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ELECTRONIC COMMERCE AND REGIONAL ECONOMIES – CONCENTRATION VS. DECENTRALISATION

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ABSTRACT

The use of the Internet as a commercial medium and market is growing tremendously in Finland, as well as in many other countries. This development process will have direct and indirect impacts that involve the whole economy, including many traditional sectors. It can also have profound effects on regional economies, their competitiveness, production structures, labour markets etc. However, little research has been conducted in order to analyse the regional impacts of electronic commerce.

The aim of this paper is to discuss the potential impacts of electronic commerce on regional economies. The paper discusses whether the digital economy fosters further centralisation, or whether the potential for decentralisation dominates and opens significant new opportunities for peripheral regions. The presented forces for centralisation include the evolution of value chains and distribution channels, increasing returns to scale, and agglomeration benefits. In turn, the possibilities for decentralisation are analysed in the light of the diminishing role of geographic distance, potential for improvements in efficiency, specialisation and the knowledge of local markets, as well as potential for networking and the improving availability of services in the remote regions.

Keywords: electronic commerce, regional economies.

1. Introduction

The term electronic commerce can be defined as sharing business information, maintaining business relationships, and conducting business transactions by the means of telecommunications networks (cf. Adam et al. 1999; Kalakota & Whinston 1996; Zwass 1996). The recent development of the Internet and the world wide web (www) has led to a rapidly increasing part of commercial transactions to become electronic.

This paper focuses on the electronic commerce over the Internet, which has been developing at a spectacular pace. At least in technical terms, Finland is one of the leading countries in this development process. Figure 1 plots out the numbers of Internet hosts per 1 000 inhabitants and the mobile subscribers per 100 inhabitants in the EU countries and some selected reference countries. The figure proves the leading position of Finland in terms of these indicators. This is also important for the future potential of electronic commerce in the country.

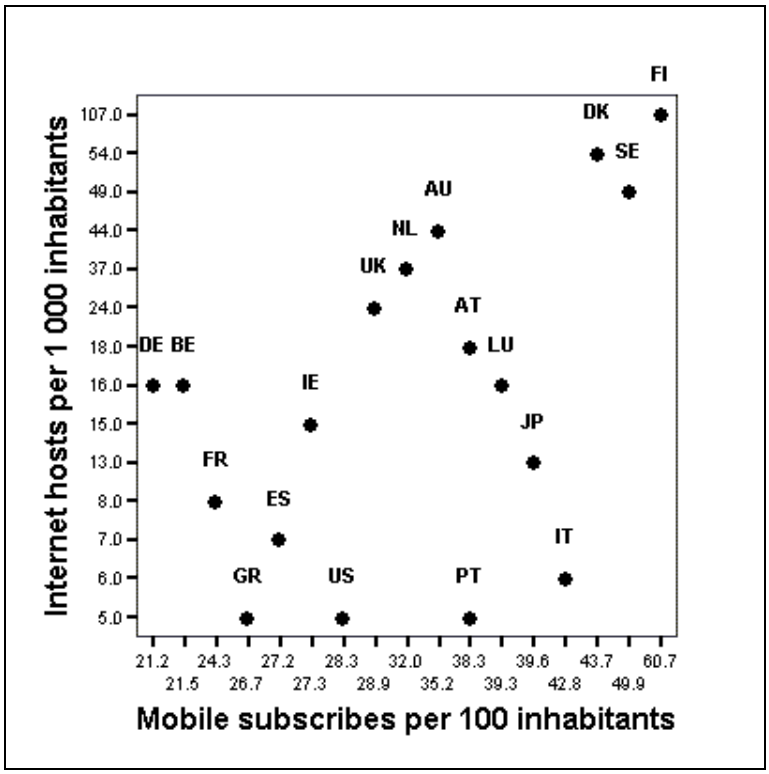

Figure 1 Matrix of technical readiness for electronic commerce
(Sources: Network Wizards, Internet Domain Survey (http://www.nw.com); Population Reference Bureau (http://www.prb.org); OECD 2000).

Finland	FI	Germany	DE	Belgium	BE	USA	US
Sweden	SE	Italy	IT	Ireland	IE	Japan	JP
Denmark	DK	Luxembourg	LU	Portugal	PT	Australia	AU
Austria	AT	Netherlands	NL	Spain	ES		
France	FR	Greece	GR	United Kingdom	UK		

A continuosly increasing number of both enterprises and consumers considers the Internet as a good place of doing business. In Finland, 90% of the enterprises employing at least 20 persons used e-mail, and 87% had Internet connections already in 1998 (Statistics Finland 1999). The smallest enterprises are also increasingly realising the potential of the Internet. The population using the Internet is also growing rapidly in Finland, and the number of Internet connections per capita is one of the highest in the world (e.g. Statistics Finland 1999). The potential for electronic commerce in Finland is also intensified by a remarkably high mobile phone penetration (see Figure 1), as mobile Internet commerce is predicted to grow explosively already in the near future.

The Internet is a unique medium that allows information to be accessed without geographic location constraints (e.g. Haynes, Becherer & Helms 1998). Hence, the rapid growth of electronic commerce over the Internet can have profound effects both on national and regional economies, their competitiveness, production structures, labour markets etc. However, little research and discussion has been conducted to analyse the regional effects of electronic commerce. This is partly due to the lack of reliable statistics or other measures of electronic commerce at the regional level. Consequently, there is also a great deal of controversy about the extent to which, and the ways in which, electronic commerce will transform the spatial patterns of development.

From the Finnish viewpoint, the regional aspects of electronic commerce are especially interesting. First, this is due to the exceptionally high penetration and user rates of the Internet, and the following growth potential for electronic commerce in the country. Second, it is also due to the special characteristics of the Finnish regional structure. Most parts of the country are very sparsely populated. Figure 2 presents the subregional setting of Finland, which illustrates the situation. There are only a few subregions with even a relatively high population density, whereas the population density in the majority of subregions is considerably low. The recent trend in Finland has also been an increased concentration of population, as well as economic activities, into a small number of urban centres (e.g. Ovaskainen 1999; Ritsilä & Ovaskainen 1999; Kangasharju, Kataja & Vihriälä 1999). Given the remarkable potential that electronic commerce has in Finland, it is interesting to consider what impacts it can possibly have on the existing regional structure.

