Industrial clusters as a factor for innovative drive – in regions of transformation and structural change: A comparative analysis of East Germany and Poland*

*Michael Clarkson, Matthias Fink, Sascha Kraus***

This article investigates the catalyst effect of industrial cluster formation on innovation propensity using as a basis small and medium enterprises (SMEs) located in two regions of transformation and structural change: Brandenburg in Eastern Germany (the former German Democratic Republic) and Lubuskie in Poland. Based upon Porter's (1990a) Diamond of Competitive Advantage of Regions, which is empirically applied in an explorative manner, this article aims to develop a better understanding of the necessity for interaction between enterprises and policy makers and looks at the rationale of establishing industrial and service clusters as the motor for sustained regional development.

Der vorliegende Beitrag untersucht den Katalysator-Effekt der Bildung von Industrie-Clustern auf die Innovationsneigung auf Basis einer Befragung kleiner und mittlerer Unternehmen (KMU) aus zwei sich in Transformation und strukturellem Wandel befindlichen Regionen: Brandenburg in Ostdeutschland (frühere Deutsche Demokratische Republik) und Lubuskie in Polen. Vor dem theoretischen Hintergrund von Porters (1990a) Diamanten-Modell der Wettbewerbsvorteile von Regionen, das explorativ empirisch angewendet wird, zeigt dieser Artikel an den empirischen Ergebnissen die Notwendigkeit der Interaktion zwischen Unternehmen und politischen Entscheidungsträgern auf und beleuchtet die Hintergründe der Etablierung von Industrie- und Service-Clustern als Motor für nachhaltige regionale Entwicklung.

Key words: Cluster, Competitive Advantage, SME, Poland, Eastern Germany

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* Manuscript received: 06.11.06, accepted: 30.07.07 (1 revision)

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1. Introduction

Innovation and the capability of a company to innovate are crucial in the development of a business which has the ability to adapt to changes in the environment and cultivate a sustainable competitive advantage (Kuratko/Hodgetts 2004). It is often argued that economic regeneration in regions experiencing demographic shrinkage and economic decline can be fuelled by innovation, and that for organisations which are entrepreneurial and innovative, there is a competitive advantage to be gained by moving into and investing in such regions (Koistinen 2002). Regions which have undergone or are still undergoing transformation, e.g. from socialist-planned economies to capitalist market economies, must display innovative traits and employ these to gain a competitive advantage. Otherwise, they will ultimately not survive the upheaval of economic and social change. The assumption that all you needed was a clearly innovative organisation to move into an area of decline and set a chain reaction in motion could not be substantiated. The win/win-situation envisaged was based purely upon low/cost, low/wage benefits for those organisations that chose to move to such regions. In face of the empirical results of this article, it is evident that interrelationships are much more complex.

It has been naively felt that in an age of increasing ease of communication, transportation, and movement of people and goods, which are all closely tied to globalisation issues, it actually does not matter from which location business is conducted. The prerequisite is considered to be innovation in what you do, regardless of the location. However, this mono-dimensional approach does not take into account the interactions with the outside world and the environment, which are necessary for innovation to flourish and for a sustained competitive business advantage to develop. Many organisations today only see the short-term economic gains to be culled from direct investment in transitional economies or in those regions having experienced economic decline. Many central and regional government organisations and development agencies clearly support this policy and actively "jockey" for position with other regions/nations to offer the most attractive package of subsidies, which nevertheless cannot be considered as long-term regional development.

Once the attractiveness of the host region declines, and production/labour costs begin to rise or subsidies become exhausted, many such organisations are on the lookout for new host offers and have no qualms about uprooting their businesses and moving on. Such companies are in fact safeguarding their sustainable competitive advantage for their shareholders by maintaining an optimum cost/performance ratio, thus satisfying their existing investors and attracting potentially new ones. We argue that regions can only start to develop sustainable economic development when they themselves start to take an innovative approach to the planning of their future.

The essential objective of this paper is to identify the potential for, and the crucial obstacles to, companies adopting the cluster concept in countries in transformation. We therefore aim to develop a better understanding of the necessity for interaction between enterprises and policy makers and look at the theory and practice behind the establishment of industrial and service "clusters" as the motor for sustained regional development. With "knowledge" now having become the panacea of success, regional development agencies should be looking for ways to foster and attract clusters of innovative knowledge-based activity. Despite the mobility of business and the fact that new technology has to a certain extent severed the "ground lines", thus making "virtual business" a reality, knowledge itself still tends to remain localised. This is all the more reason for regional economic developers to improve the competitiveness of their "home base", which in turn makes their area more attractive to entrepreneurs well positioned to exploit it.

Following an analysis of the theoretical and practical background to clusters, this article examines two Eastern European regions in Poland and East Germany (EG) (former German Democratic Republic, GDR), investigating the configuration of the four dimensions of Porter's diamond as to the existence of an inherent stock of innovative drive in both regions under consideration. A comparative analysis of the empirical results for each dimension is presented, which leads to a contrasting discussion of the regional profiles of MMM and Brandenburg. The regional profiles are then linked to the obstacles to innovation and clustering perceived by the firms investigated. We close with the formulation of recommendations on a pragmatic normative level.

Background

Innovation in post-socialist countries

Innovation in post-socialist countries still has deficits compared to Western economies. Despite good GDP growth in many Central and Eastern European Countries (CEEC) since the 1990s, these countries invest on average only about half as much of their GDP in R&D activities than their OECD counterparts. Although especially Poland has for a long time been regarded as one of the more progressive transformation countries (Lungwitz/Preusche 2000), it is steadily falling behind the rest of CEEC.

The 15 new EU member states are on average only about 4 percent (measured per capita) as active in patenting new inventions as are Western OECD member states (OECD 2005). In other words, for every patent applied for by a former socialist state from the European Patent Office, corresponding Western organisations apply for no less than 25 patents.

Additionally, the former socialist economies have not yet drawn level with their Western counterparts in terms of R&D activity and intellectual property rights. This information tends to correlate with the economic growth in non-innovative activities related to production in many of these countries, which up until now have often relied on their low-cost environments (e.g. natural resources, labour) as a potentially short-lived competitive advantage.

Despite these facts, research does indicate that there is recognition of the necessity to innovate in many CEECs. However, the influence of historical heritage cannot be ignored (Hanson/Pavitt 1987). The practice of *central planning* in former socialist economies can be regarded as having had a strong influence on the development of innovative activities into the 1990s, despite being dismantled in favour of an emerging market economy (Peng 1999). The development of relationships and networks, which are elementary to innovative activity, was more complicated in a centrally planned economy. For example, in the Soviet system, which was the model adopted by most other socialist nations, the *Academy of Sciences* was the main player in basic research, and R&D activity carried out in individual companies was very rare. These individual companies regularly were large industrial combinates, and SMEs were practically non-existent. This lack of SMEs also led to a lack of specialist suppliers and choice of supply, which is an essential component of innovation in the capitalist system.

