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International Activities of German Clusters and Regional Networks

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1 Executive Summary

Facing the increasing pace of globalization, companies worldwide are confronted with the challenge and opportunity to forge collaborations with strategic partners to sustain and improve their quality and price competitiveness. The growing importance of this international connectivity is not restricted to single enterprises. Regional and industry-specific networks—which have, in the recent past, gained substantial political recognition, as evidenced by the frequent implementation of cluster and network initiatives—also face these challenges in order to preserve their economic performance and thus economic development, employment and prosperity of their regions. The promotion of international collaborations has become an intensively discussed and crucial topic of innovation policy, as exemplified in the strategy of the German Federal Government for the internationalization of science and research (BMBF 2007). To analyze the state of play and the development of internationalization of German cluster and network initiatives, a survey was conducted among cluster managers. 72 responses from well established, research oriented, cluster and network initiatives participating in cluster competitions or public cluster promoting initiatives could be evaluated. The way of proceeding was a "two step approach", combining both general/non-regional information on internationalization activities with assessments of activities focusing specifically on Central and Eastern Europe (CEE).

Topics of the survey have been planning, initiation and implementation of international activities as strategic measures for the further development of cluster initiatives. Their theoretical and practical importance results from the attempt to avoid lock-in effects on the one hand and from the broadening of the knowledge base as well as the development of new product and factor markets on the other hand.

The results of the survey clearly indicate that international activities by cluster actors—whether enterprises, cluster management, universities, extramural R&D institutions or intermediary organizations—are viewed as essential success factors for their development. With regard to specific geographical areas, especially highly industrialized and advanced economic regions like Western Europe and North America are of distinct interest for German clusters and regional networks to initiate and implement international co-operations. Besides Eastern Europe the emerging economies of the so called BRIC countries—Brazil, Russia, India and China—are also of particular interest, with China ranked as the most important country in this group. Interestingly, Eastern Europe and Russia are

more important for initiatives active in mature industries, whereas high-tech initiatives emphasize the relevance of Western Europe and North America.

The survey responses indicate that cluster management and companies are the most active and thus likely key actors when it comes to initiation and implementation of international activities or collaborations. In comparison, further actors like university entities, extramural research and development institutions as well as intermediary organizations play only a minor role in this regard.

For a defined set of 6 areas, international activities are of considerable importance with respect to market entry, knowledge and technology transfer and for safeguarding the competitiveness of the clusters. Beyond this background, cluster managers mentioned most often increasing international recognition, expanding contact basis, co-operations in research and developments field as well as market entry as motives for international activities. A detailed inspection of the survey responses reveals that expanding contact basis, R&D co-operations and market entry are topics that are of higher importance for large initiatives (in terms of associated companies).

Concerning the existing pool of activities it appears that official and mutual visits between partnering initiatives is by far the most commonly utilized measure. Although other instruments like the development of communication platforms, joint public relations or communications with international partners as well as joint projects are also frequently used. Exchange programs in contrast are used seldom, which may be due to the fact that they certainly require much more institutionalized and thus further developed structures than most other instruments do.

Lack of financial, time or personal resources are by far the most important obstacles that hinder the initiation and implementation of international activities or at least lower their intensity. Furthermore, geographical distance between co-operating partners is seen as another important barrier.

With regard to the specific regional focus on Eastern Europe, survey results show some telling differences to the results that were observed without particular geographical focus. The importance of international co-operation with CEE partners for specific areas is significantly lower for each of these areas. The biggest discrepancies can be observed for knowledge and technology transfer and job security.

The motives for internationalization activities with CEE partners follow in principle the general assessment. Despite this tendency, some exceptions occurred: For CEE market entry was indicated as the most important followed by expanding the contact basis. Whereas increases in international recognition—

mentioned as the most important motivation without regional focus—holds only fourth position with CEE focus. Additionally, all motives were less often mentioned with respect to CEE than otherwise.

For German cluster managers the most important target countries in CEE are Poland and the Czech Republic with Hungary, Slovakia and Slovenia constituting the followers. Interestingly, Estonia plays a considerably role for initiatives from services industries. Also within the CEE context, the cluster management and companies are the essential actors concerning initiation and implementation of international activities.

Regarding specific instruments frequently applied for internationalization of clusters the tendency that responses are less frequently given—which was already observed with other topics above—is also present here. Nonetheless, official and mutual visits also represent the most often used measure within the CEE context while specific exchange programs are the least important—again following overall trends. Furthermore, the responses show that joint project activities between German and CEE initiatives are comparatively common, especially for small clusters/networks as well as services sector initiatives.

With regard to barriers that might have negative influences on international activities, significant distinctions between CEE and the general assessment are apparent. Nonetheless, lack of financial, personal or time resources are also seen as the most common barrier concerning international activities with CEE partners. However, language barriers and lack of trust in international partners are indicated to be of higher importance, whereas conflict of interests and distance are of minor importance than indicated in general.

The survey results document the high pertinence international collaborative activities already have for German cluster initiatives. Nonetheless, some deficiencies could be identified. Probably the most important is the absence of an internationalization strategy for the majority of respondents and the accompanying inconsistencies in approaching this topic. However, on the positive side is the considerable intensity of cooperation between German clusters and international partners, namely the fairly frequent approach to participate on knowledge and technology transfers, joint projects and other less-marketing oriented motives and instruments.

Nevertheless, further research is needed to analyze e.g. strategy formulation of clusters and its outcomes, internal coordination of activities and target regions or views, motivations and approaches of complementary, international partners. This last point will be partly addressed by upcoming investigations of cluster initiatives from CEE.

2 Introduction

In order to realize overall economic objectives such as economic growth, full employment and wealth of the domestic economy in general and beyond the background of the Lisbon Strategy of the European Union, the implementation of cluster initiatives and regional networks constitutes a frequently applied instrument. Clusters and networks are associated with specific growth expectations and thus recognized as appropriate instruments in regional development. Not least because of this fact, cluster promotion was, and still is increasingly important component of economic and regional policy.

Furthermore, within the public debate internationalization takes a high priority as exemplified in the strategy for the internationalization of science and research or the High-Tech Strategy of the federal government. The strategies aim at strengthening Germany's role within the global knowledge society and to strategically foster promising and beneficial collaborations.

The significance of the external dimension is highlighted and operationalized in the scope of the current study through an assessment of international cluster activities. These activities can be regarded as an essential factor to realize various benefits, such as spillovers, reductions of costs, increased knowledge sharing. Furthermore, international activities and co-operations with international partners can be seen as important measures in order to prevent a central risk of clusters, the so-called "lock-in", "blocking" or "encrustation" of clusters.[1] This encompasses primarily the danger of increasing inward looking of cluster actors with the accompanying loss of awareness of broader market developments. These "lock-in-effects" occur, if inter-regional communication channels to other clusters ("global pipelines") are rarely used, disturbed or even completely closed due to an exclusive focus on the intra-regional exchange of knowledge within the cluster structures ("local buzz").[2] Therefore, corporate actors have to find an appropriate balance between an intensive and supportive exchange within their own structures and outward directed communication and co-operation channels.