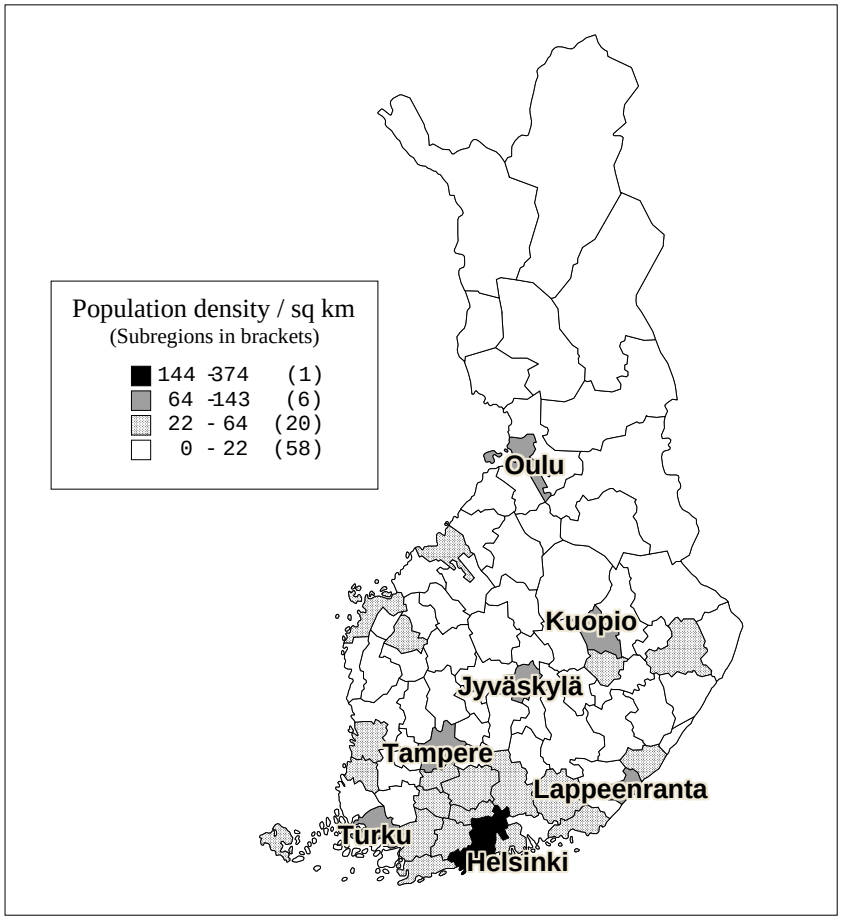

Figure 2 Population density in the Finnish sub-regions (1997)

This paper aims to discuss the potential effects of electronic commerce on regional economies. The main question dealt with is whether digital economy fosters further centralisation, or whether the new opportunities for decentralisation dominate.

The rest of the paper is structured as follows. Section 2 discusses the potential forces for centralisation. In turn, section 3 concentrates on the potential factors in favour of decentralisation. Section 4 presents the concluding remarks.

2. Forces for centralisation

The evolving electronic markets and Internet economy involve a number of characteristics that may act in favour of further centralisation of economic activities. Here, the discussed forces for centralisation include the evolution of value chains and distribution channels, increasing returns to scale, and agglomeration benefits.

2.1. Evolution of value chains and distribution channels

The Internet alters market dynamics, and the relationships between actors may also change significantly. Electronic commerce also has effects on industry structures, and the traditional value chains can confront significant reforms (e.g. Kalakota & Robinson 1999; Kettunen & Filenius 1998).

Electronic commerce provides the enterprises with new opportunities for streamlining production and distribution processes, and shortening supply chains (e.g. Kalakota & Robinson 1999; Heikkilä et al. 1998). Especially in the case of digital products that can be distributed directly over the Internet, some of the parties of traditional supply chains can lose their role, or their role is altered. The supply chains of traditional physical goods can also be reorganised, and the role of traditional wholesalers and retailers may change significantly. In the extreme case, customers can order their products directly from the producers, and the only possibly needed intermediary is a partner taking care of physical logistics. In the case of electronic products, also this party can be excluded from the value chain. Thus, direct on-line contacts with customers provide suppliers with an opportunity to have shortened lead times, more accurate order-processing capabilities, decreased storing expenses, etc. (cf. Haynes, Becherer & Helms 1998).

The Internet offers new opportunities for cost effectiveness and adding value by moving stages of value chains into the realm of information processing (E.g. Kettunen & Filenius 1998; Rayport & Sviokla 1994; Zwass 1996). Figure 3 presents an example of potential evolution of value chains in electronic commerce.[i] The functions within an enterprise form the core area of activities. Probably, electronic commerce will have direct or indirect effects on most of them. However, in this context our focus is on the activities that have traditionally been taken care of by parties outside the producing enterprise. Let us consider the case, where a domestic enterprise produces a final product, which is marketed and sold both inside the home country and abroad. In turn, the necessary raw materials are (at least partly) ordered from global suppliers abroad.

