile communications (UMTS in a European context) and wireless access to the Internet, through wireless local area networks (WLANs), where the emerging dominating standard appears to be the US IEEE 802.11, although Bluetooth - with a Scandinavian stronghold - also plays an important role. The paper will, thus, contain an analysis of the strategic options for the cluster in terms of exploiting the emergence of 4G as a vehicle for creating continued dynamism - given that questions have been raised of the strength of the cluster in 3G technologies.

Aalborg University (AAU), founded in 1974, has been a decisive factor for the development of the cluster. The research strategy at the university, especially in the 4G field, will be integrated as an important factor of the paper, as will be the interaction between the cluster, AAU and the science park, NOVI, founded in parallel with the 2G take off. Research policy in the 4G field may be related to a regional development program for diffusion of IT, the so-called 'IT Lighthouse of North

Jutland'. Large scale user experiments in local communities with integrated solutions combining wired as well as wireless technologies may represent important steps in influencing the future 4G based telecom infrastructure. The future viability of the NorCOM cluster will thus be analysed as a combination of firm based strategies and efforts at the research policy as well as regional policy level.

Previous papers from the authors dealing with these issues are listed below. The present paper will draw somehow on the Danish report on future strategies of the ICT sector in North Jutland. Although the paper focuses on the NorCOM cluster it will be done in the context of the structure of the entire industry as well as the ICT sector of the region.

Dalum, B., Kristensen, F.S. and Christian O.R. Pedersen (2002) *Vision Nordstjernen - Strategiske overvejelser vedroerende den nordjyske IKT sektors fremtid* (Future Strategies of the ICT Sector of North Jutland). Aalborg: NOVI & NorCOM.

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