Beyond this background, international orientation of clusters and networks constitutes a crucial element of successfully and sustainably developing existing

1 OECD (2007), and Kiese, M. (2008).
2 Sautter, B. (2004).

structures. By fostering their international activities and transnational co-operation with complementary initiatives and beneficial partners, clusters and thus enterprises located within these clusters, can actively expand arising potentials in new products or markets. The following aspects can be regarded as major benefits associated with openness and international orientation of clusters and regional networks (VDI Technologiezentrum 2008):

- Enhanced international visibility improves framework conditions connected with the acquisition of investments, seed and venture capital, enterprises, research institutions, highly qualified employees and further strategic collaboration partners.

- Collaborations with international partners and thus integration into transnational structures support the identification of relevant changes, trends, and developments on early stages and their proactive integration into specific and forward-thinking reactions.

- Own areas of knowledge and competences can be supplemented and strengthened by strategic co-operations and formation of knowledge alliances with worldwide partners. International collaborations of clusters can provide a platform for easier internationalization of the participating companies.

- Furthermore international activities are a useful instrument to gain access to foreign markets and develop distribution channels. Actors working together with partners may be able to realize chances which may not be feasible as individual competitors.

So far, internationalization is regarded as both a necessary and beneficial element of strategic cluster development. However, it should be noted that international activities, and in particular the scope of these activities, are nothing obligatory. Their usefulness and importance can be influenced by specific structural characteristics such as

- the thematic focus and technological emphasis of the initiatives,

- the development stage of cluster/network (in general established initiatives can effort more resources for internationalization than developing clusters),

- the internal structure of cluster actors (mainly major enterprises vs. young and financially less endowed enterprises?).

Thus internationalization can be regarded as an important piece of the whole puzzle to achieve the benefits and avoid the risks associated with the existence of clusters.

The study at hand was conducted as part of an ongoing research project in the field of identification and function of research clusters in Central and Eastern European (CEE) countries, funded by the German Federal Ministry of Education and Research (BMBF). The project aims at identifying regional clusters in high and medium high-tech as well as knowledge intensive industries. Initiatives, programs and thus established actors and structures of regional clusters will be described for selected CEE countries and will be transferred into a guide of the economically most relevant and promising clusters.

The paper is organized as follows. The next chapter (3) deals with some methodological and associated issues, followed by the presentation of the survey responses. The last part (5) includes some conclusions and proposals for further research.

3 Methodology

Internationalization of clusters and regional networks has been pushed forward in strategic considerations on the development of cluster initiatives in the last few years and globalization is doubtless one of the major driving forces of this. The current study examines internationalization activities of German clusters and regional networks and tries to gain insights on specific behavioral patterns, expectations and barriers of related measures. Central elements of the standardized questionnaire were motivations, advantages and obstacles concerning internationalization of clusters and networks.[3]

The particular interest of the study is to gain a basic overview of current issues concerning international activities of prominent German cluster and network initiatives. These include in general activities without a specific regional focus as well as activities with a specific focus on CEE countries. Thus primary research questions of the survey are, for example:

- How do German cluster and network initiatives assess activities fostering internationalization of their structures?
- Which motivations and/or ambitions are connected with internationalization strategies?
- Who are key actors in order to initiate and to implement international activities?
- Are there differences in the assessment of internationalization activities with respect to Central and Eastern Europe (CEE) as target region compared with the assessment without any regional focus?
- Are there differences between clusters with different sectoral specializations?
- What barriers hinder the further development of internationalization activities or even preclude them?

[3] The complete questionnaire can be found in the annex.

The survey focused mainly on well known cluster and network initiatives that have either participated in state-run cluster competitions or are current members of cluster promoting public initiatives on both the federal and the state level. Behind this approach stands the assumption, that in general these clusters and regional networks have already some specific internationalization strategy and co-operate with clusters and regional networks on an international level.[4] If clusters or regional networks have not yet started international activities, it is assumed that they have serious interest in implementing collaborations with international partners. Another selection criterion was the fact that these initiatives usually integrate a variety of actors – such as enterprises, universities, extramural R&D institutions, intermediary institutions and further related organizations – that play key roles within the contexts of clusters and regional networks.

In particular members/awardees as well as applicants of the following initiatives were chosen to participate in the survey: Members and applicants of the "Spitzencluster Wettbewerb" (*Excellence Cluster Competition*) of the BMBF within the framework of the "High-Tech Strategy" of the Federal Government. The cluster competition is the most noted and financially most comprehensive German initiative.[5] Another major target group was the members of the initiative "Kompetenznetze Deutschland" (*Competence Networks Germany*) by the German Federal Ministry of Economics and Technology (BMWi).[6] Beside these major federal programs, clusters and networks that are supported by the German state governments were also asked to participate in the study; among them members of the cluster competition of the state of Hesse, the cluster competition of the state of Baden-Wurttemberg, the initiative "Excellence North Rhine-Westphalia", the "Clusteroffensive Bayern" or the "Wirtschaftsinitiative für Mitteldeutschland" (*Industrial Initiative for Central Germany*). The selection of the target group illustrates that primarily established initiatives which have – to some extent – institutionalized structures and some kind of (national) recognition were asked to participate in the survey.

The cluster and network managements or other central contact persons – as representatives of the cluster and network actors as a whole – were target au-

4 According to the specific application guidelines for funding, applicants usually have to briefly describe their internationalization strategies.

5 The second competition round, of a total of three rounds, has been completed in January 2010. The awarded excellence clusters of each round will be supported with a maximum grant of €40 million over a maximum period of five years. The support follows the principle of co-financing, which means that public aid has to be complemented at least in the same amount by private investments.

6 According to the access criteria the initiative selects the country's most innovative, high performing and technology oriented networks and provides them with consultancy and many other individualized services as well as assistance in the development of internationalization strategies. Additionally, a wide range of non-financial cluster-support services is offered.

dience of the survey. With regard to the specific responsibilities of the cluster management and the central survey question this consideration seems appropriate. General functions and responsibilities of the cluster management are e.g.[7]

- strategy development and development of profile themes and projects,
- general cluster/network services,
- maintenance of contacts to all actors within the relevant environment etc.,
- marketing, promotion and internal/external representation of the cluster/network,
- positioning of the cluster/network within national and international environments,
- trend monitoring in order to set up knowledge management systems,
- implementation and realization of measures aiming at intensifying cooperations between the clusters actors.

On the basis of these wide-ranging operational responsibilities, it can be assumed that the cluster/network management, or further central contacts that perform at least some of these functions, have consistent and profound insights into structures and processes of the cluster or regional network. The fact that responsibilities concerning (inter)national relations and marketing are often essential parts of the cluster management activities, reinforces their role in this survey and justifies why not other actors such as enterprises, research institutions/universities or intermediate actors have been the preliminary target audience. Nonetheless, it has to be mentioned, that the cluster or network management board is usually not informed about any individual internationalization activities of the participating actors. This concerns especially activities of individual enterprises, which usually implement and perform corresponding initiatives themselves.