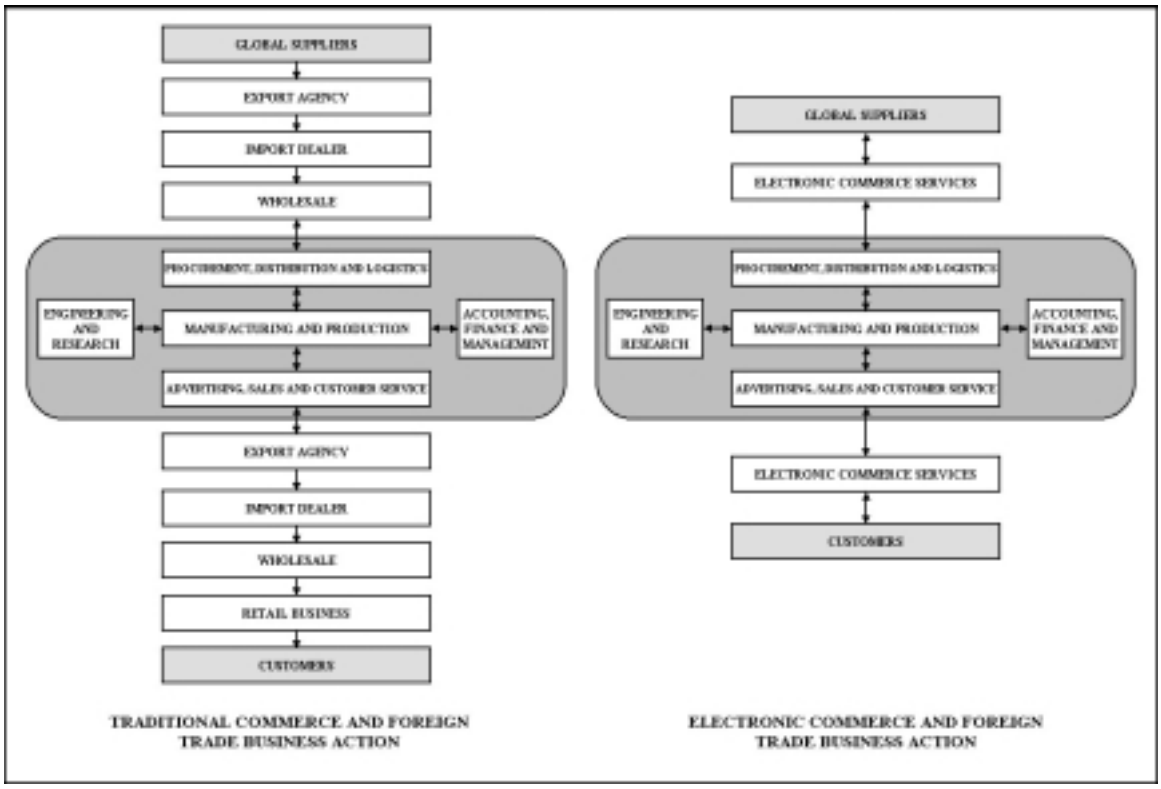

Figure 3 Evolution of value chains – an example
(cf. Kalakota & Whinston 1996; Kettunen & Filenius 1998)

In traditional case, enterprise orders raw materials from global suppliers via a number of intermediaries, including export agencies, import dealers and wholesalers. In electronic commerce, the process can be streamlined: the enterprise can order its raw materials either directly from the global suppliers, or alternatively use electronic commerce services (agencies, brokers etc.) to compare prices, distribution times etc. Also, the enterprise can considerably streamline the supply chain of its final product. Traditional commerce typically involves a number of intermediaries (export agencies, import dealers, wholesalers, retailers etc.) that all add costs, and consequently raise the price of the product. In electronic commerce, the enterprise can sell directly to its customers, or alternatively take advantage of different electronic commerce services that either increase the potential number of customers, or add some extra value that can lure new potential customers and/or engage the existing customers. The enterprise can also have cost savings that can partly increase its profits and partly increase consumer surplus (cf. Smith et al. 1999; Strader & Shaw 1999).

As described, electronic markets cause increasing pressure on many traditional intermediaries. Removing the intermediaries from a supply chain can result in

significant economies, both on the supply side and indirectly also on the demand side. However, from the regional viewpoint this may also pose considerable threats for peripheral areas. The illustrated process can result in a decline of enterprises and jobs in these areas. If the consumers increasingly start to order goods and services directly over the Internet, the physical local services are in danger to lose their living potential and eventually disappear. Although, it can be argued that not all the intermediary roles are threatened by electronic commerce and there are also new intermediary opportunities that emerge[ii], the risk of increasing regional concentration is real. Despite the electronic networks, it can be predicted that these new intermediaries and other actors typically try to increase in size and concentrate their activities into places where they can benefit from physical backward and forward linkages with other actors (see also section 2.3). This is also supported by the need of enterprises for skilled and well-educated labour force, which tends to concentrate into central areas (see e.g. Ritsilä & Ovaskainen 2000). Even though electronic commerce can provide new consumption and other opportunities for the people in remote areas, it can thus be argued that overall the evolution of value chains and distribution channels favours central areas.

2.2. Increasing returns to scale

Another important factor related to electronic commerce that can foster centralisation are increasing returns to scale. In general, increasing returns to scale are an often observed reason for the start of regional concentration. The new economic geography, and the so-called core-periphery model, is also based on increasing returns to scale (e.g. Krugman 1991a, Krugman 1991b, Fujita et Mori 1998; Fujita et al. 1999).[iii] The core-periphery model assumes a dynamic world with increasing returns, externalities and self-feeding cumulative processes. The model emphasises forward and backward linkages that can lead to agglomeration (see section 2.3). The predicted result of the model is that most economic activity will eventually concentrate in the core region of a given economy. In the case of many regions, several growth centres may emerge, while other regions can be considered as losers. The basic principles of the model can also be applied to electronic commerce.

In a competitive market, enterprises determine their production decisions on the basis of market prices. Increasing returns to scale occur, when by scaling up the inputs by a factor t, a firm gets more than t times as much output. Formally,

$$f(tx_1, tx_2) > tf(x_1, x_2),$$

for all t>1. (Varian 1993, 313). Figure 4 illustrates the increasing returns to scale, applied to the case of electronic commerce.

