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The importance of trust and networking in the learning process of Polish companies

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Introduction

Innovation, learning and competitiveness are positively loaded concepts, which are in focus in to-day's research on enterprise development. Paradoxically enough the overall trend towards the globalisation of trade, production and investment have lead to an increased focus on the micro- and meso-level structures and processes of companies during the last decade or two. This is true even in research fields which used to focus on macro level developments. The rationale behind this is the idea that in a globalised world, where the competitiveness of companies is continuously challenged by competitors from around the world, the survival of companies depends on the continuous development of individual as well as of collective capabilities. Hardly any field of production is protected from competition any longer.

It is a point of departure for this paper that this challenge also faces companies in Central and Eastern Europe. Central and Eastern European companies have faced the trend of globalisation since 1990, when their governments initiated processes of privatisation of state enterprises, price liberalisation, liberalisation of international trade and allowed the expansion of the private sector. It can be shown that the situation of western and eastern companies in relation the basic institutions surrounding them, is comparable today. The following indicators illustrate this.

Today the private sector in Hungary, The Czech and the Slovak Republic represents 80% of GDP. In Poland it covers 75% of GDP (like in Albania and Estonia) while the private sector of the former Soviet republics is generally smaller. The situation of small companies in several of the countries is comparable with the situation in the West, with no state ownership and tradability of land (Poland, Hungary, the Slovak Republic, Slovenia, the Czech Republic and four other countries). The trade and foreign exchange systems of Poland, Hungary and ten other countries are comparable with the advanced industrial economies. Tariff barriers have been removed and these countries have become members of the World Trade organisation. Only in one field, price liberalisation, there is not yet full liberalisation ((European Bank for Reconstruction and Development 2001)p.12-13.) In this comparison Poland and Hungary and Poland are the countries which according to these indicators have achieved the highest level since 1990. The smaller share of the private sector in GDP in Poland is mainly due to the continued state ownership of the mines and steel works in Katowice.

The general institutions of the market economy are thus a fact of life for companies in large parts of Central and Eastern Europe. Poland is among the most advanced countries in this respect.

The question of this paper is related to the innovation and capability building strategy of Polish companies in the context of the new market economy.

The first part of the paper describes the methodology and develops the concepts and theories, which ends up with the list of more specified questions for empirical discussion. The second part of the paper contains an analysis and discussion of two Polish companies with a

particular focus on their learning strategy and their use of local, national and international networks as part of their strategy.

I Methodology, theories and concepts

Mehodology

The ongoing processes of transformation in Central and Eastern Europe is historically unique. In spite of the introduction of market economic institutions during the 1990s Central and Eastern Europe is in many ways different from the West. The differences which were evident before 1989, still can be found today after 12 years of transformation as a historical heritage. This insight is not always reflected in research on Eastern Europe in general and in research dealing with innovation and enterprise development in particular. It is astonishing, how little research dealing with innovation and enterprise development in CEE deal with history, heritage and context. It can be argued that the application of western theories on CEE issues may represent a 'way of not seeing' the real situation. An alternative is to develop a more humble attitude towards empirical research. This implies to study the societal processes going on in CEE in their own right, and with respect to their complexity and their history. When developing a methodology and an approach to the study of innovation and enterprise development in CEE the following issues should always be considered:

The heritage from socialism (and from before that)
The industrial culture in CEE
The context or the conditions of operation of the companies (institutions, infrastructure and so on)
The ongoing processes of change in CEE
The existing innovation potentials and capabilities in CEE companies and society.

This means that narrow approaches would not be useful. On the contrary a fruitful approach should be holistic in its intentions (encompassing a complexity of mutually dependent factors) and dynamic (include processes of change). The identification of causal relationships would belong to the empirical work, and theories should not stand in the way for new insights ((Lorentzen 2002)).
The suggestion here is to develop analytical frameworks for empirical research as a dialogue between known concepts and empirical findings and observations. The development of analytical frameworks can be seen as a cumulative process involving the research collective as a whole. The following section discusses useful concepts for the study of at enterprise level[1].

Innovation, knowledge and learning

In a market economy competition forces firms to innovate. With an expression of (Freeman 1982)p167, in a market economy not to innovate is to die. However, innovation was not absent in the planned economy either. Innovation was on the agenda of the political level in relation to certain branches and in the competition between the two systems, capitalism and socialism. Innovation was also part of the industrial and of the agricultural policy, which

[1] An approach to the study of institutions and organisation in the CEE has been developed in (Lorentzen 2001).

rested on ideas of modernisation and mechanisation. Industrial branch institutes, of which some still exist, took care of product and process development in industry and agriculture. At plant level innovation was part of the struggle to overcome shortages of supply. Plant managers and workers were able to develop solutions to many different problems, which they had to solve in order to fulfil production targets. It would therefore be erroneous to say that the institutions of the planned economy were unable to generate innovations. One big difference was that while customers' needs were the key to innovation in the West, the suppliers' ideas and capabilities were the key to innovation in the planned economy. Consequently the problem, which appeared after the introduction of the market economy, was that faced with western competition many industrial and final customers seemed to prefer products from western companies. There is not one but many reasons for this, as for example the fascination of the western products by eastern populations and companies, trade policies, differences in marketing capabilities, and differences in product quality. Confronted with the new challenges companies in CEE had to learn a new way to innovate their production.

But what is innovation? Different authors define this concept differently ((Edquist 21997; Lorentzen2002)p10) Basically innovation means renewal. A definition, which is very useful in relation to an enterprise study is the definition found in Nelson and Rosenberg ((Nelson & Rosenberg 1993)p 4-5). Nelson and Rosenberg's concept of innovation encompasses the process by which firms master and get into practice product designs and manufacturing processes that are new to them. This is regardless of whether or not they are new to the universe or even the nation. From a societal point of view this notion of the innovation process concerns the diffusion or application of new technology in the firm. In this way innovation is seen as a process in which the firm is the key institution.

The introduction of both product designs and manufacturing processes in a firm presupposes access to knowledge and the ability to organise. This is what (Polanyi 1966)) calls learning. Learning is the introduction of novel practices. Learning is thus not only a mental process but also a matter of organisation. The ability of the firm to organise the application of new knowledge and integrate it into the practice of the firm is what innovative capability is basically about [2]. This notion of learning overlaps considerably overlap with the concept of innovation as defined above. The distinction between innovation and learning tends to be blurred. This confusion is approached By Bell and Pavitt.

Bell an Pavitt ((Bell & Pavitt 1993)p163) supply the debate with a useful distinction between technical change and technical learning (or technological accumulation). The former encompasses any way in which new technology is incorporated into the production capacity of firms and economies. Technological accumulation (or technological learning) refers to any process by which the resources for generating and managing technical change (technological capabilities) are created or strengthened.
In comparison the Bell and Pavitt concept of technical change is parallel to the definition of innovation by Nelson and Rosenberg above while the concept of technological learning adds precision to the concept of learning of Polaniy.