The surveyed cluster initiatives and networks are characterized by a variety of participating actors. Besides enterprises and the already mentioned management, these are primarily private and public research institutions but also inter-

7 Scheer, G., von Zallinger, L. (2007).

mediaries. A reason is the focus on research-intensive networks as opposed to more sales or marketing oriented initiatives because the internationalization activities of the latter are essentially the same as for enterprises in general. Since public intermediaries—often in the form of local or regional economic promotion agencies—are nearly always part of the cluster or network initiatives, these might be seen as Triple Helix structures (Etzkowitz, Leydesdorff 2000). Such cooperation between enterprises, university or research institutions and public actors are seen as beneficial in the production of new knowledge and its application for innovations. While essential responsibilities of the cluster management board have already been discussed above, tasks and duties of universities (in particular entities such as institutes, chairs etc.), extramural research and development institutions and intermediary organizations within the cluster and network structures can generally be described as follows:

- Universities frequently support both the establishment of new technology-implementing enterprises as well as the expansion of existing cluster activities. The active involvement of local universities as well as extramural research institutions provides corporate cluster members with convenient opportunities to access state-of-the-art knowledge and technologies.

- Intermediary actors may take on many different shapes and sizes. They include education and training institutions, public institutions and authorities, chambers, business and professional associations, trade unions, technology transfer institutions, banks, seed and venture capital organizations, interest groups, public-private partnership initiatives etc. As independent institutions, intermediaries facilitate information and knowledge sharing and most importantly, lead to the establishment of trusting relationships among the networked cluster entities, thus lowering transaction costs (Intarakumnerd 2005: 23). Furthermore, intermediary institutions play an important role in linking users and suppliers of knowledge as well as of products in a cluster; they bridge the divide between research and application, and—depending on the intermediary's nature—even in directing research activities toward implementation.

The survey was conducted as an e-mail survey, which means, that respondents were contacted via e-mail with the questionnaire as an attachment. This survey method seemed to be appropriate, because the cluster management, as the target audience, is accustomed to e-mail inquiries, the questionnaire was relatively short and quick responses were necessary.

A total number of 218 questionnaires were sent. 72 of the returned questionnaires were exhaustive enough to be included in the analysis resulting in a response rate of 33 percent. A further eight responses were received with partly

completed questionnaires or with an indication that no internationalization activities are planned or implemented.

Because of the specific interest on internationalization activities of German clusters and regional networks targeting the CEE area, the questionnaire was separated into two different parts. First, the sampled cluster managements' general stance on the issue of international networking and second, their perception of Central and Eastern Europe's role within the respective clusters' internationalization strategy. To facilitate comparability of the collected responses for survey parts one and two, we asked the same questions twice; however, with specifically phrasing the question towards the CEE region in the second round of inquiry. This approach has the advantage of providing both general (non region specific) and CEE-specific information, revealing possible differences and allowing direct comparisons between the respective assessments.

4 Results

4.1 Cluster Profiles

Before the specific results of the survey are presented, a more introductory overview of the participating clusters and their structure seems sensible. For the following analyses the clusters were divided into three broad industry categories, namely high-tech industries, mature industries and services industries,[8] because it seems likely that motivations and approaches of internationalization activities are different for different industries. The chosen categories are a result of the partially fairly imprecise descriptions of the respondent's industry foci. Table 1 gives an indication of the broad variety of industries in which the individual clusters are active, which is based on a self-evaluation of the respective cluster management. Given the sampling design, the large share of high-tech industries (72%) was to be expected which was less the case for the services based clusters (19%). Given the low number of clusters active in more mature industries (8%) the results for this subgroup (and also for services clusters) are notedly less reliable than for the high-tech clusters.

[8] The classification of high- and medium-tech (here both contained in the high-tech industry group) and low-tech (here referred to as mature) industries follows the classification of Eurostat (NACE rev. 1.1).

Table 1:
Sectoral allocation of surveyed cluster and network initiatives

	Industries/branches
High-tech industries ("high- and medium-tech") NACE rev. 1.1 codes 24, 29-35, research-intensive cross-sectional technologies	▪ Chemical and pharmaceutical industry ▪ Mechanical engineering ▪ Medical technologies, optical technologies, microelectronics ▪ Automotive industry, aerospace technology ▪ Material and surface technologies, nanotechnology, plasma technology ▪ Life sciences, biotechnology ▪ Energy technologies, renewable energies, environmental technologies
Service industries	▪ Logistics, mobility ▪ IT, virtual engineering ▪ Financial services ▪ Creative industries, media
Mature industries NACE rev. 1.1 codes 15-23, 25-28, 36-37	▪ Agriculture and food industry ▪ Textile manufacturing ▪ Metal processing ▪ Wood processing

Regarding the size of clusters and networks in terms of the number of enterprise members, more than half of all clusters represent ten to 100 enterprises (54%), 40% have between 100 and 1,000 company members and only a small number (6%) comprise more than 1,000 enterprises. The number of enterprises in the surveyed initiatives varies strongly between 10 and 50,000 which might also give an indication of the spatial scope of the respective clusters (table 2)[9]. Smaller initiatives are hypothesized to have a strong regional or even local focus, whereas the huge initiatives might have a more extensive geographical scope up to the level of *Länder* or beyond. The average number of participating enterprises is 975, the median just 98.[10] Concerning the sectoral focus, relevant differences in the size of the initiatives can be observed. The median enterprise number of high-tech initiatives is 90, whereas for initiatives from service and mature industries it is 120 and 273 enterprises respectively. Overall, the median number of large scale enterprises is seven, with a minimum of zero and a maximum of 500. "Small" initiatives include in the median five major enterprises while "large" initiatives include 25.[11] Regarding the industry focus of the initia-

9 The number of observations differs substantially between categories and questions. Therefore, it is noted in all tables and figures on how many responses the respective values are based.

10 This difference is primarily the result of the inclusion of one initiative with more than 50,000 company members. All other participants include not more than 2000 company members. In the following all averages are calculated without the four biggest initiatives or only the median is indicated.
The median divides a sample in two equally sized parts; half of all units are smaller than the median and the other half are bigger.

11 Small initiatives include less than 100 companies (54%), large initiatives include 100 and more company members (46%).
Due to missing responses, it was not possible to categorize all responding clusters into the categories small or large. Therefore the sum of the two categories is always less than 72.

tives no significant differences in the number of large enterprises can be observed.