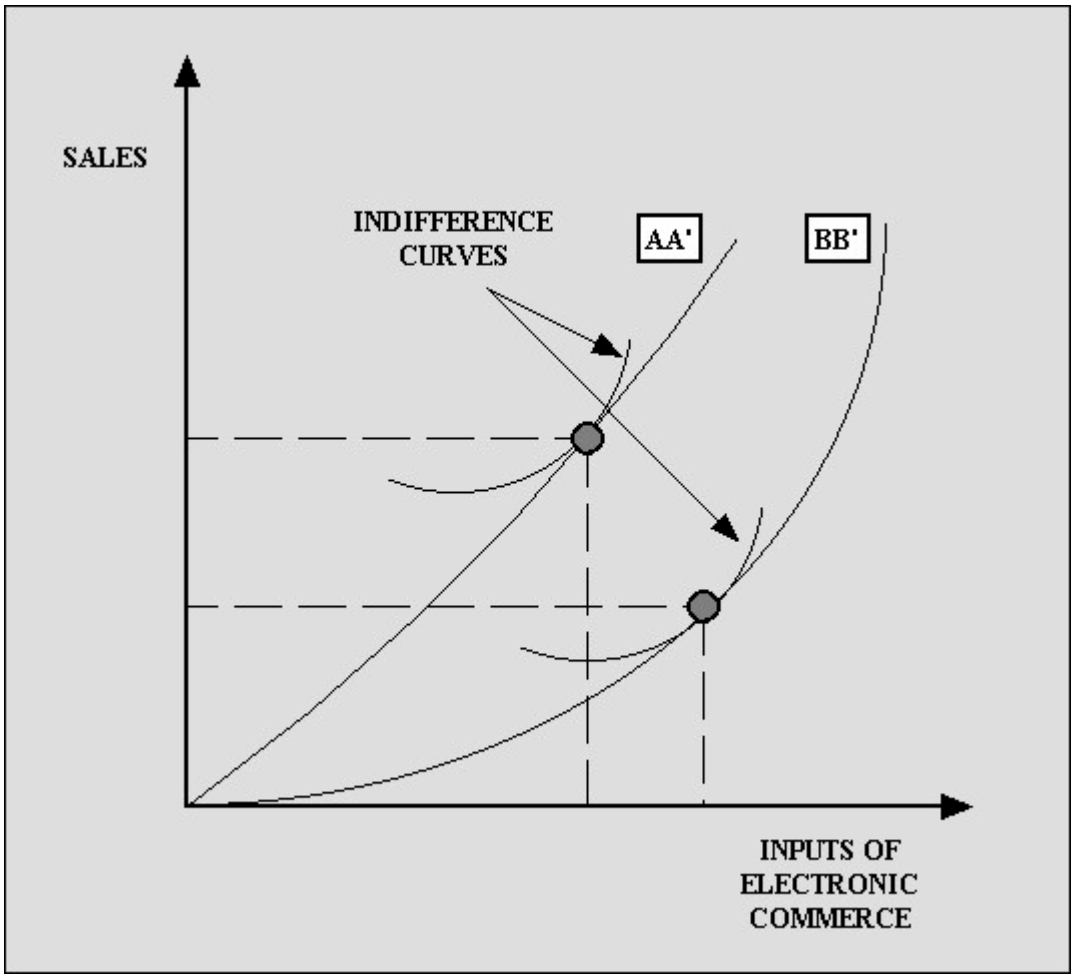

Figure 4 Increasing returns to scale in electronic commerce

As usual, the indifference curves are tangents to the production sets, which can here also be interpreted as "sales sets". Here, it must be noted that the production sets AA' and BB' are not convex. In a fully competitive market and convex production sets, market prices would tell all the information needed to determine the optimal level of production. However, when production sets are nonconvex, the prices do not convey all the information necessary for an enterprise to choose the most efficient location. Thus,

the information on all parts of business operation functions and indifference curves is of great importance for strategic decision making. (see Varian 1993, 516-518).

In Figure 4, the case AA' can be interpreted to illustrate traditional commerce, and the case BB' a typical situation in electronic commerce. When an enterprise starts electronic commerce, the sunk costs of inputs are typically high, since a lot of work and investments (equipment and infrastructure, marketing etc.) are needed before the first sales in the electronic market. After these sunk costs, however, electronic commerce is relatively cheap, and additional sales do not necessarily involve significant marginal costs. This applies especially well to digital products that can be both sold and distributed directly over the Internet. Typically, the copying of these products is cheap after the first copy is finished, and new sales do not cause extra logistics costs either. Thereby, the marginal returns increase and marginal costs decrease significantly to scale in this type of commerce. Accordingly, the start-up of electronic commerce can involve even high costs[iv], but after that additional sales can be made with relatively low costs, requiring that the company has managed to achieve its target customers.

An important question is what the above described features of electronic commerce can mean for regional development. We argue that it is likely to support centralisation. As a result of increasing returns to scale, the largest firms can dominate the markets. Their marketing (and other) budgets are high, which enables them to achieve the critical mass of customers for the leading market position. With increasing returns to scale, successful large firms can become very cost-effective, and it is hard for small enterprises to compete with them. Thus, there is a risk of oligopolistic markets, with few actors controlling them, while smaller companies cannot reach the combination of sales and prices that they would need to survive.

In principle, however, electronic commerce can be considered as a competitive industry with free entry: there are no significant restrictions against new firms entering the industry (cf. Varian 1993). The firms entering the market lead to changes in supply and prices. This, in turn, again affects the profits of existing firms, and also the incentives for firms to enter and exit.

The commonly accepted objective of enterprises is to maximise long-run profits. On the other hand, a loss-making enterprise cannot survive in the long run. In the short run,

however, there may be many enterprises in the market, a part of which makes positive profits, a part zero profits and a part even negative profits. Nevertheless, in the long run the only relevant part of a firm's supply curve is that part that lies above the average cost curve, i.e. locations that correspond to nonnegative profits (see Varian 1993, 381).

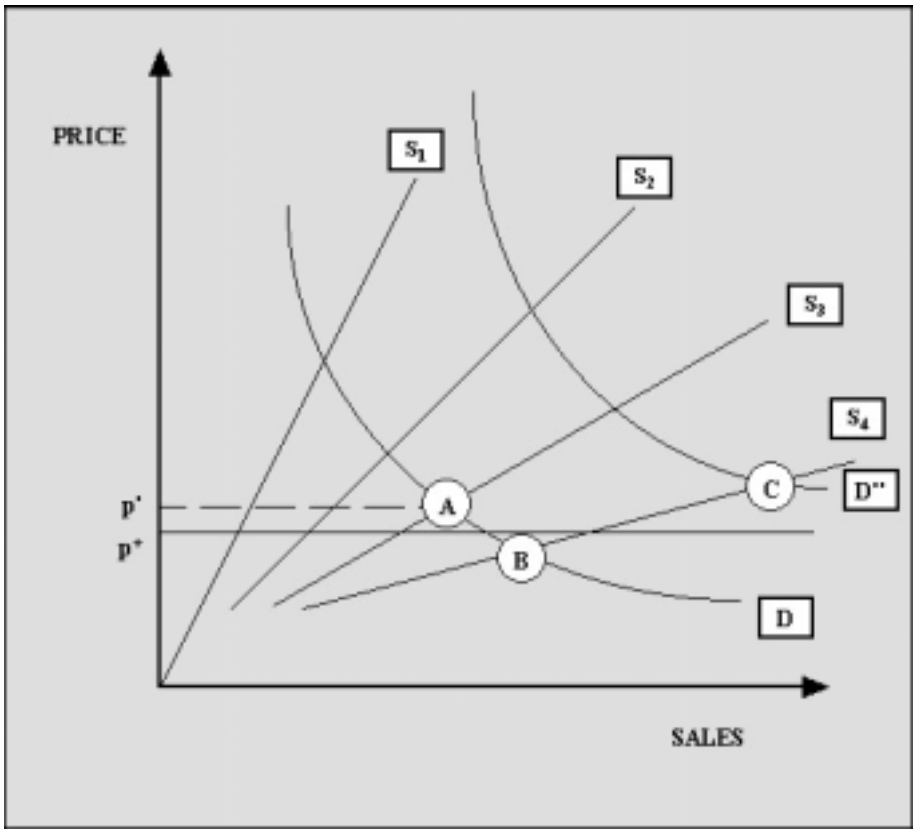

Figure 5 Electronic commerce supply curves with free entry

Figure 5 illustrates electronic commerce short-term supply curves ($S_1 - S_4$) in the cases with 1 - 4 enterprises in the market. A horizontal line at p* describes the minimum price that is consistent with nonnegative profits. D and D'' describe the market demand curves. Now let us consider the intersections of the demand curve and the supply curves for 1-4 firms. If enterprises enter the industry when positive profits are being made, the relevant intersection is the lowest price consistent with nonnegative profits. If the demand follows the demand curve D, this is illustrated by point A with price p'. Hence, in this case, profitable operations are enabled when there are three enterprises in the market. If the demand stays constant, it is not profitable for the fourth firm to enter the market, since its profits would be negative (point B). However, if the demand increases (a shift from D to D'') the market price rises. In this case, it would be profitable also for the fourth enterprise to enter the market (point C). Nevertheless, Figure 5 illustrates that

the increased supply puts downward pressure on the prices, so that without an increase in demand, a number of profitable enterprises is very limited. (cf. Varian 1993, 382-383). Unless electronic commerce leads to remarkable increases in market demand, there is hence a risk that the market entry becomes very difficult, if not even impossible, for small companies in the peripheral areas.