These two processes, the process of technical change and the process of technological accumulation expand two types of resources, which a firm possesses. The technical change

[2] Lundvall ((Lundvall 21998)1998) sums up Polayi's points by saying that knowledge is the most important resource in innovation and learning is the most important process.

expands the production capacity, while the technological accumulation enhances the technological capabilities ((Bell & Pavitt1993)p163). The production capacity includes all resources used to produce industrial goods at given levels of efficiency and given input combinations, such as equipment (capital embodied technology), product and input specifications, and the organisational methods and systems used.
The technological capabilities of a firm consists of the resources needed to generate and manage technical change, including skills, knowledge and experience, and institutional structures and linkages. It is this latter type of resources, which are of importance to change, growth and the development of competitiveness.

The work of Smith ((Smith 1995)) adds details to the concept of technological capability. All firms operate with some kind of technological knowledge base. There is not just one knowledge base which firms draw on. Smith ((Smith1995)p 78-81) suggests three areas of production relevant knowledge, with different levels of specificity.

First there is the *general scientific knowledge base*. This is itself highly differentiated internally and of widely varying relevance for industrial production. It is shaped by policy or funding decisions, which usually have economic, industrial or military objectives

Secondly there are knowledge bases at the *level of the industry or product field*. Industries often share particular scientific and technological parameters. It tends to be codified in applied scientific fields like the electrical engineering. This part of the industrial knowledge base is public, in the sense that it is available to all firms. Tassey has defined this combination of knowledge and institutional base as the 'technology infrastructure' ((Tassey 1991)). Such knowledge can be embodied in human, institutional or facility forms.

Thirdly the knowledge base of *particular firms* are highly localised. Firms usually dispose of one or few technologies which they understand well. These technologies represent the core of their competitive position. The technical knowledge is thus highly specific to the firm, and so is the related social knowledge. This means that the knowledge about the way in which technical processes can be integrated with skills, production routines, use of equipment, explicit or tacit training and management systems is also specific to the firm.
At the level of the firm, the relevant technological knowledge base may be quite informal and uncodified. The knowledge exists for example in the form of skills specific to individuals or to groups or teams in the firm. The knowledge of the firm is thus localised and tacit. This means that the competence of the firm has limits when it comes to changes, particularly such innovations, which lie outside their area of competence. Even their ability to search for knowledge outside the firm may be limited. Access to knowledge outside the firm is thus of great importance when creating new technologies.

The three knowledge bases of importance for the capability of the firm to innovate are integrated in each other, and they develop over time. New technological knowledge tends to build on past achievements. The capability of any knowledge producing institution (firm, research organisation etc) is therefore the result of its past history. The whole system, its institutions and its processes are characterised by path dependence.

In sum Smith characterises the knowledge bases of industrial firms in the following way ((Smith1995)p 80-81).

- *As differentiated and multilayered,* consisting of articulated forms of quite different knowledges.
- *As highly specific* organised around a relatively limited set of functions which firms understand well.
- As developed through costly processes of search, through processes of learning and adaptation and are *therefore cumulative* developing through time,
- *As internally systemic* in the sense of being part of an overall production and marketing system, which has many components,
- *As interactive and externally systemic*. Innovation usually involves, either explicitly or implicitly, structured interactions between institutions, involving processes of mutual learning and knowledge exchange. The latter means that not the structure of the system but its interaction, or its 'distribution power' is the most important: The system's capability to ensure access to innovators to the relevant stock of knowledge.

Nanoka and Takeuchi ((Nonaka & Takeuchi 1995)) add important details to the process of learning in a company and the enabling factors for this process. Even though their theory is based on Japanese experience, their intention is to provide some general insights.

(Nonaka & Takeuchi1995))develop the distinction between tacit and explicit knowledge developed in ((Polanyi1966)). They agree that explicit or codified knowledge refers to knowledge that is transmittable in a formal, systematic language, and that tacit knowledge is personal, context specific and therefore hard to formalise and communicate. They add that tacit knowledge entails technical as well as cognitive elements Nanoka and Takeuchi ((Nonaka & Takeuchi1995)p 60) They thus include professional intuition and basic perceptions, values and culture in the tacit knowledge dimension.

With a point of departure in the distinction between tacit and explicit knowledge they argue that tacit and explicit knowledge are not totally separate but mutually complementary entities. They interchange into each other in the creative activities of human beings. Knowledge is created and expanded through social interaction between tacit and explicit knowledge in a social conversion process Nanoka and Takeuci ((Nonaka & Takeuchi1995)p 61).
If the social interaction between tacit and explicit knowledge is a key process in learning and innovation, how can it be conceptualised? The authors see the process as consisting of four modes of so-called 'knowledge conversion', which follow each other in a spiral of organisational knowledge creation.
The four modes are ((Nonaka & Takeuchi1995)p. 62 ff):

a. From tacit knowledge to tacit knowledge, socialisation of knowledge. This process takes place as experience, observation, imitation and practice.
b. From tacit knowledge to explicit knowledge, externalisation of knowledge. Concept creation in dialogue, ((Nonaka & Takeuchi1995)p.66), which is the key to knowledge creation. This is facilitated through the use of metaphors, analogies and models.
c. From explicit knowledge to explicit knowledge, combination of knowledge. Individuals exchange and combine knowledge through media as documents, meetings, telephones or computer-networks.
d. From explicit knowledge to tacit knowledge, internalisation of knowledge. Learning by doing and storytelling is the process by which explicit knowledge is internalised in individuals and groups.

These four modes follow each other in a spiral of learning and through this process innovations are created and competitiveness achieved.

The access to external knowledge is not a key issue in this contribution like it is in Smith, ((Smith1995)). But the same points are relevant to external knowledge and its integration into the organisation, whether it is tacit or explicit. The knowledge from outside must be socialised, combined and internationalised. This means that the search for external knowledge must be supplemented by a process in the company, which allows this knowledge to be learned if it is to result in innovation.

The process can be facilitated in the organisation of the company, if there is a certain overlap or redundancy in the organisation. Redundancy facilitates dialogue among members of the organisation. So does rotation of personal between different departments. Further group work among individuals from different departments about product development is a key to creativity. Creativity is stimulated by an attitude or culture to leave behind old ways and experiment with new ones. And finally, in the Japanese cases middle level managers have a certain role to play as mediators or 'knowledge machines' between developers and the market reality (Nonaka 1991)).

In sum the firm possesses different levels and types of knowledge. This knowledge represents an innovative capability, which serves as the point of departure for innovation. Technical change or innovation takes mostly place within the existing technology of the firm, and it is cumulative, complex and expensive. Internal resources are systemically linked so that innovation in one area involves innovation in other areas, too. Interaction with external actors is a way to raise resources for innovation. The expansion of the knowledge base represents a learning process for the company.
The tacit dimensions of knowledge have a particular role to play. They include both accumulated professional intuition and basic perceptions. A virtuous spiral of learning is likely to generate innovation. This spiral consists of processes of conversion of tacit into explicit knowledge and vise-versa, and of a process of diffusion of knowledge into the organisation. This process requires dialogue and team work in the organisation.