In Eastern European nations, the existence of small to medium-sized firms was widely incompatible with state ownership and control in a planned economy. Under the socialist centrally planned economic system, engineers, scientists and technicians were often the principal agents of change, but the meaning of innovation was more often than not reduced to the narrow definition of "invention". Inventors and engineers were rewarded for their inventive prowess and became well-respected members of the community. Although innovation gained secret acceptance, large-scale production, the bureaucratic system and technocratic behaviour dominated the socialist economy, restricting the development of entrepreneurs interested in creating new ventures.

One of the key conditions recognised by Porter in his analysis of the competitive advantage of nations is the presence of demand: "Sophisticated and demanding buyers pressure local firms to meet high standards in terms of product quality, features and service. The presence of sophisticated and demanding buyers is as, or more, important to sustaining competitive advantage as to creating it. Local firms are prodded to improve and to move into newer and more advanced segments over time, often upgrading competitive advantage in the process." (Porter 1990a: 89-90). Those organisations responsible for the "innovation process" in former centrally-planned economies were not encouraged to transfer experience or interact directly; buyers and sellers seldom met and partnerships

between organisations had to be approved by the central authorities, which then dictated who was to co-operate with whom.

The approach to financial responsibility and the recognition of economic viability was an issue which differed greatly in former socialist economies to the market economies of the West. The predominance of "soft-budget constraints" meant that although organisations may not have been able to cover their costs and thus were technically bankrupt, this was not necessarily a reason to change anything. Such soft-budget constraints reduced the will of those responsible to respond to problems by undertaking any kind of innovative counteractive measure. This aversion to change and the lack of "market-pull" all contribute to the *historical baggage* which CEE nations still carry with them to a greater or lesser extent.

The question of ownership has not helped to lighten this historical baggage for Eastern European nations. The fact that property was state-owned immediately curtailed any possibility for individual entrepreneurial business activity. At best, this was limited to the trading of farm produce in market stalls, which was also closely monitored. Non-socialist nations have also experienced large-scale privatisation in recent years, which in most cases has benefited the consumer by allowing free competition to flourish. The UK for instance has embarked on considerable privatisation. However, it is the scale of this privatisation in comparison with a former socialist economy which is worthy of reflection. In the UK, before privatisation, the public sector accounted for 10 percent of GDP, 8 percent of employment and 17 percent of capital. In 1989, the corresponding Polish figures were 82 percent of GDP, 68 percent of employment and 81 percent of capital. The socialist principle ultimately holds firm to the doctrine "that individuals do not rightfully own either themselves or productive assets, only 'society' does. It rejects contractual freedom because it has already rejected personal ownership" (Jasay 1991: 103).

Innovative background of the regions investigated

Poland – Innovative Background

The companies interviewed from Poland are located in the province of Lubuskie, which is situated in the northwest of Poland and shares a border with Germany (Gorynia 2005).

The dissolving of the socialist system has resulted in extensive political, economic as well as social change, initiating a transformation process from a planned economy to a free market (Robinson 1999). Over three-quarters of companies active in Poland today did not exist 16 years ago, and the development of the private sector can be divided into three phases: The initial phase was at the beginning of the 1980s, when a first attempt to reform the centrally planned economy was undertaken (Aggestam 2004). This involved the removal of certain barriers to trade and released the first wave of entrepreneurial

activity and the creation of SMEs (Robinson/Tomczak-Stepien 2000). Following the introduction of a democracy in 1989, further barriers were removed and reforms in the public and private sector were introduced. These changes lifted the suppression on entrepreneurial spirit and saw the birth of a large number of private companies. Market self-regulation started from 1992, and many firms literally ran out of steam or were unable to cope with the extreme internal and external competition, lack of capital, or both (Kewell 2002). There was a dramatic increase in foreign direct investment (FDI) during this time, and the creation of new Polish ventures slowed as the number of bankruptcies increased (European Commission 2005b).

East Germany – Innovative background

The second former socialist economy chosen for analysis is the region of East Germany (EG), the former GDR, a country which, on the one hand, benefited from the proximity of a wealthy sister who was able soften the blow of transformation. On the other hand, the country suffered the most abrupt end to its former methods, making it difficult in many ways to compare to other transitional economies. The very speed and severity of the German reunification placed businesses under extreme pressure to perform from the outset in terms of quality and productivity to even have the slightest chance of survival. Western firms literally performed a takeover and were quickly in a position to establish marketing and distribution links to serve the local population and even customers farther east, who had previously been supplied by indigenous conglomerates. Problems of privatisation were evident as in all former socialist nations. In the former GDR, however, these were exacerbated by the *Treuhand*[1], which systematically devastated the former public sector in favour of a spread of private sector entities, mainly of West German origin. A stark difference to other transitional economies is the significant amount of Western investment and management which has subsequently flowed into this region (European Commission 2005c).

The innovative performance of East Germany is difficult to analyse these days. No longer are statistics produced which enable the comparison of the former national entity of the GDR with its transitional counterparts. Global statistics now only refer to a unified Germany, and local statistics which are produced in the individual Federal States of Germany do not make for fair comparison.

The companies interviewed are located in the German federal state of Brandenburg.

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[1] The Treuhand ("trust agency") was legally created in the summer of 1990, while the GDR was formally still in existence. It was the main economic instrument for carrying out the transition of the East German state-owned economy into a free market economy. Its main function was to transfer all valuables of the East German economy into private hands.

Synthesis

Both regions, Lubuskie (Poland) and Brandenburg (East Germany), are located in countries which have undergone a drastic transformation process from socialist planned economies to at least the physical adoption of capitalist, free market economic values. Both regions share the label of "less advantaged" (Rosenfels 2002), as they are highly dependent on agriculture. Against the background of European integration, these East European regions will face considerable change as they become subjected to the full force of the rules on quotas and subsidies as members of the European Union. Such regions are often seen as regions of outward migration, where the population heads out to larger towns and cities in the hope of securing employment. Other less advantaged regions are obsolete industrialised conurbations, which were dominated in the past by labour-intensive industries. Many such areas have lost their ability to compete with the new technologies found in manufacturing and less labour-intensive processes and are simply surplus to requirements. In these areas, outward migration or even emigration to other nations is being experienced; both can severely weaken an economy through the loss of skills and educated, often entrepreneurial, individuals. This phenomenon is referred to as *shrinkage*, which is often made worse by declining birth rates in many of the world's industrialised nations.

Poland, in contrast to East Germany, which no longer has a choice since it had the West German rules imposed on it, may decide to continue building upon its low-cost environment (see above), using largely non-innovative activities to increase economic growth, and is seen as a convenient reservoir for relatively simple manufacturing services for Western multi-national organisations. A long-term alternative choice, however, would be to imitate the experience of other nations and slowly climb the ladder to increased involvement in innovation. Faced with such harsh realities, government and regional developers in Poland and East Germany should be looking to harness some of the benefits of EU economic integration, such as access to markets. They should become aware of the need to take stock and build upon the social and human capital assets that are already in existence in their regions and move away from reliance on attractive, but often mobile, external FDI.

One model worthy of examination combines entrepreneurship with the establishment of so-called "knowledge-based networks" or "clusters". A knowledge cluster strategy recognises that local businesses which share a common knowledge base can promote regional growth by providing a dynamic environment for the transmission of knowledge among local actors and institutions (Porter 1990a). With the help of a questionnaire and evaluation based on Porter's diamond model, this article attempts to ascertain evidence of clusters in the two regions under examination.