Table 2:
Initiative Profiles – Participating Actors

n: number of observations

	High-tech (n=52)	Services (n=14)	Mature (n=6)
Industry Focus (%)	72,2	19,4	8,4

Participating Actors	Min.	Max.	Average	**Median**
Enterprises (n=68)	10	50 000	975	**98**
thereof large scale (n=59)	0	500	26	**7**
University Entities (n=66)	0	85	11.6	**5**
Extramural R&D Institutions (n=66)	0	48	7.6	**5**
Intermediary Organizations (n=65)	0	100	11.9	**6**
Cluster/Network Employment (n=37)	500	503 000	54 600	**20 000**

The overall number of workers employed in associated companies varies considerably, with a minimum workforce of 500 and a maximum workforce of over 500,000 employees.[12] The median employment of the initiatives is about 20,000. Small initiatives have in the median an employment of 10,000 whereas that of large initiatives is 27,500 and thus considerably higher, which was to be expected. Beside enterprises as central actors of clusters and regional networks, cluster managers were asked to quantify the number of further important actors: universities, non-university research and development (R&D) institutions and intermediary organizations. The number of participating university entities in the median is nine, while some differences between small (3.5) and large (9) as well as high-tech, mature (5 each) and services initiatives (10) exist. Some interesting distinctions can also be observed concerning participating non-university R&D institutions and intermediary organizations: while the overall median number of non-university R&D institutions is five, it is 3.5 for small and seven for large clusters. For the different industries no differences can be observed. In the median six intermediary organizations are represented in the responding initiatives, in small initiatives around four and in large ones 12 intermediary institutions. With regard to the sectoral focus, the number of involved

12 Please note that only 37 (51%) of the questionnaires provided useful information on the number of employees within the cluster.

intermediary organizations is the lowest in high-tech initiatives (5), while initiatives in services (6) and mature industries (7.5) show somewhat higher values.

To sum up, the number of participating actors in terms of universities, non-university research and development institutions and intermediary organizations increases with the number of participating enterprises but significantly slower than the number of enterprises. This leads to falling shares of the other institutions the bigger the cluster gets. Initiatives with a focus on high-tech industries are on average smaller but include similar numbers of research institutions, both university and non-university entities. Adjusting for the different size distributions in mature and services industries, especially clusters in mature industries include significantly less universities as well as non-university R&D institutions. For services industries mixed results emerge; compared with non-university R&D institutions universities are comparably common. For intermediary institutions no significant differences emerge between the different industries. Table 2 provides an overview about these general cluster and network profile information.

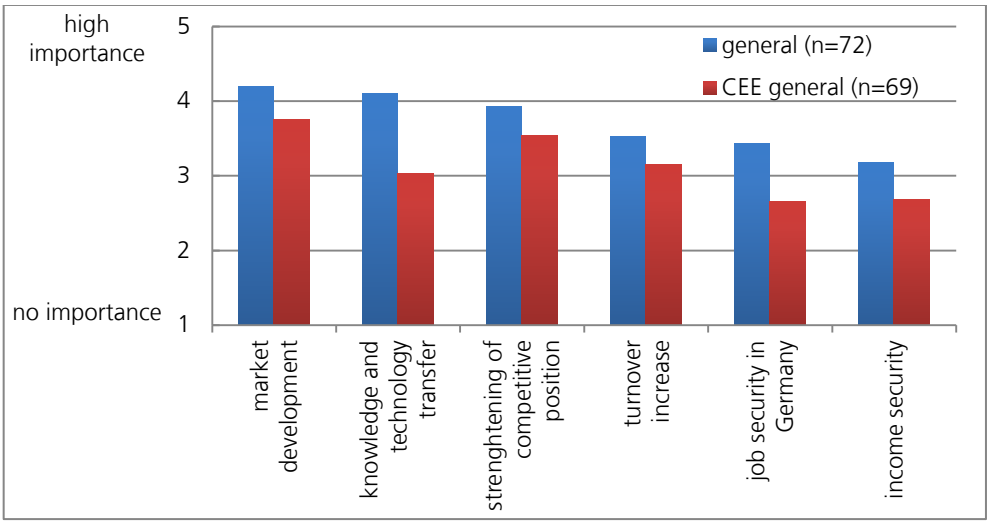
4.2 Aims, intermediary objectives and instruments of internationalization activities

As already mentioned before, international activities have become an integral part of strategic considerations of clusters and regional networks. Of the responding clusters and networks 94% have either already taken action in order to initiate international activities or have specific agreements with international partners. However, given the considerable importance and wide application of international activities merely 26 percent of the surveyed clusters have any kind of documented or fixed internationalization strategy. Of those without a formal strategy around half plan to create one in the future.

In order to gain information about the overall importance of international activities, cluster managements were asked to rate their relevance with regard to a set of overarching cluster objectives. Their average ratings are given in Figure 1, based on a scale between 1 (no relevance) and 5 (very high relevance). Overall, market development is the most important factor associated with international collaborations and networking strategies (4.2) followed by participation in international knowledge and technology transfer (4.1) and strengthening the own position within international competition (3.9). Even the less important factors are at least rated as of medium relevance.

Figure 1:
Relevance of international activities

mean responses
n: number of observations

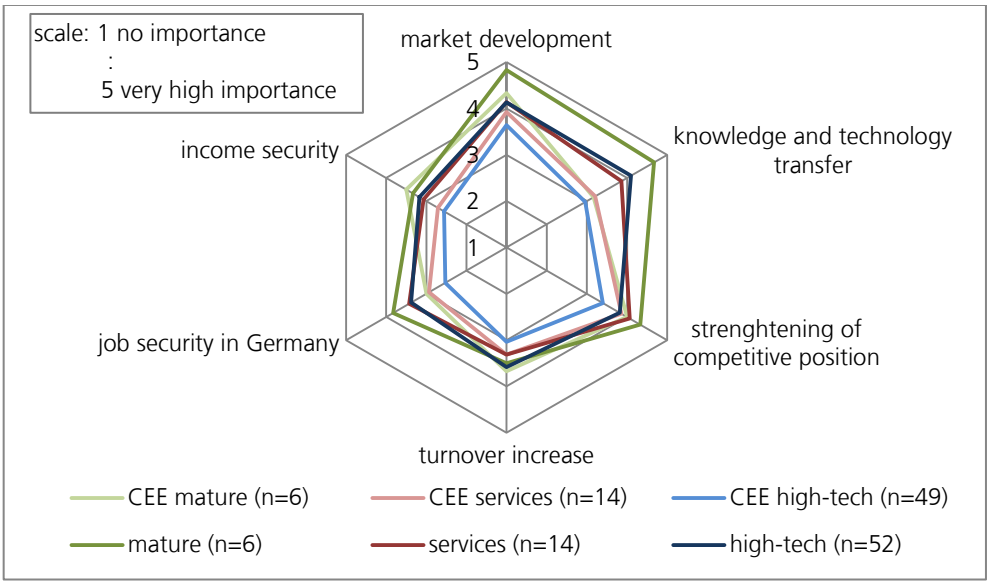


This picture changes when cluster managers were asked to assess the same factors with respect to internationalization activities in Central and Eastern Europe (CEE). Before, all regions were included but now only one specific region has to be evaluated, which might have an impact on the respective answers. It is notably that for this particular region internationalization activities are generally of less importance than without a regional focus (average rating of all items is now 3.1, before it was 3.8). One reason might be that respondents refine their judgments when questions are more specific than before. Nevertheless, market development (3.8) and the strengthening of competitiveness (3.5) are also the most important objectives of internationalization activities, but the participation on knowledge and technology transfer (3.0) falls behind an increase of turnover (3.1). This could be an indication that German cluster managers see the CEE region more as a market and less as an innovation and knowledge supplier.