As described in Figure 5, although electronic commerce in principle enables any enterprise to enter the market with relative ease, it is in many cases not profitable. Hence, the overall market potential for the small and middle-sized enterprises (SMEs) from remote regions may not be improved by electronic commerce. On the contrary, it is even possible that they lose a significant part of their home markets to the big-sized electronic commerce companies with well-known brands and large marketing budgets.

2.3. Agglomeration benefits

Agglomeration benefits result from spatial concentration of production and consumption actors, like enterprises, institutions, people etc. (e.g. Davelaar & Nijkamp 1997). Small initial advantages can start the agglomeration process which leads to remarkable regional disparities in the long run. Once the process begins, it tends to be self-reinforcing (e.g. Hansen 1992; Krugman 1996).

The development trends in the United States, as well as in Europe, have followed the agglomeration path (e.g. Krugman 1993, Haaland et al 1999, Pekkala 1999). This is partly also due to the technological change and the resulting demand for more advanced human capital, better commuting possibilities and information flows and so on (e.g. Mokyr 1994, Ritsilä 1999). Advanced electronic networks are also of increasing importance as sources of agglomeration. Agglomerations can also be formed merely as a result of positive future expectations in a given location (Ottaviano and Puga 1998).

The central element of agglomeration theories is the presence of beneficial externalities between enterprises (Venables 1998). Geographical concentration of enterprises allows a pooled market for labour with specialised skills (e.g. Krugman 1991). Local clustering can provide advantages in terms of a finely detailed division of labour, and proximity makes it more easy and efficient to build up and exploit production inputs and resources (Suarez-Villa and Rama 1996). Locating in a regional pole of own industry may also

help to create and maintain learning networks, which are especially important for technologically advanced sectors (see Suarez-Villa and Rama 1996).

Figure 6 illustrates the regional agglomeration process, as a result of which continuous concentration can take place. The accumulation of different actors support each other, creating a self-feeding concentration process (cf. e.g. Hansen 1992).

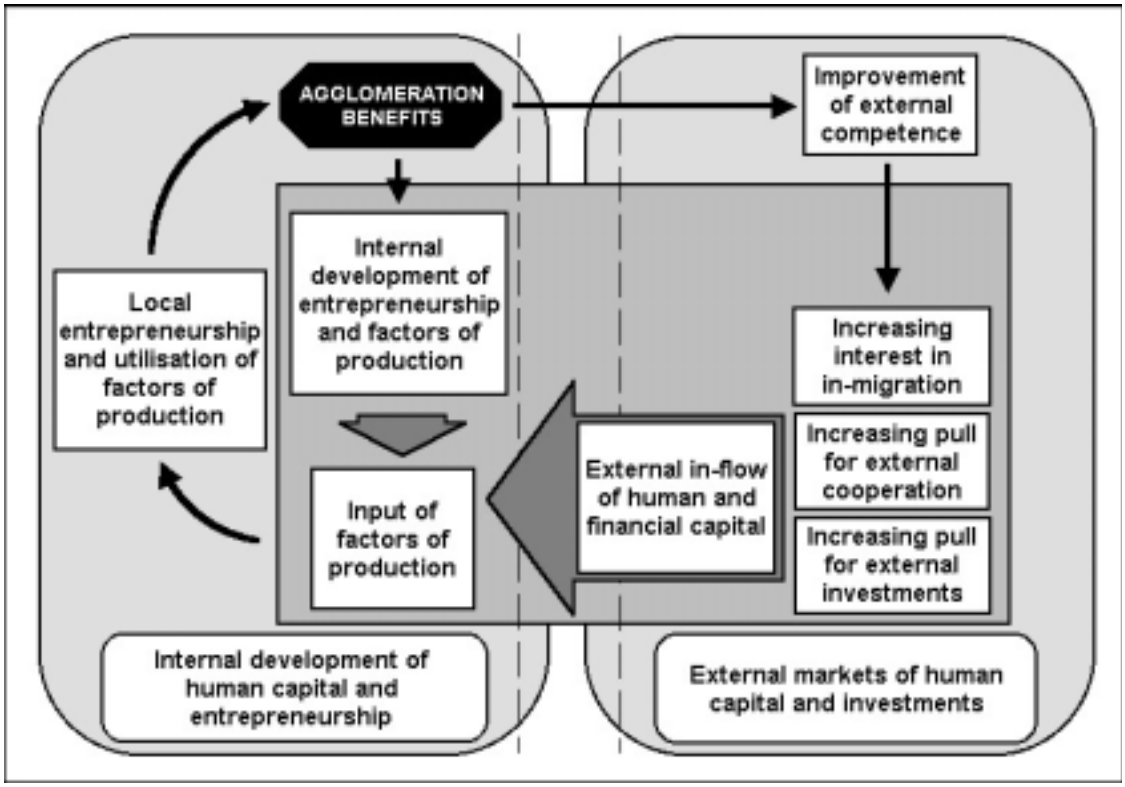

Figure 6 Regional agglomeration process

Agglomeration benefits play a significant role in the location decision of enterprises. A good example of this are high technology firms, such as the many of the electronic commerce system and service providers. A well-known concentration of high-tech activities is the Silicon Valley in the United States, but the same type of phenomenon can also be noticed in Finland (see e.g. Ritsilä & Ovaskainen 1999; Svento et al. 1998). This is also related to the concept of innovative milieu (Camagni 1995; Maillat 1998, Ritsilä 1999). A favourable economic environment involves a set of relationships encompassing in a coherent way a production system, economic and social actors as well as a specific culture and representation system, and thereby generating a dynamic and collective regional learning process (Camagni 1995). This eliminates uncertainty faced by economic actors, and thereby enhances learning and creativity.