Theoretical foundation

Regional clusters and porter's value chain

The concept of regional specialisation and industrial districts is not a new phenomenon. Marshall (1890) noted that knowledge and know-how accumulate in regions and become locally socialised into a "local industry atmosphere", which in turn fosters the innovative creation of new ideas. In former times, during the industrial revolution in Europe, communities developed around the availability of resources. The textile industry e.g. originally developed in areas which were close to the raw material of wool, or near a seaport in the case of cotton imports. Factories were also located near sources of water, which was an integral part of the process itself and was also required for the generation of power. Interaction between the wool mills in terms of technology, R&D and marketing was shared, and the sheer presence of such agglomerations attracted skilled labour to the area.

An industrial cluster can accordingly be described as a geographical concentration of firms with related or similar technologies. Clusters include competitors, suppliers, distributors/re-sellers and customers. More often than not, clusters are situated within close proximity to universities or technology/research establishments (Audretsch/Stephan 1996; Zucker et al. 1998).

Clusters are composed of companies located near one another, which collaborate to create a highly innovative and productive environment to promote the growth of existing members and create new ones (Porter 1998b). The players in a cluster all have something in common, and have something to offer which can benefit other cluster members. They are thus bound together by their overall economic self-interest(s). Clusters have the effect of improving the capacity of member firms to innovate and thus enhance their potential for productivity growth.

"Clustering" is the tendency of firms in related lines of business to vertically and/or horizontally integrate. However, they are more than the value chain, although the value chains of individual companies within the cluster can become embedded in the structure of the cluster. Links develop between companies both vertically, through buying, selling and R&D input (*commonalities*), and horizontally, through complementary products and services (*complementarities*). Porter (1995) put forward the idea of the "Generic Value Chain". The classic example of clusters optimally using the value chain is seen in the automobile industry, where a car plant sets up operations in a particular location. This serves as the catalytic magnet, which then sets out to attract links to other companies which it needs to feed its activities. This is the first step in the four-stage process described by Porter.

The second step involves the location of horizontal industries (in terms of the value chain) or firms which produce complementary products or services, which usually make use of similar, specialised inputs or technologies, or share common supply side links. The third step involves the location of key institutions which provide the cluster network with specialist skills in technology, information, finance or infrastructure (research institutes, real-estate organisations, universities, venture capitalists, banks etc.) The final step involves local government and, in some cases, central government. Porter himself has an aversion to the role of government in cluster development. He argues that the role of government should not be more than that of a "facilitator", "broker", "initiator", "participant" and "listener", who can upgrade cluster development and create opportunities for productive dialogue to bring cluster participants together (Porter 1998a). Governments, government agencies, and regional development agencies alike should, in Porters opinion, take a hands-off approach to fostering cluster development, which should be allowed to develop its own dynamics. Otherwise there is a danger that the innovative drive needed within the cluster will be stifled.

Key determinants of a competitive cluster

In order to be successful, the cluster needs to be competitive – and to be competitive, it needs to be driven by innovation. Porter (1990a) presents a model entitled "Competitive Diamond of Competitive Advantage", which he originally applied to an analysis of nations, establishing a ranking of their innovativeness. Innovation can be summed up quite succinctly as the creation and distribution of new ideas, the transformation of new ideas into commercial value, and the development of new products and processes (Schumpeter 1934; Roberts 1981).

This article has taken the "Competitive Diamond" model (see Figure 1) as the main tool to analyse the innovative nature of the two regions in question (Grant 1991). This model is especially appropriate in the context of countries that are marked by the legacy of the transition process from planned economies to market economies (such as Poland and the former GDR), because it does not focus on the stock of factors available in a region at a given point in time, but on its ability to rapidly and efficiently evolve them (Chobanayan/Leigh 2006; Porter 1990b). The Competitive Diamond comprises four sets of factors or determinants. The more intense the interactions between the four sets of factors, the greater the innovative capacity and productivity of the firms concerned. If regions lack these key determinants, the creation of a competitive cluster is difficult to start. The model relies on pressure being generated at as many points of the diamond as possible.

Porter's competitive diamond

The following four determinants according to Porter (1990a) are the forces that exert the pressures, provide incentives and encourage the capabilities of firms to undertake innovative action:

1. Firm strategy & rivalry: the firm's own strategy (vision, mission, value proposal), the way the business is organised and managed, as well as the local/regional environment and the competitive rivalry amongst firms. Companies in close proximity to one another (industrial clusters) know more about each other's strategies, strengths and weaknesses. They will compete to continually upgrade their products and/or processes to remain competitive. In doing so, it can be assumed that they are motivated to constantly innovate in order to differentiate themselves from their rivals. Even if companies are highly dependent on a single buyer - or a group of buyers - which may prescribe business conditions and a general, one-sided strategy, each firm has to find their specific strategy to deal with this dependence, thus (again) giving room for strategic differentiation between the firms within a cluster.
2. Factor conditions: specialised inputs available to firms, i.e. the factors of production, such as a skilled labour force, specialised infrastructure, capital resources, educational institutions etc. These represent the input resources necessary to carry out business.
3. Demand conditions: this determinant looks at the nature of the firms' home market. The presence of demanding local customers forces firms to stay at the "leading edge". Firms must co-operate with their customers in order to satisfy their needs. Porter (1990a) argues that when firms are able to meet the demands of the local customer, they are primed for being successful in global markets.
4. Related & supporting industries: looks at industries which share common technologies, inputs, distribution channels, customers or activities and which manufacture or provide products and/or services which are complimentary, i.e. the idea behind industrial clusters. Firms which have similar or identical inputs and outputs pool their resources in an industrial cluster and benefit from synergies. This factor also relates to the availability of capable, locally-based suppliers. Co-operation between firms and suppliers can create innovation, which is vital to the development of new products and/or processes.