Discriminating between industries reveals some further differences. Overall clusters from mature industries assess internationalization activities as more important for most objectives than other industries. This is the more pronounced the higher the relevance of the specific objective. The order of the objectives is fairly similar between the different industries with the exception of participating on knowledge and technology transfer, which is less important for services clusters than for the other. The other differences are fairly small, the lower three objectives are always the same, namely increasing turnover, job security in Germany and income security. Figure 2 provides an overview for the different industries.

Figure 2:
Relevance of international activities with CEE Partners

mean responses
n: number of observations



For the CEE region changes in the assessments are fairly uniform for the different industries. For clusters from mature industries especially participating in knowledge transfer loses relevance (from 4.7 to 3.2) while income security is a bit more important in a CEE context than in general. Strengthening of competitiveness and increasing turnover is for clusters from mature and services industries of similar importance in the CEE region than in general. In high-tech clusters the relevance of knowledge transfer and of job security is almost one degree lower with respect to CEE than in general (from 4.1 to 3.0 and from 3.4 to 2.5, respectively).

Between small and large clusters only small differences in the relevance of internationalization activities emerge. Generally small clusters value internationalization activities higher for market development than for participation in knowledge and technology transfer while for large clusters it is the other way round. One reason might be the higher need for large clusters to reduce or avoid lock-in effects, because small clusters are more likely to require external knowledge than large clusters incorporating a bigger number of research institutions. Also slightly less important for small clusters is the strengthening of competitiveness (3.8 vs. 4.2 for large clusters). For the CEE region no differences between small and large clusters exist.

Intermediary objectives and areas of internationalization activities

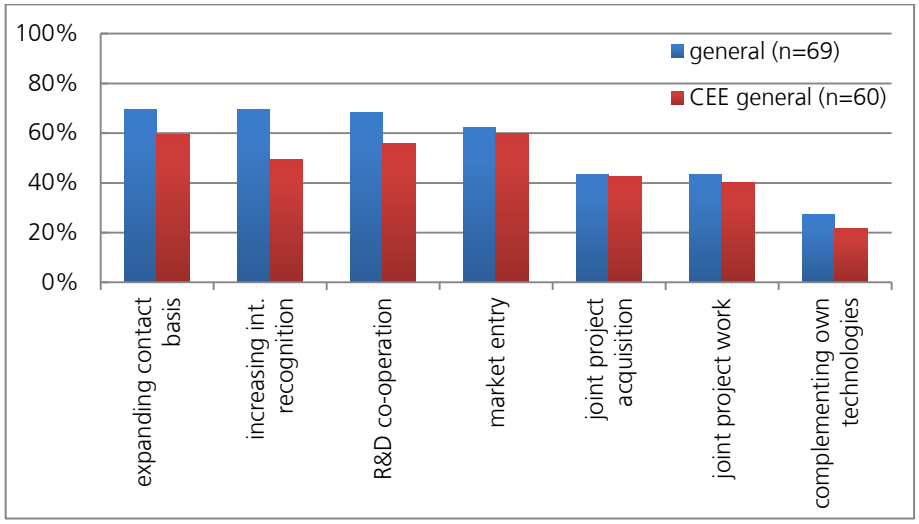
As has just been shown, international activities of clusters and regional networks are of great importance concerning general objectives of German clusters and networks (see Figure 1). Beside these assessments on the relevance of according activities, clusters and network managers were asked for specific mo-

tivations and objectives that guide their efforts to initiate and implement internationalization measures.

Figure 3:
Motivations for international activities

share of respondents mentioning the respective category, multiple answers possible

n: number of observations



The most often mentioned objectives for internationalization activities were the development and expansion of contacts and increasing international recognition of the cluster. Both objectives are closely connected and a majority of respondents named either both or none. This is also true for cooperation's in research and development as well as specific technologies. All three objectives were mentioned by almost 70% of respondents, with around 60% slightly less often mentioned is the entry into foreign local markets. Of considerable less importance are joint projects and project acquisition. Surprisingly these are less often mentioned together than was expected; only around 60% of those pursuing one of these objectives also pursue the other. The least important objective is complementing and supplementing own technologies or products.

It is interesting that of those cluster managers that mentioned strengthening competitiveness as important for their internationalization activities especially access to foreign local markets is an important area of activities. A bit surprisingly the almost identical questions of the importance of international activities market development and market access as an objective for internationalization activities resulted in less than clear cut answers. Some respondents which placed a high importance on internationalization for market development regarded access or entry to foreign markets not as objective of their internationalization activities. The other way round was more consistent, i.e. respondents with market access or entry as important objectives of their activities placed also a high importance on their internationalization activities for market development. Such partial inconsistencies were for almost every objective discernible, but general tendencies were as expected. If for example turnover increases were important than measure and objectives that further turnover like access to

local markets were often mentioned and if turnover was of less importance than this objective was less often mentioned. One reason for the aforementioned inconsistencies might be the absence of an elaborated internationalization strategy, which then results in mismatches between objectives, areas of activities and instruments. These inconsistencies are fairly general; they appear also with CEE as regional focus or for the different subgroups that are analyzed.

With respect to the CEE region the sequence of the objectives as well as their overall importance changes considerably. Most important are market entry and the expansion of contacts followed by research and development cooperation's. All three objectives were mentioned by more than half of all respondents. Slightly less than half were interested in increasing their international recognition in the CEE region. Here was the decrease in importance the most pronounced. The other three objectives were of similar importance in the CEE region to that in general.

Between small and large initiatives exist some interesting differences. For small clusters increasing their international recognition is by far the most important objective of internationalization activities. The other three generally important—expansion of contacts, cooperation in research and development, market entry—are mentioned exactly equally often (around 55%). For large clusters the most important area is expanding their contacts (85%) followed by cooperation's in research and development and market entry which are both mentioned by around ¾ of the respondents. Slightly less important for large cluster is their international recognition, albeit it has around the same importance for large clusters than for small clusters. It is interesting that all important internationalization areas are more often mentioned by managers of large clusters than of small clusters since the relevance of internationalization activities was fairly equal between small and large clusters. For the less important areas the differences are small, even though contrary to large clusters joint project acquisition is more important for small clusters than joint project work.

However, in the assessment of these areas with respect to the CEE region no differences occur between small and large clusters.