The role of the environment and of proximity

If a firm innovates on the basis of specific internal and external resources after a learning process, which involves knowledge conversion and dialogue, what is the trigger of this process? A rational-choice approach would point at the role of incentives in the environment to innovation: No doubt competition, demand, moral pressure or other incentives arising from the social, cultural or economic environment has a role to play to trigger innovation in firms. It has often been pointed out, that competition is the strongest incentive to innovation ((Porter 1990), (North 1990)).

Other incentives can also be found. Nanoka and Takeuchi ((Nonaka & Takeuchi1995)) mention the attitude or perception prevalent in the company. In summing up the debate on factors stimulating innovation Susanj ((Susanj 2000)p 350-351) points at the following culture and climate factors as being facilitative of innovation: Support for ideas; willingness to tolerate failure; challenge; risk encouragement, playfulness and debates, trust, freedom; harmony; a certain level of conflict; participative decision making and pragmatism.

In his investigation of differences in culture and climate factors in East and West, Susanj (Susanj2000)) concludes that in comparison Eastern European companies are less focussed on the organisational development of new and better products and new ways of solving problems. They are also less pioneering, wanting less to be in forefront of new technology, or search for new markets, or challenge old ideas. If this is a general finding then the cultural barriers to innovation in CCEE are not firm specific but societal, a characteristic of the environment.

The notion of the environment of the firm can be developed more in detail. The environment of the firms is not only to be considered as the general or specialised conditions of operation. It also, as it has been argued above, represents knowledge resources which can be used by the firm in its innovation or learning process. While Smith pointed at the importance of the technological infrastructure also other aspects of the environment represent resources from which the companies may learn. The environment or the external knowledge resources of the firm consists among other elements of customer's needs and ideas; of suppliers' offer and ideas; competitor's ideas and strategies in various fields of their activity; different semi-public organisations' offer of ideas and financing; financial organisations' offer of knowledge and credit-schemes; the labour market or the labour supply with its offer of different qualifications; The technological infrastructure consists of the supply of R&D by universities or branch research organisations, technology centres and so on.

The spatial dimension of this environment and its importance to enterprise development and innovation has been a matter of debate. The core of the debate is the argument that geographical proximity favours the development of firms. Recent debates have focussed on the role of proximity to innovation and learning.

Oerlemans et al, ((Oerlemans, Mees, & Moekema 2000)present an overview of the debate. They organise the contributions in four groups: The 1) industrial districts approach, 2) the approach of 'new industrial spaces, 3) the innovative milieu approach and finally 4) the regional innovation system approach. These groups of theories point at different types of environmental factors of importance to enterprise development.

Early industrial districts' theory point at the external economies which small firms can achieve by locating close to each other. Already Alfred Marshall ((Marshall 1922)) pointed at the importance of personal contacts and the flow of information between firms. Recent industrial districts theory focus on the qualitative elements, which make inter-organisational relations possible: Co-operation, mutual dependence and trust. The relations between enterprises stimulate innovation and facilitate the spread of information ((Oerlemans, Mees, & Moekema2000)p 26-27).

The approach of 'new industrial spaces' argue that there is a reciprocal relationship between vertical disintegration and the spatial organisation of production ((Scott & Storper 1992) p. 8). Groups of small firms may specialise and draw on common external resources, among which the local labour market is the most important. Together the firms may achieve economies of scale as well as economies of scope (variation). New production technology has enabled the small firms to be extremely flexible. Flexibility also characterises the way the firms relate to each other. The district as a total is innovative and highly responsive to market changes.

An important aspect of the new industrial district is a common pool of specialised skills, conventions, norms, values and common institutions (i.e. public or semi-public organisations). The region may possess a specific and partly tacit knowledge, which facilitates learning and innovation. This regionally specific knowledge may explain specialised innovation in certain localities ((Oerlemans, Mees, & Moekema2000)p 27-28).

The French innovative milieu approach argue that the environment is sometimes extremely decisive to innovation, and sometimes not ((Oerlemans, Mees, & Moekema2000)p 31-32). The importance of the environment, (meaning access to technological know-how, the availability of local linkages and inputs, the proximity of markets, and the presence of qualified and skilled labour) depends on the type of innovation. By incremental innovation, resources can be found within the firm itself. In comparison radical innovators are more likely to develop relations with the local production environment. In that case the role of the environmental factors is of very big importance in fostering innovation.

Regional innovation system approaches integrate many of the insights from the three other groups of theories The innovation system approach as such focuses on knowledge ((Oerlemans, Mees, & Moekema2000)p 33-35). The core of the theories is the idea that the performance of an economy depends on the way companies, research institutions and the public sector interacts as regards production and distribution of knowledge. Together these organisations constitute an infrastructure, a system that generates and distributes knowledge. The view postulates a focus on the process, which is never really developed. The first wave of contributions within the innovation system theories focussed on the national level, while later waves have addressed sub-national, regional and local levels. Today the innovation systems are identified for particular sectors, technologies or localities.
The innovation system is a structure within which a process of learning takes place. Learning is defined as a process in which knowledge is recombined to form something new. This definition of learning is very simple, compared to Bell and Pavitt and Nanako and Takeuci. People or organisations communicate in an interactive process of learning. The communication process is facilitated by geographical, cultural and psychological (trust) proximity.

The role of inter-organisational proximity to innovation depends on the type of innovation. Like the French theory on innovative milieu there is a distinction between incremental and radical innovations in relation to the role of the environment. A third type, stationary technology, is added in the innovation system approach. The stationary technology is codified and in principle independent on specific types of environment. Incremental innovation requires flexible codes and communication with the users, so that proximity between producers and users is advantageous to innovation. Radical innovations break with the known codes and require communication of non-codified or tacit knowledge. This means that spatial proximity of user and producer becomes important. Thus a positive relationship is assumed between the degree of tacitness of knowledge, degree of innovation and the importance of spatial proximity.

The Regional innovation systems theorists stress the role of the regional institutions and cultural proximity for innovation. They argue that the region[3] is an efficient level for

[3] The notion of the 'Region' is mostly not defined. It is not clear what the criteria are for defining the borderline of a region. This borderline may be administrative (a county, a group of counties), economic (a coal mining

communication and interactive learning. The trust and networks arising from participation in different local networks and associations facilitates the communication of tacit knowledge for innovation ((Cooke & Morgan 1998); See also (Braczyk, Cooke, & Heidenreich 1998)). The existence of localised learning networks in regions is a topic, which has been studied based on the hypothesis that the existence of such networks may explain the emergence of new and competitive regions. The social capital[4] of such networks is what makes firms, associations and public agencies engage in processes of self-organised, interactive learning. ((Simmie 1997); (Cooke & Morgan1998);(Storper 1997); (Braczyk, Cooke, & Heidenreich1998)).