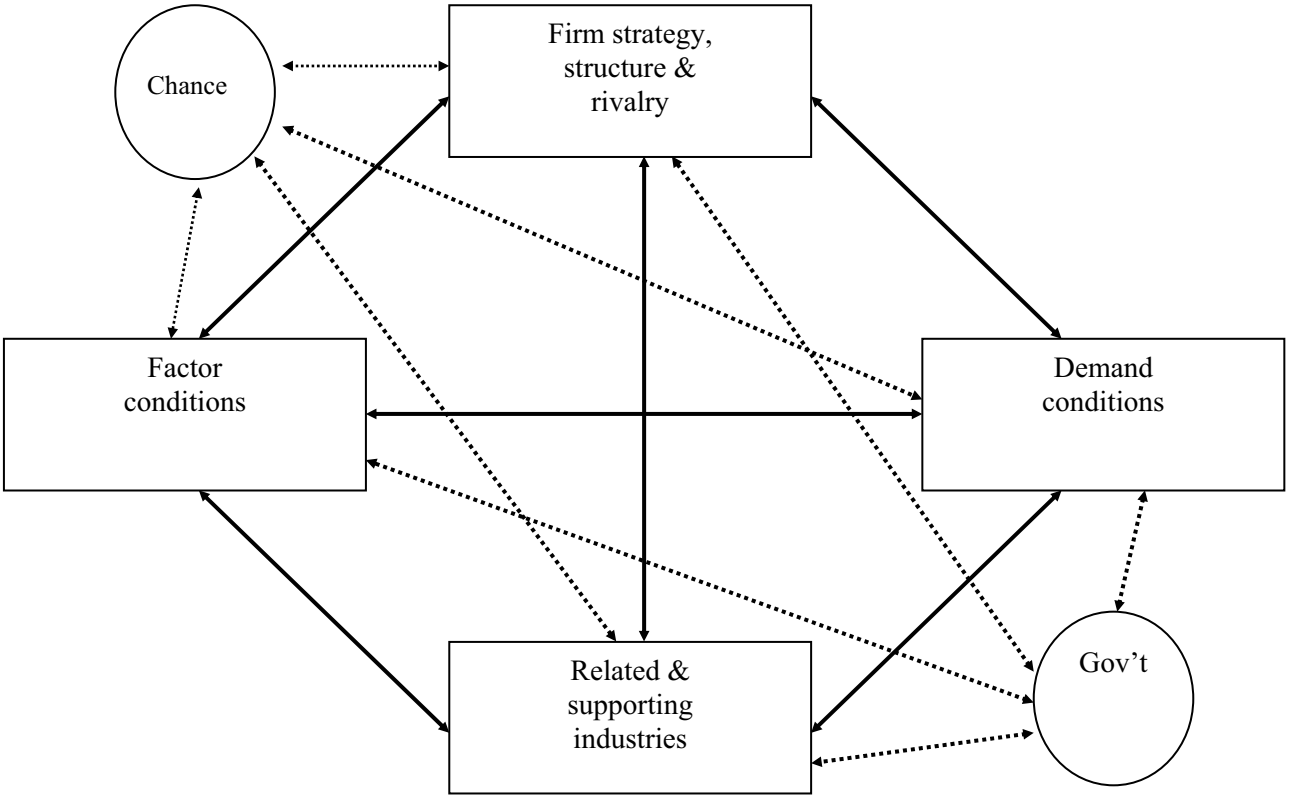
Cluster recognition

Despite the recognition of the importance of clusters, the Polish government has been rather slow to adopt the concept, and there are no governmental policies covering "cluster formation", although research is being undertaken which

supports this direction. Politicians are paying lip-service to the concept, however, no financial support has come forth yet (see table 1).

Many European nations have adopted cluster strategies to support specific technologies, develop regions which exhibit some industrial specialisation, and improve economic development in general. As previously mentioned, in the United Kingdom, the promotion of cluster development has become the main thrust of the government's policies on increasing competitiveness, and it has been made an essential part of regional development policy. The establishment of cluster policies in the EU has been identified as critical in being able to achieve the ambitious goals set by the Lisbon agenda[1] of making Europe a competitive and dynamic knowledge-based economy.

Figure 1. Porter's Diamond Model, adapted



Source: Porter (1990a).

[1] In March 2000, the Lisbon European Council presented a ten-year strategy intended to make the European Union the most competitive and dynamic economy in the world (European Commission 2005a).

Table 1: Central- and Eastern European Countries and Cluster Formation

Action	Czech Republic	Poland	Hungary	Slovakia	Slovenia
Importance of clusters has been recognised	x	x	x	x	x
State financial support for clusters	x		x		x
Cluster mapping		Local research		Research commenced	x

Source: European Commission (2003).

Methodology

The results presented in this article are based upon data received in response to a postal survey carried out in summer 2006. The questionnaire was written in English and translated into Polish and German. Using the key informant approach (Silk/Kalwani 1982), the questionnaire was sent to the mangers/owners of small and medium-sized manufacturing companies in regions identified via prior Internet research to be areas of regional economic development. Owing to the relatively small number of responses, our results can only be regarded as exploratory. Nevertheless, the overall aim of the survey was to obtain feedback from companies on issues which could shed light on their innovative behaviour and the degree of co-operation with private and public sector organisations within their regions. The questionnaire was designed in such a manner that it could serve as a means to test the theoretical model of Porter's Competitive Diamond (Porter 1990a), which is central to this article. Fifty-seven questionnaires were sent out to companies in Poland and East Germany, of which twenty-four completed questionnaires were returned (return rate of 42 percent), of which four were rejected on the grounds of insufficient data.

The first area of questions asked for general information on the year the company was established, the company's legal status, and the industry sector. The second group of questions asked for details on company size in terms of turnover. The remainder of the questionnaire was split into four distinct sections corresponding for the most part to the four elements of Porter's diamond.

The companies chosen as respondents in Poland are located in the Kostrzyn-Slubice Special Economic Zone, a regional development area in the western part of Poland in the province (voivodship) of Lubuskie. In that area, all firms are being offered business advice and support service from official development agencies. The combined area of the zone is 462.56 ha and comprises two sub-zones, one located near the town of Słubice and one in the city of Kostrzyn. The province of Lubuskie has a population of approximately 1 million, of which approximately 42 percent are of working age. The GDP per head for this region

in 2002 was 40.8 (EU 25 average = 100). The GDP per capita for Poland in 2005 was 50. Unemployment levels are around 25 percent (Eurostat 2005). The towns in the region have workforces with skills in the following industrial sectors: paper production, chemical processing, building material production, machinery manufacture, electronics, food processing, wood processing, and textiles. According to the official data of the Central Statistical Office (GUS) of March 2006, there were 102,682 business entities in the region. Approximately 2,343 of these have a share of foreign capital. The average monthly gross wage in the region amounts to PLN 1,460 (378 Euro) (Gorzów Wielkopolski 2006).

Nineteen firms located in this special economic zone were sent a questionnaire designed to analyse their innovative drive, and their responses were related back to the four factors in the theoretical "Diamond of National Advantage" developed by Porter (1990a) (see Figure 1). This model provides a method to visualise and understand how countries establish climates where innovation can thrive and lead to competitive advantage. Although originally established as a model for the evaluation of nations, the analytical approach demonstrated by this model can equally be applied universally to regions, cities and agglomerations. Of the nineteen firms which were sent a questionnaire, eleven replied, of which ten were complete. In order to facilitate the highest possible number of responses to the questionnaire, it was written in Polish. Consistent with previous research from Poland (Mroczkowski et al. 2005), a large number of companies only returned their postal questionnaire after a telephone follow-up in Polish.

In East Germany, the region of Brandenburg was chosen. This area borders the Polish region of Lubuskie from the German side. The same questionnaire, this time in German, was sent to companies listed by the *Brandenburg Economic Development Board* (the Central Agency for business development and consultancy services, e.g. in questions of technology transfer, investor services, patent services, foreign trade etc.). In total, thirty-eight questionnaires were distributed. Thirteen postal replies were returned, and three were dismissed, as they were incomplete.

The Federal State of Brandenburg encircles the capital city of Berlin, but does not fall within the administrative authority of Germany's capital city. The population of the region is approximately 2.6 million. GDP per head in 2002 was 74.4 (EU 25 average = 100). The GDP per capita figure for Germany as a whole in 2005 was 110. Unemployment levels are around 18 percent (Eurostat 2005). The towns in the region have workforces with skills in the following industrial sectors: biotechnology/life science, aerospace, media and communication, automotive, food production, energy production, timber industry, plastics, logistics, metal industry/mechatronics, mineral oil/biological motor fuels, optics, railway engineering, and tourism. Labour costs are 25 to 30 percent lower than in West Germany, and the working hours per week are on average 39.3, compared with 35.7 hours per week in West Germany. There are

nine universities in the region and eleven research institutes (Federal Statistics Office Germany 2003).