One of the central forces in the agglomeration process and regional concentration are movements of human capital (see e.g. Forslid 1999; Ritsilä & Ovaskainen 2000). Workers like to live in the areas where jobs are abundant, and enterprises like to be located in the areas with a supply of skilled labour force. This is also important from the viewpoint of electronic commerce. The companies have to find appropriate labour force in their local markets. Also, they need to find managers that fit to the roles required by the rapid development of electronic commerce. Due to the agglomeration processes, it is difficult for remote regions to attract either potentially successful electronic commerce companies, or high-skilled workers and managers to run them. On the opposite, remote regions may well lose their most talented labour force to the central areas with better job opportunities, like-minded individuals and social networks, advanced free time activities etc.

In general, and also in electronic commerce, agglomeration benefits and the resulting accumulation effects can further increase the gap between prosperous and less prosperous regions. Electronic commerce is not likely to have a decreasing effect on agglomeration. On the contrary, it involves features that favour agglomeration, and the overall centralisation of markets (concentrated electronic marketplaces etc.). This phenomenon is also related to increasing returns to scale (see section 2.2.) Probably, this process promotes an ever increasing centralisation of economic power into the urban centres that can exploit their advantages to enhance the position in the markets.

3. Potential factors in favour of decentralisation

Despite a number of centralising forces, electronic commerce can also provide peripheral regions with potential to reduce some of their traditional economic disadvantages. The possibilities for decentralisation are discussed here in the light of the diminishing role of geographic distance, potential for improvements in efficiency, specialisation and the knowledge of local markets, as well as the potential for networking and the improving availability of services in the remote regions.

3.1. The diminishing role of geographic distance

As explained in the previous sections, the patterns of trade are going through significant changes. The Internet plays a continuously increasing role in the transmission of goods

and in spatial interactions. At least in principle, the Internet allows businesses of any size to communicate and coordinate online with their suppliers, employees, and customers, and thereby also to provide improved products and services at lower costs

It has been argued that new technologies, including electronic commerce applications, could have potentially significant positive impacts on peripheral and rural areas (see e.g. Capello & Nijkamp 1998; Fitzpatrick 1998; Newlands & Ward 1998). At least in principle, the use of the world wide Internet enables all producers to gain access to a global marketplace with relative ease, without respect to geographic location (e.g. Haynes, Becherer & Helms 1998; Traxler 1998). Thus, the Internet can provide enterprises with new opportunities to take advantage of the benefits of being close to customers. However, as both buyers and sellers can have contacts that were previously beyond their reach, competition also becomes increasingly intense. Increasing supply and reduced search costs can also cause increasing downward pressures on prices. As the profit margins shrink, enterprises have to seek for the most cost-efficient ways of doing business. Consumers in the peripheral areas can also make purchases directly over the Internet. They can benefit from improved information, larger choices, as well as lower transaction costs and prices, which may threaten the local producers and retailers (see sections 2.1. and 2.2). The important question for peripheral companies is, whether it is the new positive market potential, or the new competition threats that finally dominate in the future development of markets.

Anyway, the diminishing role of geographic distance can open new types of opportunities for peripheral regions. First, it must be remembered that majority of electronic commerce is business-to-business commerce (see e.g. Forrester research). Often, the enterprises operating in the business-to-business field have established their contacts before they start electronic commerce. The Internet and electronic commerce can provide peripheral enterprises with major advances in communication with their business-to-business trading partners. For example, the Internet has enabled the use of the benefits of electronic data interchange (EDI) for a large number of new SMEs, since the investment costs (and consequently risks) are now considerably lower than before (see e.g. Lankford & Johnson 2000; cf. Koski 1997).

Second, the Internet enables companies to manage dispersed production systems more easily than before, thereby reducing the need for fully centralised operations. The firms

can locate their different functions in whichever region they consider to possess comparative advantage in the relevant inputs. This may open significant opportunities for remote areas, requiring that there is appropriate labour force. For example, land rents and also wages are usually lower in remote areas than in central areas, which may attract firms to move some of their functions away from the centres.

3.2. Potential for improvements in efficiency

The Internet offers the enterprises new opportunities for improving efficiency, customer service etc. through improved business process management, and/or the concentration on main business activities. The matrix presented in Figure 7 illustrates the strategic decision making options of an enterprise related to these aspects.

Increased efficiency of business process management can be achieved by the integration of different electronic commerce related systems, both internal and external. An enterprise has to decide whether it is best for its strategy to proceed directly into the full integration of all internal and external systems, or move gradually from separate electronic sales into more deeply integrated solutions (cf. Kettunen & Filenius 1998). In turn, another important strategic decision is related to the level of externalisation of supporting activities. An enterprise has to decide whether it outsources all the supporting activities, organises them internally, or stays in between these extremes. In Figure 7, each enterprise can search for the combination of the factors on the two axes that best responds to its own goals and purposes.