In sum the four theories contribute with different points in relation to the role of the environment to innovation. This environment can be seen as a resource of the firm or as an external knowledge base. General incentives play a role, but in specific processes of learning relations with customers and suppliers, the supply of skills, relations to research and development organisations and other organisations, and the shared culture, norms and values, personal contacts and the social capital are factors which are important for innovation. Communication between organisations enables interactive learning and the development of new knowledge. Shared culture facilitates the transfer of tacit knowledge. Interactive learning facilitates innovation, but it is not always necessary. Cultural and geographical proximity facilitates interactive learning. Interactivity is particularly important in connection with very uncertain processes, the exchange of un-coded, tacit knowledge and radical innovation.

The theories thus all point at the role of proximity to innovation, but it can be argued that IT has added a virtual dimension to the concept of proximity. Physical proximity may not always be necessary for intensive knowledge exchange and mutual learning among actors because intensive and rapid communication is possible over long distances. In very specialised and globalised branches, geographical proximity may not even be possible. Distant partners must sometimes be mobilised in interactive processes of learning.

The research questions

Based on the theoretical framework above the two cases will be analysed with respect to the following questions:

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region) or cultural (an entrepreneurial region). The extension of a region is not defined either. Administratively defined regions vary so much in size and legislative competence, that the distinction between nation and region in relation to innovation system may not be relevant. While the definition of borderlines is a weakness, the strong point is the rediscovery of the localised dynamics of learning

[4] While the notion of social capital is mostly used without further definition in the RIS texts, its precise definition is useful in this context: The social capital is the resources, tangible or not, that are available through a set of social relationships, and facilitate the attainment of goals (Bordieu and Wacuant,1992:119, quoted in (McNaughton 2000)p 70). Social capital is not only a network of social relationships, but moreover the resources and obligations embedded in the network and available through participation in it. Social capital contributes to the formation of obligations, trust and sanctions. The economic importance of social capital is that it mitigates contracting costs among the members of the network (Routledge and von Amsberg, 1996:1 quoted in in (McNaughton2000)p 71). Its importance to inovation is that it facilitates the exchange of tacit knowledge among the members of the network. Morgan and Nauwelaers suggest the creation of social capital a means in regional development ((Morgan, Nauwelaers, & Nauwelaers 1999)). Social capital may have negative impact on growth and innovation if it excludes newcomers, if it is anti-ompetitive or if it discourages pioneering by demanding conformity ((McNaughton2000)p 75).

How can the innovation in the companies be characterised (stationary, incremental or radical)
What are their incentives to innovate?
What type of knowledge do the companies base their innovations on? (coded, or tacit, specialised or general?)
What internal resources do they draw on in the learning process?
What external resources do they draw on in the learning process?
What is the extension of the external knowledge base (local, national international).
What qualities characterise the interaction of the company with its external partners? (formal or informal, personal or anonymous, permanent or changing, trust or control?
What is the role of external relations (networks) in the innovation of the companies?
What are the strengths and weakness of the knowledge base of the companies?

The empirical data base

The data for this ongoing study is primary data collected through visits in enterprises. The enterprises were located in and nearby the two provincial capitals Krakow and Wroclaw,[5] and a few of them in Warsaw. The Warsaw companies served as pilot studies. The visits were made in 1999, 2000 and 2001, and a final round of visits will be made in 2002. The number of enterprises will be around 20, which is a number suited for qualitative studies. The selection of enterprises is made in relation to branch of industry (manufacturing) and size (between 10 to 500 employees).[6] The enterprises were contacted through chambers of commerce, regional development agencies and technology agencies in Poland. There is no intented representativity in the data. The intention is not to describe typical characteristics but to identify 'critical' issues[7] in the development and innovation of the companies.

The interview persons were managers on a high level in the companies. The interviews were conducted in English or German. On few occasions an interpreter was necessary.

An interview guide served to structure the conversation. The interviews were structured around the following topics. The first part of the interview guide dealt with intra-firm issues. It included history of the company; present production, historical changes and planned changes in production; production methods, historic changes and planned changes; production methods, historic and planned changes in production methods; qualification structure at present, historic changes and planned changes; organisation of the company, historic and planned changes. The interview person was in each case asked to explain why a historic change had taken place or the background for the future plans. A particular focus was on innovative activities in the company, their type, outcome and organisation.
The second part of the interview guide focused on the relations between the company and the outside world. Issues in this section were: markets and customers, historic changes and plans for the future, as well as co-operation with customers; supplies and suppliers, historic changes and plans for the future, as well as co-operation with suppliers. Following this came questions

[5] Krakow and Wroclaw are in focus of the research project on regional systems of innovation in Poland, see Lorentzen (2001). Therefore the companies included in the project should be located close to these towns.
[6] Very large enterprises are not part of this study, because they represent specific problems, not shared by the smaller enterprises.

[7] A critical issues is an issue which is important ('critical') to understand a problem, or a certain development (See for example (Yin 1994) or (Flyvbjerg 2001))

about sources of information about new products and production methods, markets and financing. Finally questions about co-operation in general with organisations or with other companies, and about the attitude of the company towards such co-operation. The last brief section was an overall SWOT[8] analysis of the company.

This empirical method reveals a picture of the companies at a certain point of time. The dynamic and historic perspective is build in through the questions regarding historic development and future plans. At present it is considered to choose a few companies for a follow up visit in order to get more information about the process. Below follows a description, analysis and discussion of two selected cases from the sample.

II Discussion of case studies

Case one. Description

The company was founded in 1911. It is situated in a medium sized town in the southern part of Poland. It was turned into a state owned company in the fifties, and privatised in 1993. It is a share holding company, and the share-holders are workers of the company as well as investors from outside. This company has like most other companies in CEE experienced a decrease in employment after 1990 due to a fall in demand in Russia as well as on the local market. Productivity increases have contributed to the decrease in employment. Employment has decreased by 34 % from 500 in 1990 to 330 today. This comparatively small decrease in employment indicates the relative success of the company in adapting to the new conditions in Poland after 1990.

After 1990 the production has changed considerably. Not only did the materials change from wood to plastic, so that the company today produces shoe-parts in plastic. The product series have become increasingly shorter because of the quick changes in fashion. The number of different designs has grown, due to demand. Supplementary products are being introduced, and plastic film wrapping was the first alternative product to be introduced by the company. The company has got seven basic patterns for shoes, and in addition special designs can be made on request. The management searches for supplementary plastic products and alternative industrial customers in order to be able to keep up production and employment. A basic incentive for this strategy is the Polish legislation, which makes it difficult to fire people. Another incentive is the fierce competition from Italy, from the newly industrialising countries and from 'pirate' companies in Poland.