Empirical findings and results

Descriptives

The firms interviewed were predominantly founded after the year 1990 (90 percent of the Polish and 80 percent of the East German companies). The majority of the firms (80 percent of the Polish and 90 percent of the East German companies) are indigenous independent companies involved in the production and sale of their own products. The companies can thus be regarded as predominantly "home grown" to the regions in question, and not as examples of foreign investment aimed at a cheap source of labour. Of course it is very difficult, especially in East Germany, to ascertain the source of the financing for the establishment of an East German company. As far as our research indicated, the majority of the interviewed companies were not established as production outposts of foreign direct investment ventures.

The majority of firms in both countries have the legal form of a "private liability company" (80 percent in Poland and 90 percent in East Germany). Only ten percent of the German firms are "public limited companies", whereas ten percent of the Polish firms are "sole proprietorships", and another ten percent "others". With regard to the industry sectors of the companies interviewed, 50 percent of the Polish firms are in "services", another 20 percent in "manufacturing", and 10 percent each in "electronics/IT" and "transportation". The East German companies are more equally distributed, with 30 percent each in "services", "chemical/pharmaceutical" and "manufacturing", and 10 percent in "electronics/IT" (see table 2).

Table 2: Industry sectors of the companies interviewed (in percent)

	Poland	East Germany
Chemical/Pharmaceutical	0	30
Electronics/IT	10	10
Manufacturing	20	30
Services	50	30
Transportation	10	0

The German firms are economically larger than their Polish counterparts. 30 percent of the Polish companies have a yearly turnover of zero to one million euros, and 70 percent of one to ten million euros. With the German companies, 30 percent have one to ten million euros turnover per year, and 70 percent between ten to 100 million euros.

Empirical findings related to the porter diamond

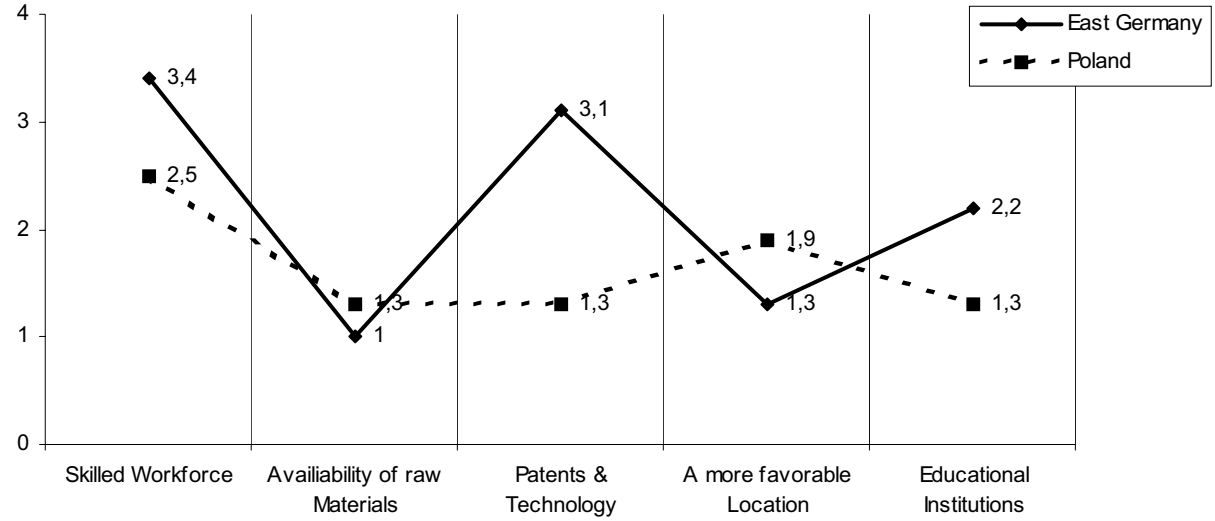
The responses to those questions identified as indicative of the four factors within Porter's diamond were extracted from the twenty completed questionnaires. The respondents indicated their degree of agreement to a set of statements on a five-point scale (from 0 to 4). Each set measured a specific aspect of one of the four dimensions of Porter's diamond. The following figures depict the detailed results for each of the diamond's dimensions. The average values are compared between the two regions. In addition, we aggregated the data into four indices corresponding to the diamond's dimensions. Using Porter's diamond as an analytical tool, this enables us to compare the configurations of the two regions under the scope on an aggregated level regarding their relative competitive advantage.

Factor conditions

These are the presence of high-quality specialised input factors available to firms. Unlike general use factors, specialized factors of production such as a skilled workforce and a favourable location are difficult to imitate by competitors and therefore are jigsaw pieces of a region's sustained competitive advantage. As shown in figure 2, there were remarkable deviations in the reaction of the respondents from Poland and East Germany across all of the questions in this section.

The biggest variations of the average degree of agreement indicated by the respondents from Poland and East Germany were found concerning the variables "skilled work force", "patents & technology" and "educational institutions". In all three of these areas, respondents from East Germany judge the factor conditions far more favourably than their Polish counterparts. Concerning availability of raw materials and the general propitiousness of the business location, Polish interviewees rate their region slightly higher.

Figure 2: Results – Factor Conditions



The competitiveness of a region rises in proportion to the degree of demanding customers on the regional, national, and international levels. This puts pressure on local firms to continuously innovate and improve their product range. Additionally, challenging conditions on the markets force firms to quickly adopt new trends and methods of production. Thus, demand conditions in a region sharpen the specific factor conditions and strengthen a region's competitiveness.

In this section, a comparison of the average values shows almost congruent profiles for the two regions under consideration. In Poland as well as in East Germany, the interviewees perceive their customers as highly demanding and willing to try new products and services. The further the market is away in terms of geographical and psychological distances, the more challenging the firms experience the customers (see Figure 3). In comparison to their East German counterparts, the Polish respondents indicated being confronted with slightly more demanding customers on the local market, though on a rather low level. In accordance with Porter's argument, the more challenging local market makes the Polish perceive less pressure from customers on the national and international level. Environmental demands do not seem to be an issue for firms in either region.