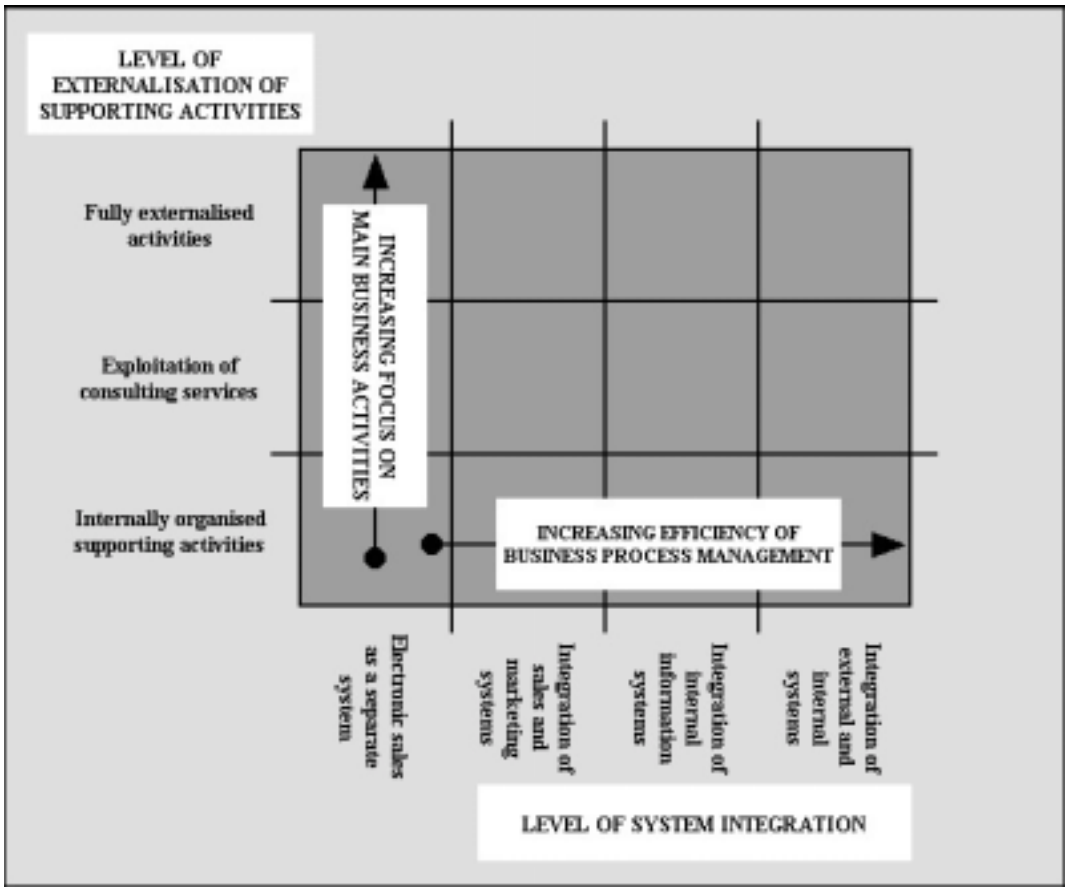

Figure 7 Matrix of system integration and focus on main business activities

From the viewpoint of remote regions, the above considerations are of special importance. As the competition increases as a result of electronic commerce, the improvements in efficiency become even more important than before. Competitive outsourcing and system integration are important tools for the enterprises in the remote regions to considerably improve their living potential in the new market environment.

3.3. Specialisation and the knowledge of local markets

A potentially very positive feature of electronic commerce for the remote regions is remarkable new opportunities for selling tailored products to finely targeted customer groups. Hence, one way for remote enterprises to survive in competition could be increasing focus on specialisation. The Internet provides a good forum to have contact with small special groups throughout the world. By targeted niche marketing, also the enterprises in remote areas can benefit from this. The Internet also provides new opportunities for customer feedback to tailor products to market demand (e.g. Wyckoff 1997). In some cases, enterprises can also take advantage of the possibility of instant

delivery for intangible services and products in digital form. In other cases, the enterprises just have to find new ways of organising their logistics so that the remote location, and the following long-distance delivery, does not cause delays that could prevent or decrease the orders[v].

Like in conventional retail trade, an important factor in electronic commerce is customer awareness. It helps in addressing advertising and marketing, as well as in developing the product selection. Often, the local enterprises and retailers have the best capabilities to understand what are the most appropriate goods and services to offer in a specific area (cf. e.g. Greenstein 1999). Local enterprises can also have significant advantage of their traditional personal contacts with customers and the overall knowledge of the features in their local markets. This can be one of the most important strategic tools that they have in competition with large inter-regional or even international electronic commerce companies. Usually, in order to replace the local competitors, large-scale strategic marketing and advertising budgets are needed. Figure 8 illustrates the potential strategies for enterprises in the remote regions in terms of specialisation and local market expertise.

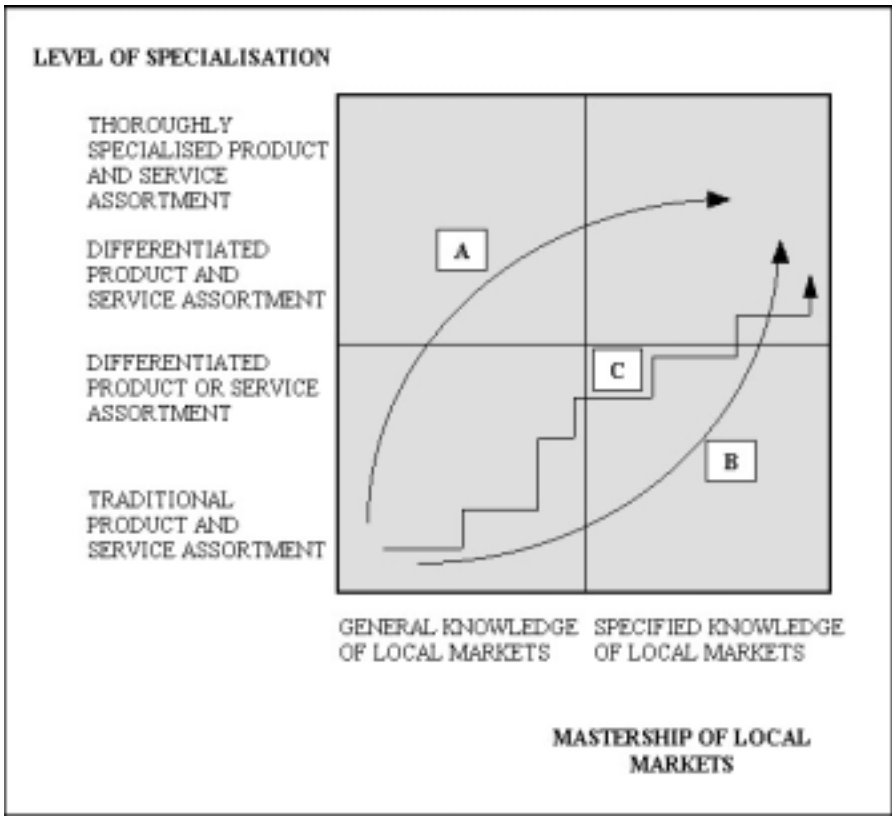

Figure 8 Potential strategies for specialisation and local market expertise

In general, the finding of right strategies to guarantee the future success of local SMEs is crucial for regions, since they play a significant role in economic development and employment (e.g. Ministry of trade and industry in Finland 1996; Haynes, Becherer & Helms 1998). Related to electronic commerce, specialisation and local market expertise can be keys for this. An appropriate combination of these advantages can provide SMEs with good future prospects, despite of new electronic competitors.

3.4. Potential for networking and the improving availability of services in the remote regions

In general, network relationships are becoming a more and more important feature in the markets. The competitive edge of many firms has shifted from static price competition towards dynamic improvement, favouring those who can create knowledge faster than their competitors (Porter 1990; Maskell et al. 1998). The role of networks is growing in significance also in small-business development, and the economies based on high levels of business trust and cooperative relations have been emphasised as a recipe for economic success (e.g. Perry, 1999).

Long-term contacts and a continuous exchange of information allow the development of expertise (e.g. Maskell et al. 1998). Although the Internet provides a new channel for information exchange, knowledge spillovers take place only if a firm establishes a trustful relationship with other firms, which can be assumed to be easier over small than larger distances (see Caniëls 2000). Despite the opportunities opened by the Internet, it can be argued that information still flows more easily and efficiently locally than over greater distances, and face-to-face contacts are still important.