The production process starts with the design, which is developed in co-operation with the industrial customer. The company produces a form for the moulding of the plastic shoe parts. The production of the form is very expensive, and a big order on shoe parts is the precondition for the production of a new form. For each shoe pattern a different form is needed. The fabrication of shoe parts is fully automatic, polishing and painting is mostly done mechanically, while some cutting, painting and polishing of complicated parts is made by hand. The machines in the moulding process are German and Italian. New machines are

[8] SWOT analysis is a quick method to identify Strengths, Weaknesses, Opportunities and Threats. In the interview it served as another way to identify critical issues in and around the company as a cross check and supplement to the answers from section one and two of the interview.

bought every year to substitute the old machinery which is about 20 years old, and not very efficient.
Plans for the future include an expansion of the production line by buying more pouring and moulding machines, and to automate the cutting process by buying a production line for the cutting. Finally the company envisage the introduction of computer aided design to substitute the present design of shoe parts by hand. The incentive to invest is the need to increase productivity and the technical demands from the increasingly sophisticated shoe patterns.

The organisation of the company is traditional with a relatively heavy management and administrative level. A quarter of the personnel of 330 people is white-collar workers. Top management consists of 3 people, and next come 18 directors of different departments. The organisation is undergoing a process of change. The number of people in production is decreasing due to productivity increases. At the same time more people are hired for marketing and sales. Incentives for personnel changes are the technical changes of production, and the need to cope with the market.

Qualifications is considered a problem area, because workers have a lack of understanding for new methods in production. Training is organised continuously to solve this problem. Specific training is organised with the intention to introduce ISO certification of the production. Culture, in terms of the 'communist mentality' is considered by the management a main obstacle to change. Due to this mentality some employees are reluctant to change and to co-operation in the production.

The board and the shareholders exert a pressure on management to develop and to innovate. To be in the board in this company means to come up with new ideas. They exert a pressure that the company should continuously perform better.

The company exports directly 41 per cent of the production, mainly to countries in Eastern and Central Europe, while a large share of the rest is indirect exports to Western Europe. Before 1990 the company had a monopoly on the Polish market. Today Western companies have entered the market and compete by methods that are felt as unfair by the company. Foreign companies have more resources for advertising and they dump their prices. Very small local companies also compete on low prices.

The competitive advantage of the company is considered its high quality and its well-known name. The disadvantage is the vulnerability to copying of designs by competitors. The company would like to speed up product innovation to cope with this problem.
The greatest opportunity at present is the search for different but related products and markets, but simultaneously a threat is that many other companies have got the same idea. A great danger is uncontrolled imports from Asia, combined with the relatively high prices of the company's products.

Raw materials are bought in Italy and Germany. The company dropped its supplier in Hungary due to quality problems. The company would like to find alternative suppliers to be less vulnerable to price changes of one supplier.

The company makes benchmarking, compares its performance to that of other companies, and it makes market analysis. The source of information about the market is a branch chamber.

Sources of information about new products are basically international fairs, mostly in Italy, which is the biggest market of shoe making. Sources of information about new equipment, production methods and materials are also international fairs. The company is mainly watching the development in Italy, which is considered by the company to be ahead of other countries in innovativeness and sophistication. Sources of information about organisation practices are different organisations and companies. The branch chamber is one such organisation, and the company is very eager to learn.
The company has for several years focused on the gathering of information on products, processes, markets and management practices, and there are no plans to change this strategy for searching information.

A local organisation, the central laboratory of shoe making which is a former state owned producer of shoes, offers training and information of design. There is also a high school of shoe making, where the workers get education.

The management would like the government to make the macro-conditions in Poland easier by limiting the fierce competition from imports and from the 'grey' producers in Poland, and to lower taxes, and to make credits cheaper. This would enable more the company to invest more in innovation.

Case two. Description

This company is a producer of glassware. It was founded as a private company in the beginning of the eighties. It is situated in a small town close to a provincial capital in the southern part of Poland. There is one single owner. The company has expanded from 10 employees in the start to more than 110 persons in 2001. Also the scope of production has expanded from ten different products to hundreds of different products, including tableware, art, and stained glass for old buildings. Most of the products are finished products, while a small part is industrial products. Lately the variation of products has expanded considerably, and there are an infinite possibility of variation in shape and form. The strategy is to focus on hand made and hand decorated products. The incentive for the changes in production is the competition, both from the many Polish glass factories, from highly automated factories in the West and competition from China. Comparatively cheap hand made products represent a niche in this market.

The production is divided in different sections in separate buildings, including melting, decoration and packaging. Almost all processes connected with shaping are manual processes, while the control of gas, and the steering of the production of the melting of glass is computer controlled.
The equipment is regularly repaired or changed so that none of it is more than five years old. The melting and cooling processes have been in focus in the renewal of the equipment. The purpose is to achieve better reliability and better quality. Another reason was that the old equipment was worn out. The introduction of more modern equipment has increased productivity. Future changes in the production process will include the introduction of more automation, which is needed to satisfy the quality requirements of the western markets to table-ware (no bubbles).

The qualifications of the company are high, and they are almost exclusively technical. Most workers are skilled workers with four or five years of glass school. One fifth is unskilled. The managers are engineers, one of them with more than 30 years of branch experience.
The number of staff increased about 40-30 percent during the last five years, and the management has also been widened.
Qualifications of the staff have been increased. The engineers have attended courses in languages, technology, modern sales methods and the use of inter-net in marketing. In connection with marketing the company would like to learn more about co-operation with the US and with Western Europe. The local offer of courses is big, and some of them are financed by the European Union.

The company is organised in five functional departments with the owner as top manager. 100 people work in the production, and the management and administrative level is 'slim'. There are five managers and decision-makers. The production department is the biggest. The head of production has two vice-managers who have the direct contact with the workers. Co-operation among the managers and employees is informal and based on daily contact. The white-collar staff meets twice a day and the workers are invited once a month or so to a meeting with management. The owner takes the strategic decisions but many decisions are delegated to the managers. There are plans to expand of the sales organisation in the future.

Ideas for new products come from different sources, from inside the company or from customers or competitors. The owner and the sales manager together discuss whether to introduce the new product. Ideas for changes in the production process usually originate from the highly qualified manager of the technology department, who has many ideas. Every change is decided upon by the owner, after discussion with the managers.

Half of the production is sold in Poland, and half of it is exported. The customers are gross trade companies in Poland and abroad. After 1990 the export into Western Europe have expanded and still more countries buy the products. The newest destination is Spain. In Poland the final customer is people from the middle class and below, who focus on price.

The competitive advantage of the company is considered to be the flexibility and speed with which customers' wishes are fulfilled, combined with the low competitive prices. The weakness or what must be developed further is considered to be the service and marketing. The future market is considered to be Western Europe, because of a disbelief in increasing demand in Poland. The threat is considered to be competition from Asia, not only because of the low prices, but because of the whole export organisation of these countries which is considered to be very well developed. Two strategies should attract the attention of the customers in future: In Poland new packagings and abroad new, attractive and surprising products.

Communication with customers is direct, about new products and shapes. Internet communication has developed, and photos of products, price-lists and so on can be communicated very quickly. The company would like to discuss more with customers about local tastes.
The suppliers have changed along with the renewal in production. The major part of them is located in Poland, and they come to the company to make offers.