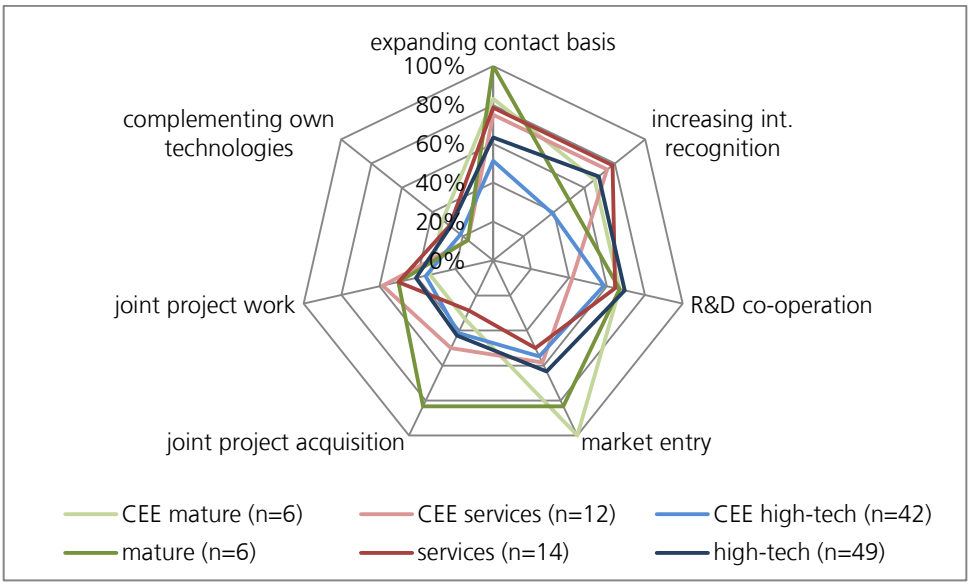
With respect to different industries significant disparities concerning objectives and activity areas emerged in the survey. The high-tech clusters follow closely the general picture with expanding of contacts, increasing their international recognition, cooperation in research and development as well as access and entry to foreign local markets as the main areas of activities. Joint project work and project acquisition follow behind and complementing own technologies and products is the least often mentioned area. Cluster in the services industries value recognition and contacts considerably higher than high-tech clusters

while market entry and joint project acquisitions are of less importance. However, working on joint projects was mentioned more often than by high-tech clusters. With the exception of cooperation's in research and development and the low interest in complementing one's own technologies and products clusters from mature industries have not much in common with the other industries.[13] Contacts, market entry and joint project acquisition were mentioned most often, while increasing recognition was comparably seldom. An overview of the shares of respondents mentioning the individual areas and objectives provides Figure 4.

Figure 4:
Objectives and areas of activities of internationalization, divided by industry and region

share of respondents mentioning the respective category, multiple answers possible

n: number of observations



Clusters from high-tech industries mention all aspects with a focus on CEE less often than in general. This is most pronounced for gaining recognition, followed by research and development cooperation and access and entry into foreign markets. Almost no differences exist with respect to joint projects and the joint acquisition of projects. For mature industries the market access is of even higher importance while the joint acquisition of projects is markedly less often mentioned. For clusters from services industries the latter is more important in the CEE region than in general which is also true for market access whereas research and development cooperation's are less often mentioned.

Instruments

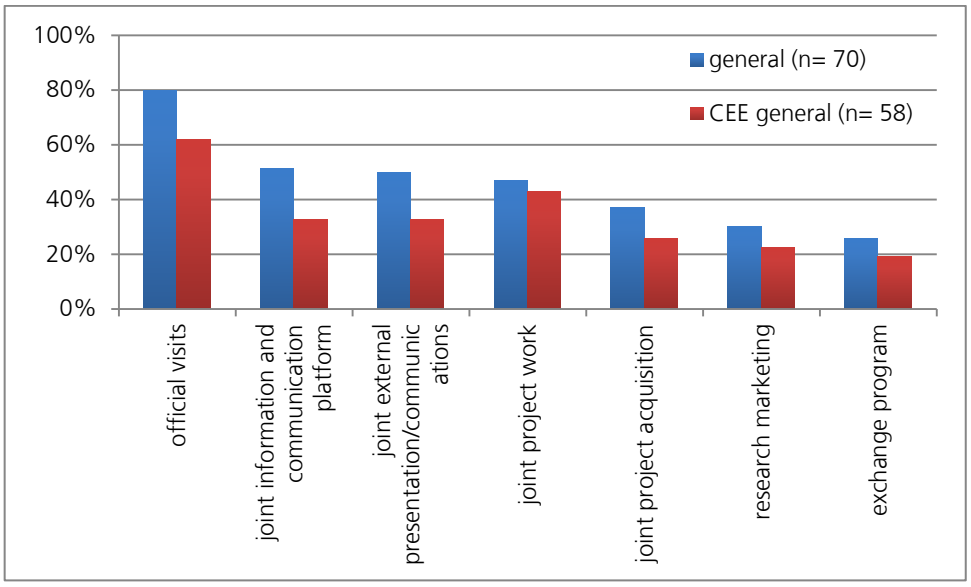
13 With only six respondents all interpretations are fairly imprecise and (a lot) less reliable than for the other industries.

The range of measures and instruments that can be used to initiate and implement international activities of clusters and networks as well as their single members is fairly broad. They range from initial and limited instruments like official and mutual visits or joint external presentations to extensive and long lasting measures such as joint project activities. Obviously the various instruments aim at specific and different target audiences and initiative actors, e.g. joint project activities involve rather actors like enterprises, university entities or extramural research and development institutions than intermediary institutions or management boards.

Figure 5:
Instruments for internationalization activities

share of respondents mentioning the respective category, multiple answers possible

n: number of observations



The most commonly used actual internationalization activities are official and mutual visits, which are used by 80% of respondents (Figure 5). Most of them mentioned increasing their international recognition and the expansion of contacts as important objectives of their internationalization activities. Joint information and communication platforms as well as joint project work or acquisition were other common activities. Interestingly, the concordance of project work and acquisition as actual activity and as objective of activities is lower than expected. A sizeable part mentioned the objective but not the activity or the other way round. One reason might be that preparations for activities have not yet reached maturity, so that activities will follow in the future. But that still leaves respondents who mentioned activities but not the corresponding objective; in these cases no simple explanation can be given.

Activities in the CEE region are less frequent than overall internationalization activities, which is probably simply caused by the restricted geographical area. Official visits are still the most common activity, but joint project work as the second most frequent activity is in the CEE region almost as common than

overall. Altogether activities aiming at recognition and publicity seem less relevant in the CEE region than without any regional focus. This might be a result of a generally better awareness of German clusters by Central and Eastern European actors, which reduces the need for further activities in this regard.