Figure 3. Results – Demand Conditions

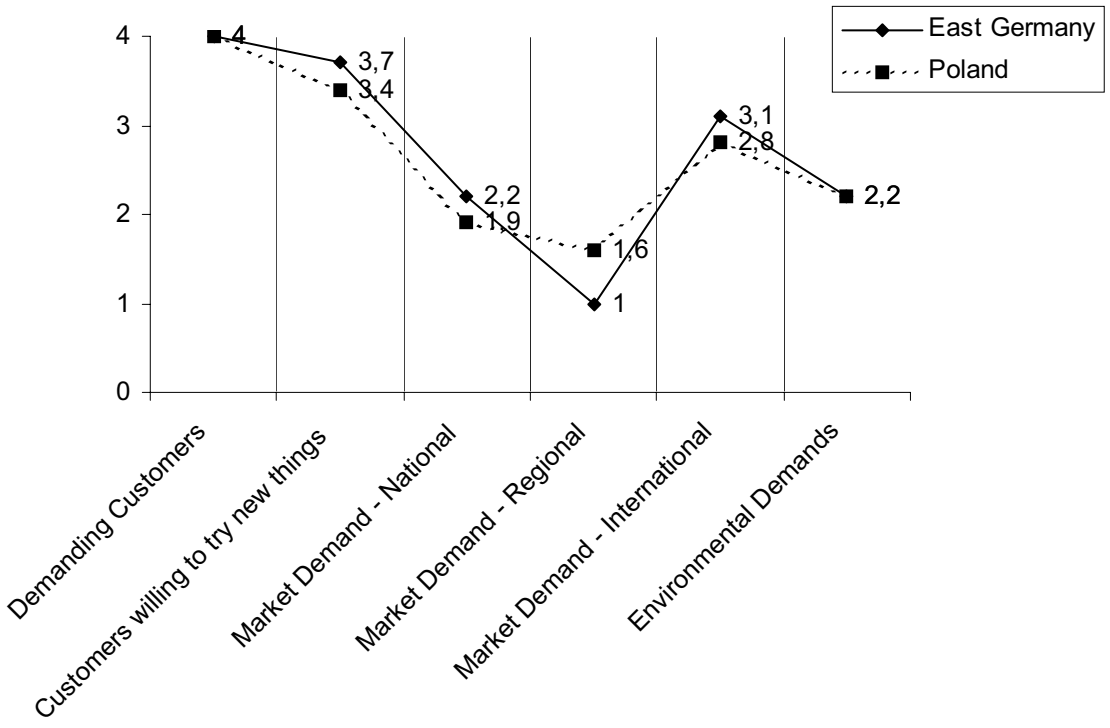
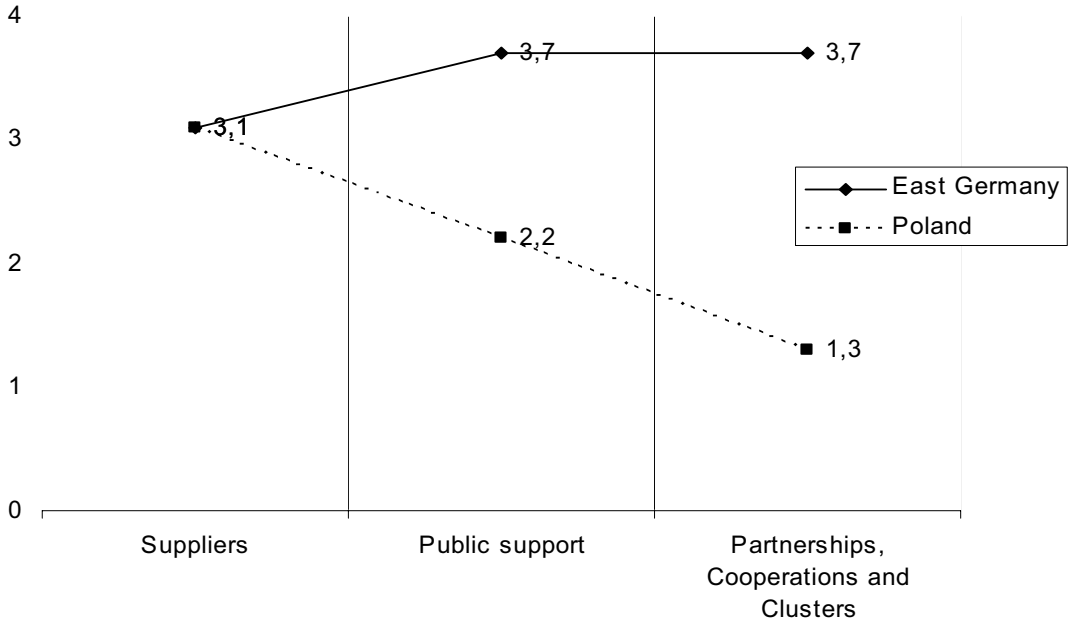


Figure 4: Results – Related and supporting industries



Related and supporting industries

Firms profit from being embedded in a value chain together with highly competitive companies. Not only spatial proximity to upstream, downstream or related industries, but also the close link arising from common day-to-day business facilitate the exchange of information and foster a continuous flow of ideas and innovations. After all, competitive local supporting industries may supply firms with more cost-effective and innovative inputs. This leads to a self-enforcing process resulting in a region's competitive advantage.

Only with regard to "suppliers" can German and Eastern European companies judge themselves equally on a rather high level, whereas "public support" seems to be significantly higher in East Germany than in Poland. Concerning "partnerships, co-operations and clusters", Poland falls behind even more (see Figure 4).

Firm strategy, structure and rivalry

The cultural patterns as to management structures, working morale, or interactions between companies vary between regions. Corporate objectives co-acting with the patterns of commitment among the workforce form the firm's structure, but are in turn heavily influenced by the structure of ownership and control. The intensity of rivalry moderates this dynamic internal process, as the environment puts a certain degree of pressure for change on the company