Development work is done continuously in relation to design. The company co-operates with designer companies in big towns, and intends to continue this practice. Research as such is not done in the company. Information about new production methods and material are available through the many offers from different companies. Organisational development is not an issue in the company. The company follows the development of the market from home, through the inter-net, and through the co-operation with different Polish export/import companies, who participate in fairs and present the products of the company. It is too expensive for the company to go to fairs to present the collections itself themself. Also magazines and newspapers give relevant information. Western companies sometimes tell the company what to do.
Information about possibilities of financing is the responsibility of the financing director who meets with banks, and participates in different courses.
The seeking of information is in focus in the company and the way of seeking information has changed radically with the inter-net. Also the fact that the management represents competencies in English and German makes information seeking efficient. The bottleneck is not the information but
time to use it in the company. The company plans to employ a person with the responsibility to seek and process information.

The company co-operates with other companies on joint products, like candlesticks for the candle industry or parts for machines or equipment, and this is a type of co-operation, which the company would like to expand. The company thus hopes for an expansion on the industrial market.

The focus on information exchange means that the technology department co-operates with different technology centres around Poland. The company is also a member of a local chamber of commerce. The company has not had, nor does it expect to get much help from governmental institutions. 'You are alone, you must fight alone'. The company suggests that the government and the self-government assist Polish companies with information on the foreign markets about the companies and their products.

Analysis of case one

Innovation in company one can be characterised as radical, incremental as well as stationary. The radical innovations include the introduction of a new materials and automation, and lately of a completely new product. Also incremental changes have been made. Production no longer consists of stable goods in large quantities. The product series have become shorter, and the variety of products much larger. Machinery is renewed year by year. The core competence of the company, the preparation of designs and forms for the moulding process, is gradually developed. The planned introduction of computer aided design is going to represent a radical innovation for the company and an important enhancement of the core competence of the company. Incremental product innovation is planned, as the company is searching for related products, based on moulding of plastic. Finally stationary innovation is planned, when production will be expanded at the same level of technology.

The incentive to innovate products and processes is mainly competition. The competition is double edged: Price competition from the newly industrialising countries, and from 'pirate' companies within Poland and competition on sophistication from Italy. The regulation of the

labour market by the Polish government is another incentive: The company is forced to keep up employment, and as an entirely private company this means that production and sales must be kept at a corresponding level. Finally the board and the shareholders represent incentives as they exert a pressure on management to develop the company and to innovate.

The organisation of the company was radically changed in 1993, when the formerly state-owned company turned into a share-holding company, and new decision making structures were made, with the general assembly and the board as the highest authority. The internal management represents characteristics, which are inherited from the communist period. It is hierarchical and functionally divided in a multitude of departments, and with a heavy management and administrative layer. The on-going innovation of the organisation is gradual: it includes a reduction in the production staff and an increase in the staff dedicated for management and sales. In production a systematic substitution of unskilled workers by skilled workers takes place. The organisational changes are caused by the productivity changes, by the introduction of more advanced machinery, and by the need for market related knowledge and action. These changes represent an enhancement of the internal knowledge base.

What types of knowledge does the company base its innovation on? Benchmarking (comparison with the performance of other companies) and market analysis represent the knowledge which is the basis for decision on how to innovate. This is explicit and encoded knowledge. Customer's wishes and ideas for new shoe models are other sources of knowledge. This knowledge is explicit, but not yet codified. Internal knowledge of the equipment and its possibilities represent the key competence of the company and is the technical base for innovation. This internal knowledge is both codified and tacit.

The internal knowledge base consists of the experiences and history of the company. It is a company with a long history, and a pre-communist as well as a communist heritage. It has accumulated knowledge on shoe production and of the shoe market during many years. The workers are partly the same who worked in the company before 1990, when changes did rarely happen and everyone had to meet targets within his or her area. This past is present in the tacit knowledge of these workers. As a result some workers are considered by the management to be reluctant to change and to co-operation in production. The strategy of the management to cope with this is to gradually substitute unskilled workers by skilled workers. Further, training is continuously organised for the workers, with the assistance of a local high school of shoe making. This is considered necessary because skills are needed to operate the new and advance equipment. A particular focus is on qualifications relevant for the introduction of ISO certification, which is a very explicit, documented and thus 'encoded' type of knowledge.
The board represent another part of the internal knowledge base. The board consists of people with ideas on how to develop the company, and they are motivated to apply these ideas in the company.

In the internal knowledge both inherited knowledge tacit knowledge and up to date codified and tacit knowledge is represented. There seems to be a contradiction between these two which represent a barrier for learning and innovation.

The external knowledge base of the company has been widened considerably after 1990. The company has for many years focused on the gathering of information on products, processes,

markets and management practices, and the management intends to continue this strategy. The company management understands itself as highly motivated to learn. Knowledge about the performance of other companies in the branch is regularly made through benchmarking (systematic comparison of performance). The company watches particularly the development in Italy, which is considered to be ahead of competitors, but also companies in Poland. This part of the external knowledge base has been expanded. Before 1990 there were no other companies in the branch as company one had a monopoly in Poland. The branch chamber of commerce in Warsaw (founded during the nineties) provides knowledge about the *market*. Knowledge about new trends in *products* and about *new equipment* is obtained by visiting international fairs. Contact to the western market is indirect, through indirect exports. Newly established direct contact to the West goes through the purchase of inputs from Italy and Germany. There is no direct contact with customers in the West. The direct foreign customers continue to be located in Central and Eastern Europe. Knowledge about organisation practices is provided by the branch chamber, but also from other organisations and companies. When developing shoe designs there is a close co-operation with customers, the shoe producers in Poland. A local organisation, a central laboratory of shoe making offers training and information of design. The workers are educated on a local high school of shoe making. A company licensed to do this, is helping with the ISO certificate.

The external knowledge base of the company has undergone considerable development after 1990, and it continues to be a main focus in the development of the company. The external knowledge base of the company consists of foreign, national and local organisations and companies.
The external knowledge base is thus differentiated, and the company is very motivated to develop and use it. The knowledge thus transferred to the company is likely to be explicit, codified and written down, but also tacit knowledge is likely to be obtained about market development and product trends, through personal contacts with customers, participants on fairs, consultants and teachers. A weakness in the external knowledge base of the company is the lack of direct contact to customers in the West, which is likely to be important to innovation.

In the generation of ideas for new products and new methods there is interplay between these two knowledge bases. It is the board, and sometimes the general assembly of shareholders, which comes up with ideas for new products and changes in methods and equipment. The ideas are generated on the basis of input from the external knowledge base, particularly from demand. The final decision on what innovations to implement is taken by the board. It is noteworthy, and most likely a weakness, that the wider internal knowledge base does not seem to be to be mobilised in the generation of ideas for innovation.