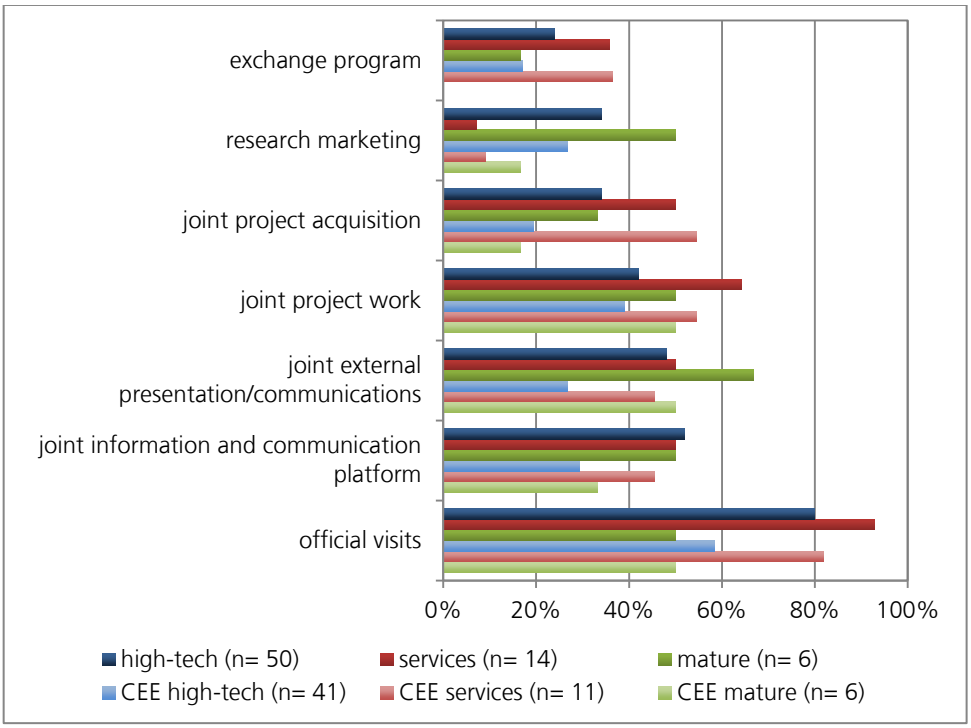
Between small and large clusters exist some differences. Large initiatives use even more often official visits (90% vs. 73%) and joint communication and information platforms (62% vs. 43%) than smaller ones. Exchange programs are used more by small clusters; almost one third of them mentioned activities in this field against half of that for large clusters. In the CEE region the last aspect is even more pronounced because almost no large clusters mentioned exchange programs while small clusters used this instrument as often in CEE than in general. Reasons for this disparity are not clear, maybe specific support programs are more often used by or geared towards participants of small clusters.

Differences in usage of instruments are comparably small between clusters from different industries. Joint project work and project acquisition as well as exchange programs are more common by services industries while research marketing is considerably less common. Focusing on the CEE countries some further differences in instrument usage emerge. Clusters in services industries show only small differences in CEE compared with their overall responses. High-tech clusters use only joint project work as often in the CEE region as in general, all other instruments are noticeable less common.

Figure 6:
Instrument usage in CEE countries

share of respondents mentioning the respective category, multiple answers possible

n: number of observations



4.3 Initiating and implementing internationalization activities

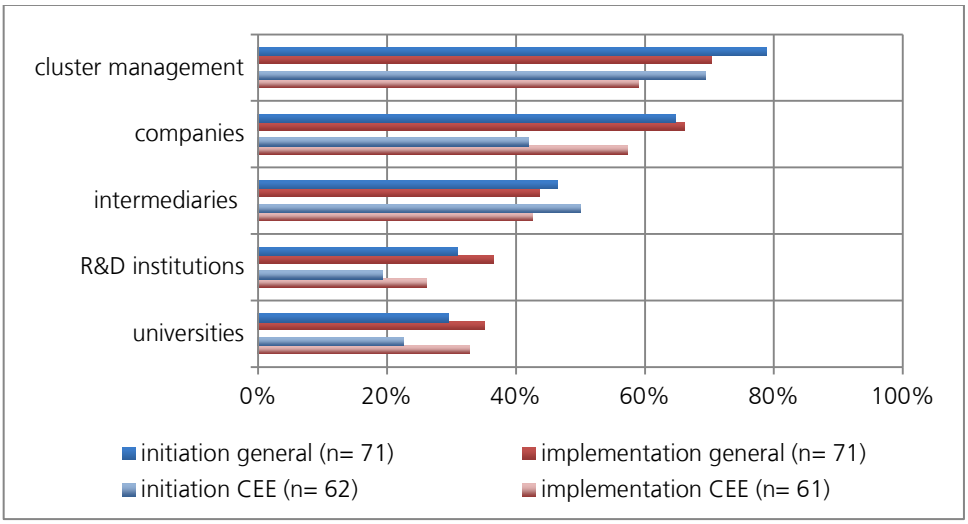
As already mentioned, the cluster management adopts responsibility for strategy development and implementation of the whole cluster. As internationalization activities are essentially strategic activities it seems reasonable that cluster managers play an important role in initiating and implementing such activities. To appraise this hypothesis and to gain further insights concerning which actors in a cluster are most likely to initiate and which actors are most likely to implement internationalization activities then, was another important part of the survey.

The responses suggest that cluster managers are most likely the ones responsible for the initiation of activities, but they were also the ones asked. Furthermore other cluster participants are also often involved in the launch of internationalization activities. As Figure 7 illustrates, there exist notable differences between the likelihood of initiating and of implementing activities for the different actors. While cluster managers and intermediaries are less often mentioned as implementing actor than as initiating actor this is the other way round for extramural research institutions and universities.

Figure 7:
Share of actor initiating or implementing internationalization activities

multiple answers possible

n: number of observations



Concerning activities in CEE all actors were mentioned less often than in general, which again is probably simply the result of the smaller geographical scope of the question. Companies are a lot less likely to be the initiating actor which is the opposite for intermediaries.

Universities and other research and development institutions initiate less often internationalization activities in large clusters than in small clusters. With respect to implementation of activities this is also true for universities but not for extramural research and development institutions. Otherwise, intermediaries in large clusters are significantly more often active in the initiation of activities. For activities in CEE the cluster management is as likely to be an initiating actor as in general in large clusters but not in small clusters, where they are less important. Companies meanwhile initiate significantly less often activities in large clusters, but with respect to implementation no differences between small and large cluster emerge.

Between the different industries in which clusters are active no significant differences are notable. Companies from cluster in services industries are a bit more likely to implement activities than in other industries, while in clusters from mature industries the role of universities in initiating and especially in implementing activities is lower than in the other industries. The lower importance of the cluster management for activities in CEE countries is most pronounced for services industries.

Altogether the respondents see cluster management and companies as the main actors of internationalization activities. Non-parametric correlations show that initiating and implementing activities is often done by the same actors. Also universities and extramural research institutions were often mentioned to-

gether, while intermediaries were scarcely mentioned together with companies or research institutions but comparably often with cluster managers. They were also especially important in large clusters, which is likely just a result of their higher number therein.