Figure 5. Results – Firm Strategy, Structure and Rivalry

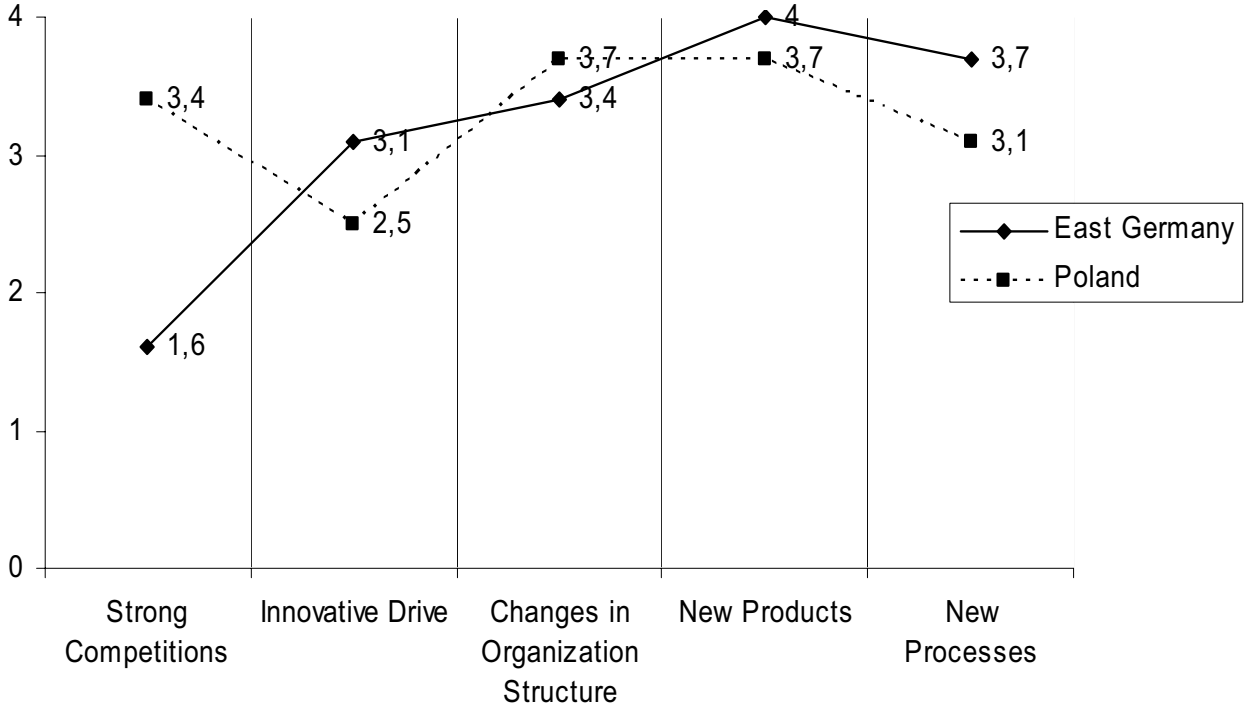
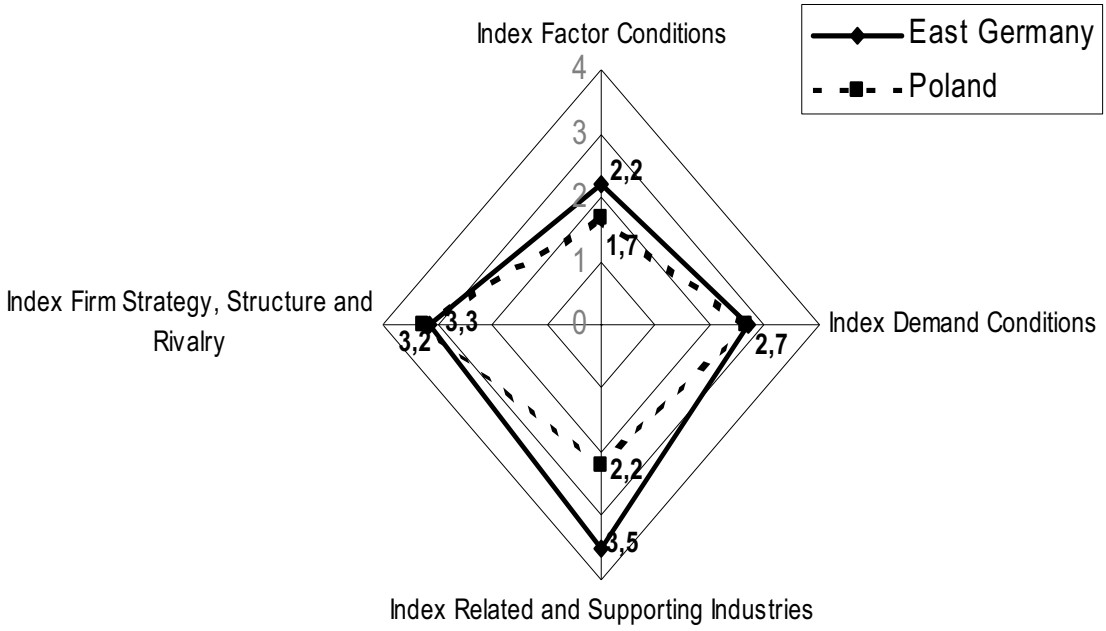


Figure 6. Results – Regional profiles according to the Porter diamond



Initially, a low level of rivalry makes an industry attractive for entrepreneurs. However, in the long run, stronger local rivalry improves the firm's flexibility and innovative power. Those firms which face strong rivalry on their local market are fitter in global competition. Thus, a high level of rivalry may contribute to a region's competitive advantage.

Our empirical results show that the Polish respondents feel significantly stronger competition in their markets than their counterparts in East Germany. However, the perception of the firms' innovative drive, changes in organizational structure, as well as new products and processes do not vary as much as Porter's argument would have us believe. Additionally, the Polish respondents who face stronger competitive pressure indicate less dynamic change than the East Germans. Obviously, the Germans pursue a more proactive strategy concerning innovation to gain competitive advantage in the long run.

Comparative analysis of the regions' competitive status

On an aggregated level, it can easily be seen what already has become apparent in the detailed discussion above. The regional profile plotted in a net diagram, with each axis representing one of the dimensions of Porter's diamond, highlights the shortcomings of the Lubuskie region as to the key prerequisites for gaining competitive advantage (see Figure 6).

Competition on the CEE markets is rapidly intensifying, as the integration of the CEE economies into the European Single Market proceeds. In view of this dramatic change, both regions under consideration are positioned rather inadequately.

The Lubuskie region in particular suffers from a lack of related and supporting industries. In addition, the access to critical factors of production is far less favourable than in Brandenburg. Therefore, in the Lubuskie region, dynamic economic development, which leads to a position of competitive advantage, is hampered from the outset.

Compared to the Lubuskie region, Brandenburg's competitive position is relatively strong, although there are major deficits relating to factor and demand conditions as well. However, Brandenburg may take advantage of its tightly knitted fabric of highly competitive companies in related industries that are willing to collaborate in a context of active public support. The cooperative climate in Brandenburg may be the key for local firms to jointly overcome the disadvantage in factor conditions and to initiate a dynamic economic development within a regional cluster. Mutual support between the economic actors and the development of a common strategy for the Brandenburg region will then be the fast track to competitive advantage.

Obstacles may arise which actually hinder the formation of clusters in transitional economies. Among these are e.g. the legacy of industrial policies of the past, historical under-investment in infrastructure and services, regional insularity and isolation, low education levels or a low- skilled workforce, poor access to sources of technology and benchmarking opportunities, weak links to benchmark regions and markets, lack of entrepreneurial spirit, lack of trust in institutions by entrepreneurs, lack of informal networks among entrepreneurs, bureaucracy, and lack of legal and financial frameworks (Ionescu 2003). This holds particularly true for the regions under investigation.

Suffering from less advantaged conditions in the Lubuskie region, the Polish respondents perceived the hurdles for the evolution of competitive advantages by clustering them as being more severe throughout the tested set of variables in comparison to their German counterparts. The perceived economic risk, the low organizational flexibility, the low availability of financial resources, the lack of qualified personnel, information and technology as well as the lack of customer responsiveness to new goods and services is substantially higher in the Lubuskie region (see Figure 7).