Analysis of case two

The technology of the company, glass making, has not changed since the start in the beginning of the eighties. Both the scale and the scope of production have expanded considerably during the last five to eight years. Incremental changes in products take place as new designs are continuously developed for the final products, and a new niche, industrial products, is under development. For every market there is a different offer because taste is so nationally different. There is an increasing focus on hand decorated products, and this focus will continue in the future. Further incremental change will be introduced as the product

strategy is about to be diversified. For the Polish market products will be packed differently, for the foreign market new and surprising product shapes will be developed. The production process is incrementally as well as stationary innovated. The production equipment is regularly renewed, usually it is bought in Poland, and technology has developed by the introduction of more productive and precise computer-controlled equipment for the melting and cooling of glass. The shaping of glass is still done manually (blown or in forms). It is envisaged to introduce automatic production of tableware. This is going to be a radical change of technology of company two. In sum, innovation in company two can be characterised as incremental and stationary, while radical change is envisaged for the future.

The incentive to innovate is competition. The competition is complex. It arises from Polish glass factories, from low cost competition from China, and from highly automated factories in the West. Competition regards thus both costs and quality. The choice of company two has been to develop a niche, which unites quality and costs as its competitive advantage: low cost hand made products. The incentive to expand the company was a consequence of the strategy. It is necessary to achieve a certain minimum size to produce the necessary number of product variations.

No radical changes have taken place in the organisation of the company. The company was founded as a private company and basic management principles have not changed. Company two is still owned by one person, who is also the top manager of the company. The staff has expanded from 10 to 110, and a delegation of responsibilities has been introduced, and today five managers share the decision-making competence. Knowledge is mainly exchanged among the white-collar staff, which meets twice a day, with informal co-operation in between. Monthly meetings between workers and management supplement the daily co-operation between production management and workers. Future plans for organisational change include the expansion of the sales organisation, including the employment of a person dedicated for the seeking of information from outside the company. The organisation of the company has changed in a stationary way and also by incremental innovation. The general exchange of knowledge takes place through personal contacts, which enable both tacit and explicit knowledge to be exchanged.

What type of knowledge does the company base its innovation on? Innovation is based on technical internal knowledge, basically the knowledge of one very experienced engineer employed in the company, and with 30 years of experience in the branch. This knowledge is both tacit and codified, and it is highly specialised. Knowledge about the market is an important input to innovation, and this knowledge is both codified and tacit, transferred through the inter-net or through other written sources, and by personal contacts to customers and specialists.

The internal knowledge base has developed in the company since the beginning of the eighties, when the company was founded. The core competence of the company is the technical mastery of all phases of glass manufacturing. The qualifications of the company are mainly technical. This can be seen as a heritage from the pre-1990 tradition, as production plants during communism did not have to bother with sales and financing. The managers are engineers. One of the engineers has great importance in the company with his 30 years of branch experience. 80 per cent of the workers are skilled, with four of five years of glass school. The qualifications of the staff have been increased, as the engineers have attended

courses in languages, technology, modern sales methods and the use of the inter-net. In the future the management would like to learn more about co-operation with the US and with Western Europe.

The strategy of the management can be interpreted as an effort to develop the internal knowledge base to better cope with operation in a globalised market economy. This is achieved by enhancing the formal qualifications of the staff through training, and to strengthen the functions of the company dealing with sales and information gathering.

The strength of the internal knowledge base is its culture: Its comparatively flat structure and informal culture allows information and ideas to diffuse quickly in the company. The motivation of the staff to innovate is important assets. The weakness of the knowledge base is the rather one-sided weight on technical qualifications, which is in contrast to the ambitions of the management to expand on the western markets. A need is felt in the company to develop knowledge on this point.

The development of the external knowledge base is in focus of the company, which give priority to the search of information of relevance for the development of the company. The knowledge base consists of organisations like the glass school, the local chamber of commerce and different technology centres in Poland. It also consists of different companies. There is a co-operation going on with designer companies in big towns. The import-export companies which present the products of the company at fairs is also a source of information, so are direct customers who suggest product designs. Both receive samples of the production and give response to it. Some foreign companies with which the company has a contact also make suggestions on product development. Joint learning processes are made together with related companies about the development of joint products. A huge offer of courses by local and national organisation, some of them financed by the EU and drawing on international expertise, belongs to the picture of the external knowledge base. The inter-net has become a very important source of information and communication. For the company the inter-net, and the web camera, has revolutionised the search of information and communication, which has been speeded up and widened. The use of the internet has also minimized the disadvantage of localisation in a comparatively peripheral town. But traditional sources of information, newspapers and magazines are also used.

The external knowledge base of the company is undergoing continuous development. It consists of local, national and foreign companies and organisations. Communication with the external knowledge base is both personal and formalised, based on written information. The extended use of inter-net implies that the knowledge exchange is increasingly codified in its form. The weakness of the external knowledge base is its complexity and the overwhelming mass of information that it generates. It is much more than the company can sort out and absorb in a learning process.

The ideas for new products and processes are generated in interplay between the external knowledge base and the internal knowledge base. The sales manager, the director, the production manager and the technical manager who is the best glass specialist of the company, are the core people in the internal knowledge base to find out and to decide on what innovations to implement. The sales manager conveys the market knowledge about the development of tastes, the glass engineer the technical knowledge from outside and from the

company, and the director the financial knowledge. The bottleneck is the capacity of the internal knowledge base to process all the information from the external knowledge base. A solution to this problem is envisaged by an expansion of the staff with a person dedicated to the processing of knowledge. It is questionable whether this is enough.
A modification of the external knowledge base would be a useful supplement to the enhancement of the internal knowledge base: A more strategic and goal directed development of the external knowledge base would be favourable to strategic learning in company two.

Discussion

The two companies share some characteristics concerning learning and innovation, while on other points they seem to differ.
Both companies are innovative, but company one covers three categories of innovation, while company two only covers two. Company one has made stationary, incremental as well as radical innovations, while innovations in company two are stationary and incremental. The difference is related to the fact that company one has changed its market more substantially than company two.
In both companies the main incentive to innovate is national and international competition. Both companies also experience internal incentives, in the form of pressure from the board, and the motivation of the staff to innovate.
The knowledge used for innovation is in both cases quite complex, consisting of tacit, codified, and explicit, but not yet codified knowledge. In company one the weight seems to be on codified knowledge, while tacit knowledge plays a larger part in company two.
This difference in the type of knowledge used for innovation may be related to the difference in organisation. Company one is organised in a hierarchic manner, with formal procedures. This again is caused by the heritage from communism, and by the larger share of unskilled, and of insufficiently skilled workers. Company two is organised in a comparatively flat structure with informal procedures. This structure can be explained by the history of the firm, as a very small firm, and by the high qualification level of the staff.

The internal knowledge bases of the companies are different in structure. In company one management is an important asset for innovation, while the staff represent a reluctance to change. In company two the knowledge base is characterised by the high level of technical qualifications, and a general motivation to innovate.
The external knowledge base is in both cases complex, and in both cases it includes contacts at local, national and international level. In both cases focus is on getting codified knowledge from outside, but when it comes to product development more tacit knowledge is transferred through personal contacts to customers or to agents. The companies lay much stress on developing the external knowledge base, and the two knowledge bases are linked when strategies for product development are made. Company one needs a further development of the external knowledge base, while company two may need a more selected strategy because of an overflow of external information.