Spatial diffusion of activities between the core and periphery can be described in the framework of peripheral “satellites” (cf. Shefer & Frenkel 1998). This framework is illustrated in Figure 9. The basic idea is that the regional system would consist of economically strong core regions which would support the operation of a few “satellites” in the periphery. The agglomeration benefits, innovations, etc. would first diffuse from the core region into the immediate surroundings and into “satellites” in the periphery, and then further into the immediate surroundings of these “satellites” (cf. Shefer and Frenkel, 1998). This diffusion process can be strongly supported by the use of the Internet, and also by electronic commerce. Through digital communication it is

possible to build and maintain crucial business networks, despite of actual geographic location factors. For example, real-time digital contacts enable the business negotiations and meetings, and even business agreements, over long distances. However, ensuring the efficiency of this framework would certainly postulate a number of other regional policy measures that aim at developing the infrastructure, etc. in remote districts.

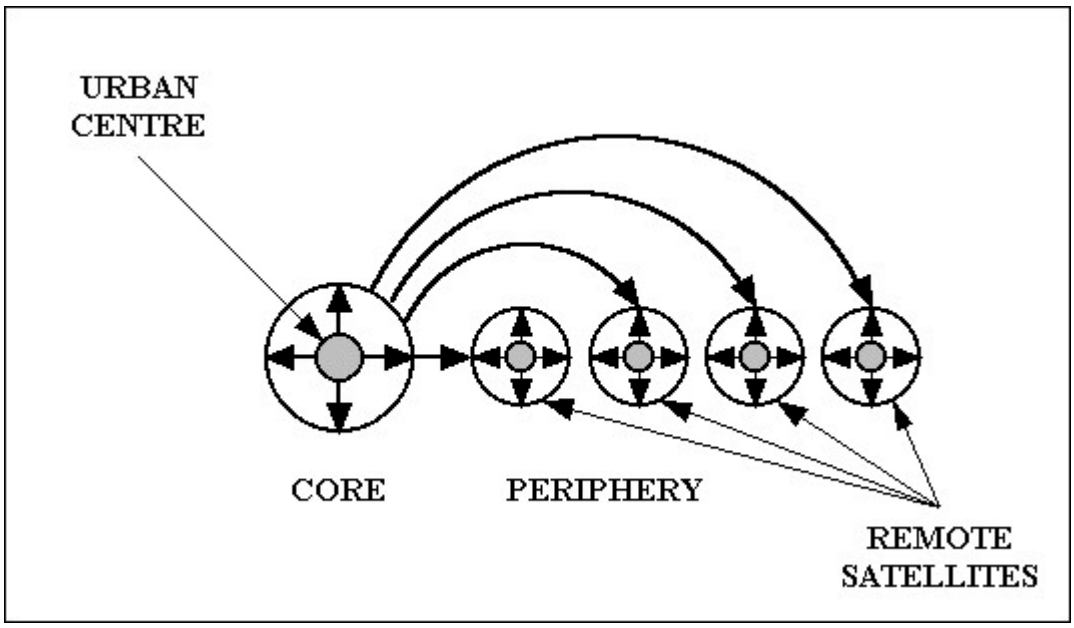

Figure 9 Regional diffusion of innovation and knowledge over networks

On the demand side, it must be also noted that the Internet can provide peripheral areas with new kinds of not only business, but also leisure, information, entertainment and cultural experiences. Digital technology enables the availability of many crucial basic services in the remote districts, where the supply of traditional services lacks far behind the more central areas. Perhaps, this can have at least a slightly decreasing effect also on out-migration.

4. Concluding remarks

Electronic commerce is changing traditional market structures, which will have impacts also on regional economies. The electronic markets are still at their early stage, and they are constantly changing. In the future, the introduction of broadband Internet networks, as well as mobile networks and new interfaces (digital television etc.) open a vast amount of new opportunities. This increases both the potential for the growth of electronic commerce, and the emergence of completely new types of services. In

general, there are both centralising and decentralising forces involved in the rapid development of new digital markets. Therefore, the actual effects of electronic commerce on the development of regional economies remain controversial.

Regional questions are important in order to support the balanced development of digital economy. Despite the lack of reliable statistics, it can be assumed that neither electronic commerce activities (supply) nor the Internet use in general (demand) are likely to be equally divided between regions. Although electronic commerce and information society could theoretically open new opportunities for decentralisation and help regionally balanced development, this does not seem to be the trend in reality. The forces in favour of centralising processes of economic activity are strong, and affecting this tendency seems troublesome also in the Internet age.

An important question of how to develop competitive environments for enterprises in remote districts remains also in electronic commerce. For regions, it is important to form their own strategies in order to define their own strengths, weaknesses, opportunities and threats in relation to electronic commerce. The success of peripheral regions in the future competition requires both adequate physical infrastructure and advanced information & skills needed in the new digital environment. Both private and public measures would be needed in order to avoid the digital divide in regional terms (cf. e.g. Fitzpatrick 1998; Moss & Townsend 2000). Finally, it must be remembered that the answer to the question of centralisation vs. decentralisation depends on the locational decisions of consumers and supply parties, together with actual consumer behaviour. This applies as well to the electronic commerce as to the traditional commerce.

There are several further interesting research questions related to electronic commerce and regional development. Unfortunately, the lack of appropriate data makes it impossible to conduct empirical analyses of electronic commerce activities in different regions. However, a lot of work is being done in order to improve this situation, and hopefully we can soon make preliminary empirical estimations about the regional impacts of electronic commerce. There are also several further theoretical analyses that could improve our understanding of the complicated phenomena under consideration.

[i] The potential impacts of electronic commerce on value chains have been discussed and illustrated for example in Kalakota & Whinston (1996) and Kettunen & Filenius (1998).

[iiii] New intermediaries include e.g. Internet service providers (ISPs), online business bureaux, virtual shopping malls, new electronic commodity and stock exchanges, on-line auctioneers etc. It may be even argued that by the increasing number of these, the role of intermediaries will be reinforced in electronic commerce. (cf. e.g. Strader & Shaw 1999; Zwass 1996).

[iii] This is in contrast with the neoclassical trade theory based on constant returns and zero transport costs.

[iv] The high costs can result to a large part from marketing. Although, it has been argued that the set-up of an electronic commerce company is cheap compared with e.g. traditional retail shops, it has turned out that in order to achieve sufficient publicity and critical consumer mass, massive marketing campaigns are often needed. This applies especially to business-to consumer electronic commerce. In any case, the set-up involves costs related to e.g. necessary equipment, connections etc.

[v] On the possible arrangements and problems of electronic commerce related logistics, see e.g. Kettunen & Filenius 1998.

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