These findings sharpen the picture of structural deficits in both regions analysed: The private sector in transitional economies is composed of individual, isolated actors who often lack financial and social resources. Here, it has to be the responsibility of local and central governments to "jump start" activities and

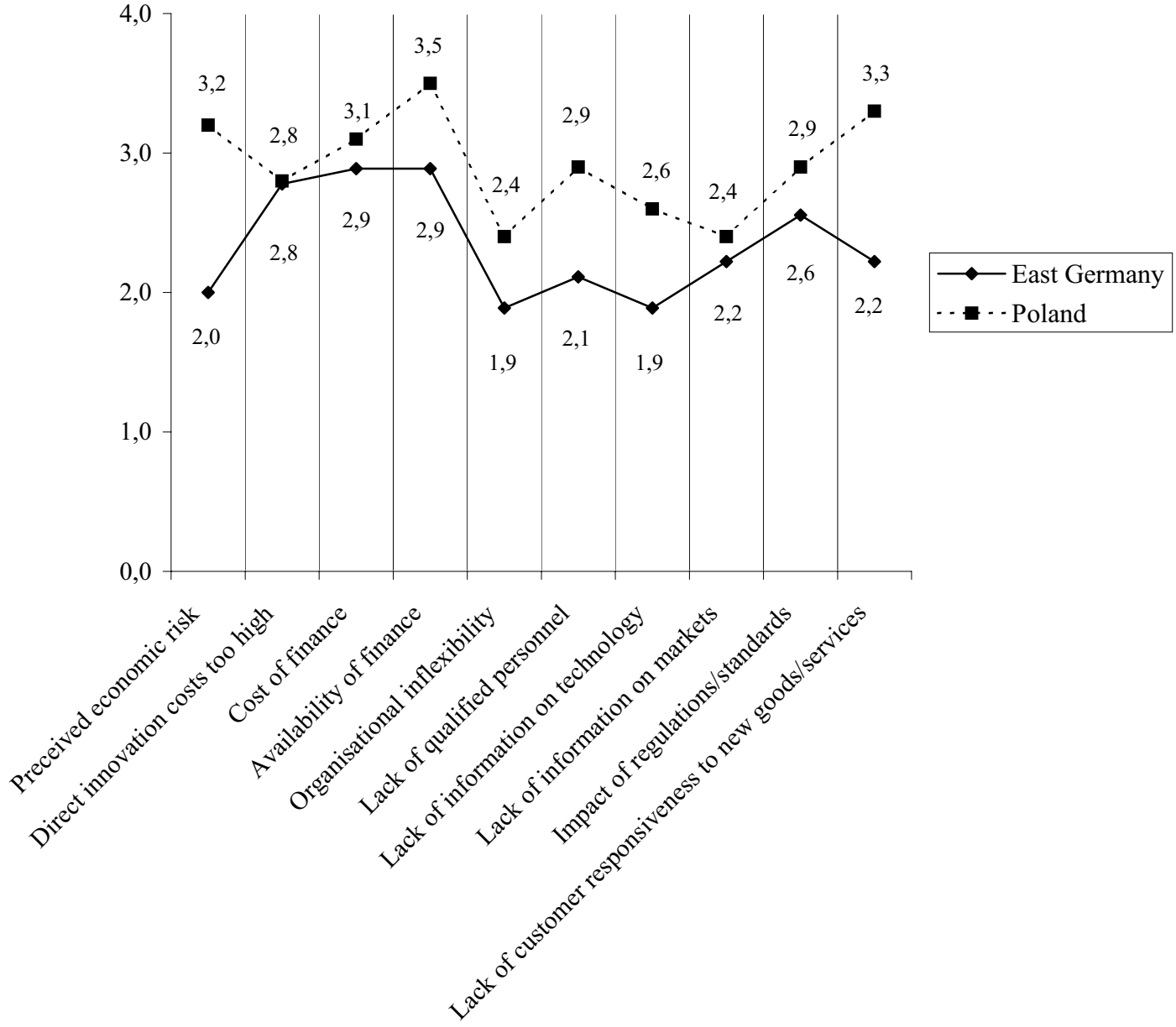
actively improve the conditions for the development of highly competitive regional clusters.

Discussion

This article attempted to look at the reasons for the establishment of industrial and service clusters as the motor for sustained regional development using the examples of two regions in Poland (Lubuskie) and East Germany (Brandenburg). The presence of an inherent stock of innovative drive in the regions in question, as well as the question of whether this is leading, or has lead to the establishment of industrial/service clusters was empirically investigated in an explorative manner. Thus, it could be shown that the development of innovative traits in these areas is dependent upon a supportive environment such as industrial clusters and institutional government programmes which are in tune with these requirements.

An analysis of the questionnaires indicates clearly that respondent companies in East Germany are for the most part enacting the business model for sustained competitive advantage promoted by Porter, and that the majority of the companies replying recognised the need to cluster their efforts with like-minded companies and/or institutions. It is beyond the scope of this article to suggest that the influence of West German management practices has led to a faster adoption or forced recognition of these doctrines. The questionnaire did not approach the question of ownership, and to what extent Western interests play a role in the management of the East German respondents. However, based upon the general development of the East German market after reunification, it would be advantageous to make such a conjecture.

Figure7. Results – Obstructions to clustering and innovation



The results of this study suggest that cluster formation in Poland is not yet as elaborate as in East Germany. The deficiencies in the areas 'factor demand' and 'related and supporting industries' of the Porter diamond need to be remedied before such industrial clusters can start to make sense. The challenge for Poland is to move from isolated firms to an array of clusters, enhance interaction within clusters from neighbouring areas (i.e. Brandenburg) and then upgrade the breadth and sophistication of their clusters to more advanced activities.

Nevertheless, the Polish approach to the establishment of clusters is still under consideration by regional developers. Acceptance of the doctrines of Porter's diamond model of competitive advantage would, however, seem easier to instil into the business strategy of Polish companies, as our empirical results suggest. Much harder is the recognition that the innovative fuel to ignite regional

development may actually be embedded within the subjective mindsets of individuals and that these are shaped by the broad cultural framework of the region/nation. Although these cultural factors have not been the explicit subject of this article, they can be assumed capable of inhibiting change both at the individual and corporate levels. As our results suggest, in the case of Poland, the lack of social capital (including trust, competitiveness and openness to change) is emphasised more than the lack of skills and knowledge. Future research as well as regional development agencies should therefore recognise the factors of cultural heritage and work with organisations to educate and nurture trustful relationships, motivation and teamwork, while also improving competencies and skills in conducting business. Development agencies and industrial associations should spend time benchmarking clusters in neighbouring regions with their members.

National cultures and cultural differences can be used as a source of competitive advantage. It is therefore important to recognise one's own cultural benefits and deficits. Where deficits are identified, benchmarking those cultures which offer cultural solutions to those deficits can be undertaken. Cultures do change and evolve and a nation is not doomed to remain trapped in its own culture. Future research should attempt to provoke discussion on the value of looking at regional development policies in the light of cultural influences. This could be used to help determine the catalytic role that such development organisations should be playing by emphasising the need to base decision making on cultural as well as economic factors in order to stimulate cluster formation and enable innovation by optimising cultural interchange.

Limitations

This study was based on a rather limited amount of data from only two regions. Furthermore, in order to compare regions with cluster structures, we have focused on the comparison of two special economic zones. The number of cases at hand can obviously only provide limited empirical evidence. Thus, further empirical research has to be conducted to test if the statements formulated hold true for different types of companies and if the statements also apply to other geographical contexts within the individual countries or the CEEC. However, for the context surveyed, the empirical study conducted serves to provide evidence that, first, national cultural values seem to influence all four dimensions of the Porter diamond of competitive advantage, and that, secondly, a more favourable configuration of these four dimensions in a specific region correlate with a more optimistic perception of the local firms as to the conditions for innovation and clustering. In this way, Porter's diamond proved to be an adequate tool to detect deficits, which in turn led to the formulation of recommendations for those responsible for enhancing the competitive strength

of less advantaged regions such as the Polish province of Lubuskie and the German federal state of Brandenburg.

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