The two case companies have enhanced their knowledge bases during the nineties quite considerably. Internally this enhancement has been achieved by training and by development of the organisation. A special focus in company one is to change the culture or the inherited tacit knowledge from the communist period.

The external knowledge base has in both cases been much in focus. It has been developed a lot much during the nineties, and it has become global in its extension. The challenge is to match the development of the two knowledge bases so that the internal knowledge base is more prepared to exploit the possibilities offered by the external knowledge base.

The companies have thus proven a considerable ability to learn. They will continue these efforts in the future. Many external contacts more than stable networks have been important for the innovation in the companies. Trustful and personal external contacts have not been unimportant in relation to product development, but formalised relations play a large role.

Internally formalisation of relations and codification of knowledge seems to be gaining importance. This is related to the need to control the personal and the quality (ISO certification). It is also related to the extended use of computers internally and externally.

An innovation strategy of the Polish government should according to these companies include information about markets, and the provision of a stable macro-economic environment, favourable for investment. A more general suggestion could, be to change the attitude of the labour force to include the culture and climate factors in favour of innovation.

Reflection

This paper has focused on the learning aspects of innovation. In doing so it has presented different theoretical contributions in an effort to link these in a coherent approach to the issue. In the empirical analysis of two Polish cases no theoretical statements or hypotheses have been made. The use of the framework has been rather exploratory. The methodology has enabled specific historical and contextual issues to be reflected while the focus, learning for innovation, was clear during the analysis.

The analysis of the cases revealed that a considerable learning process has taken place in the companies since 1990, allowing different types of innovation. The problems identified were mismatches between the internal and the external knowledge bases due to a rapid and not quite balanced development of the two. Further the inherited tacit knowledge of the labour force seems to represent a considerable inertia for learning and innovation.

The advantage of the approach developed in this paper is that it links various levels of resources and learning processes in a complex holistic framework. The focus on knowledge implies, however, that the economic realities on the micro- as well as the macro-levels are not included in the problem formulation. Not only in the two case-companies, but in many other companies in Poland as well as in Hungary the interviews with managers indicate that access to capital is a main barrier to innovation and competitiveness in the present phase of transformation.

Reference list

Bell, M. & Pavitt, K. 1993, "Technological accumulation and industrial growth. Contrasts between developed and developing countries", *Industrial and corporate change*, vol. 2, no. 2, pp. 157-200.

Braczyk, H.-J., Cooke, P., & Heidenreich, M. 1998, *Regional Innovation systems*, 1st edn, UCL Press, London.

Cooke, P. & Morgan, K. 1998, *The associational economy. Firms, regions and innovation*, 1st edn, Oxford University Press, Oxford.

Edquist, C. 21997, "Systems of Innovation approaches - their emergence and characteristics," in *Systems of innovation. technologies, institutions and organisations*, 1st edn, C. Edquist, ed., Pinter, London, pp. 1-35.

European Bank for Reconstruction and Development 2001, *Transition Report 2001. energy in transition*, 1st edn, European bank for reconstruction and Development; The stationary office Publications Centre, London.

Flyvbjerg, B. 2001, *Making social Science matter, why social inquiry fails and how it can count again* Cambridge University Press, N.Y.

Freeman, C. 1982, *The economics of industrial innovation*, 1st edn, Pinter, London.

Lorentzen, A. 2001, *Institution building in regional development, business development and innovation in Poland after 1989. Paper for Regional studies Association International conference University of Gdansk Poland 15th-18th September 2001*.

Lorentzen, A. 2002, "The study of institutional and organisational change in CEEs. A discussion of methodology. Ppaer for the 18th EGOS Coloquium Barcelona. July 4-6th.", pp. 1-20.

Lundvall, B.-Å. 21998, "The learning economy: Challenges to Economic Theory and Policy.," in *Institutions and economic change*, 1st edn, K. Nielsen & B. Johnson, eds., Edward Elgar, Cheltenham, UK; Northhamption, MA.USA, pp. 33-54.

Marshall, A. 1922, *The principles of economics*, 1.st edition 1890 edn, London.

McNaughton, R. B. 2000, "Industrial districts and social capital," in *Industrial networks and proximity*, 1st edn, M. B. Green & R. B. McNaughton, eds., Ashgate, Aldershot, pp. 69-87.

Morgan, K., Nauwelaers, C., & Nauwelaers, C. 1999, "A regional perspective on innovation: From theory to strategy," in *Regional innovation strategies. The challenge for less-favoured regions.*, 1st edn, K. Morgan & C. Nauwelaers, eds., The Stationary Office with the regional studies Association, London, pp. 1-18.

Nelson, R. R. & Rosenberg, N. 1993, "Technical innovation and national systems," in *National innovation systems. A comparative analysis*, 1st edn, R. R. Nelson, ed., Oxford University Press, New York, Oxford, pp. 3-21.

Nonaka, I. 1991, "The knowledge creating company", *Haward Business Review*, vol. 1991, no. November-December, pp. 96-104.

Nonaka, I. & Takeuchi, H. 1995, *The knowledge creating company*, 1st edn, Oxford University Press, New York, Oxford.

North, D. C. 1990, *Institutions, institutional change and economic performance*, 1st edn, Cambridge University Press, Cambridge.

Oerlemans, L. A. G., Mees, M. T. H., & Moekema, F. W. M. 2000, "Innovation and proximity," in *Industrial networks and proximity*, 1st edn, M. B. Green & R. B. McNaughton, eds., Ashgate, Aldershot, pp. 17-47.

Polanyi, M. 1966, "Tacit knowing," in *The tacit dimension*, 1st edn, M. Polanyi, ed., Doubleday and company inc., New York, pp. 3-25.

Porter, M. E. 1990, *The competitive advantage of nations*, 1st edn, The MacMillan Press Ltd, Hong Kong.

Scott, J. A. & Storper, M. 1992, "Regional development reconsidered," in *Regional development and contemporary industrial response. extending flexible specialisation*, 1st edn, H. Ernste & V. Meier, eds., Belhaven Press, London, pp. 2-24.

Simmie, J. 1997, *Innovation,networks and learning regions*, 1st edn, Atheneum Press, Gateshead.

Smith, K. 1995, "Interaction in knowledge systems: foundations, policy implications and empirical methods", *STI Review*, vol. 1995, no. 16, pp. 69-102.

Storper, M. 1997, *The regional world*, 1st edn, The Guilford Press, New York.London.

Susanj, Z. 2000, "Innovative climate and culture in manufacturing organizations: differences between some European countries", *Social Science Information Sur les Sciences Sociales*, vol. 39, no. 2, pp. 349-361.

Tassey, G. 1991, "The functions of technology Iifrastructure in a competitive economy", *Research Policy*, vol. 1991, no. 20, pp. 345-361.

Yin, R. K. 1994, *Case Study research. Design and Methods* Sage Publications, London.