4.4 Regions of interest and international partner institutions

World regions

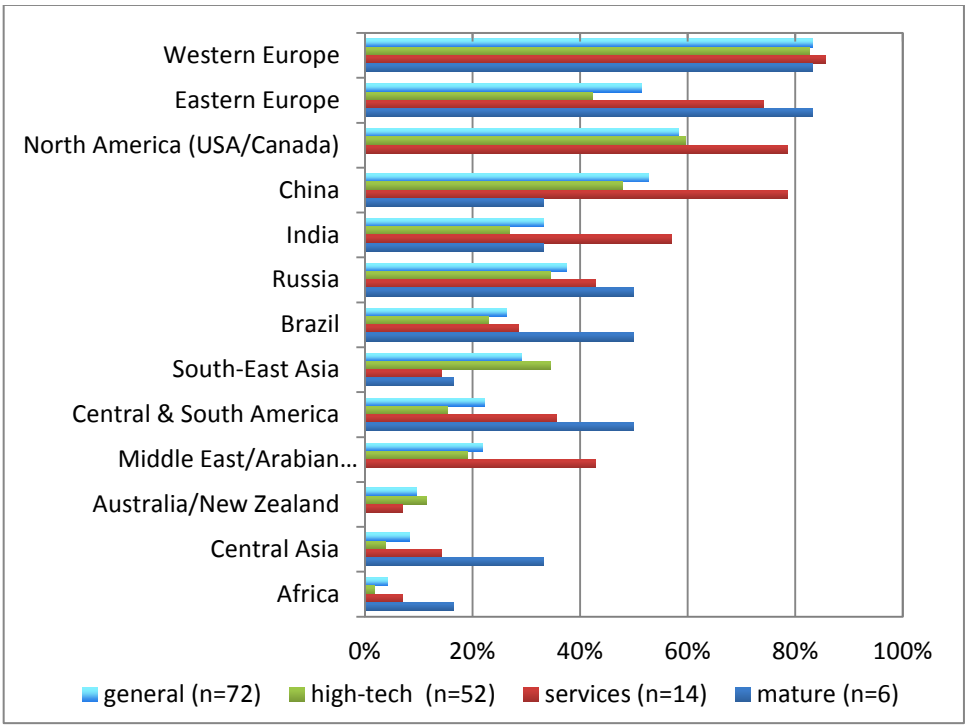
Concerning the geographical focus of international activities cluster and network management were asked to indicate world regions they regard as of substantial relevance for international activities of their initiatives. Generally, the industrialized world—mainly Western Europe (83%) and North America (58%)—is still the most important region for internationalization activities. But Eastern Europe (51%) and the so-called BRICs countries (Brazil (26%), Russia (38%), India (33%) and China (53%)) are surprisingly close behind in the number of responses. Almost no response got Africa and Central Asia, which is likely the result of their low economic development and small market. The latter is probably also responsible for the low share of Australia.

The size of the cluster initiatives seem of no importance for the relevance of the different world regions in their respective internationalization activities. There were no significant differences in the responses of small and large initiatives.

Figure 8:
Important world regions for international cluster activities

share of respondents mentioning the respective region, multiple answers possible

n: number of observations



Differentiating of the surveyed initiatives according to industry focus reveals some interesting variations in regional preferences. Eastern European is of distinct importance for initiatives from mature (83%) and services (74%) industries, while merely 42% of their high-tech counterparts mention this area as important. North America is of high importance for 60% of high-tech and even 74% of services initiatives while being not mentioned once by clusters from mature industries. This might be a result of the diverging internationalization objectives with a higher sales-orientation of mature industries against more research and knowledge orientation of high-tech industries. This would also explain the further differences in importance for South-East Asia, Central and South America and Central Asia. Notable is the high importance of India and the Middle East for clusters from services industries and generally their wide regional interest.

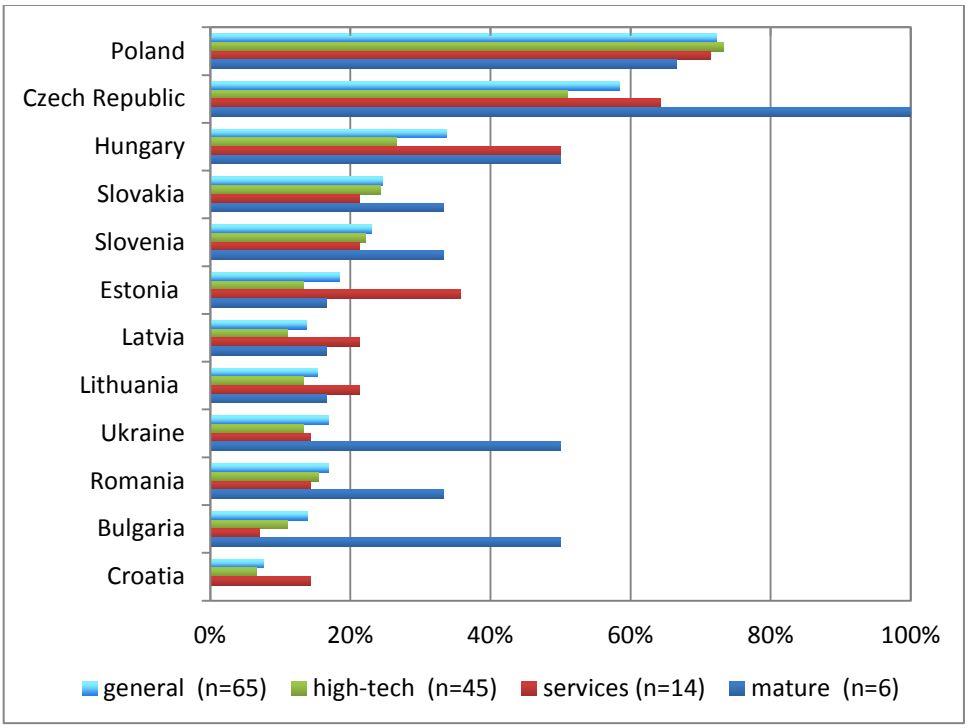
Central and Eastern Europe

Within the study's region of interest CEE cluster managers were asked to identify their preferred individual countries for internationalization activities. As was to be expected, Poland and the Czech Republic are by far the most important target countries with each over 50% of responses. Hungary is a distant third with around 33%, which are almost as many responses as Russia, as the single Eastern European country among the world regions, got.

Figure 9:
Important CEE countries for international cluster activities

share of respondents mentioning the respective countries, multiple answers possible

n: number of observations



Given the here obtained results (see Figure 9), it seems reasonable to assume that all other CEE countries which were not explicitly mentioned, are of even lower importance for German clusters. The two economically and politically most Western Balkans countries—Slovenia and Croatia—are included as are their counterparts further east—Ukraine and Russia. Therefore, it seems unlikely that the interest of German cluster actors would be higher in the not mentioned countries than in those above.

As for the broader world regions, the responses of small and large cluster initiatives are rather similar. The only significant exception is Slovenia which large clusters (33%) mention more than two times as often as small ones (14%).

Between the different industries some differences are observable. Clusters from mature industries seem to prefer larger countries or markets more than the other industries and are also in general more interested in this region (see above). Estonia is comparably often mentioned by cluster from services industries. Clusters from high-tech industries mention the Czech Republic and Hungary comparably less often than clusters from other industries.

International partner institutions

Another important question pertaining to internationalization of cluster and networks concerns actual and possible partners. Here the study focuses on the

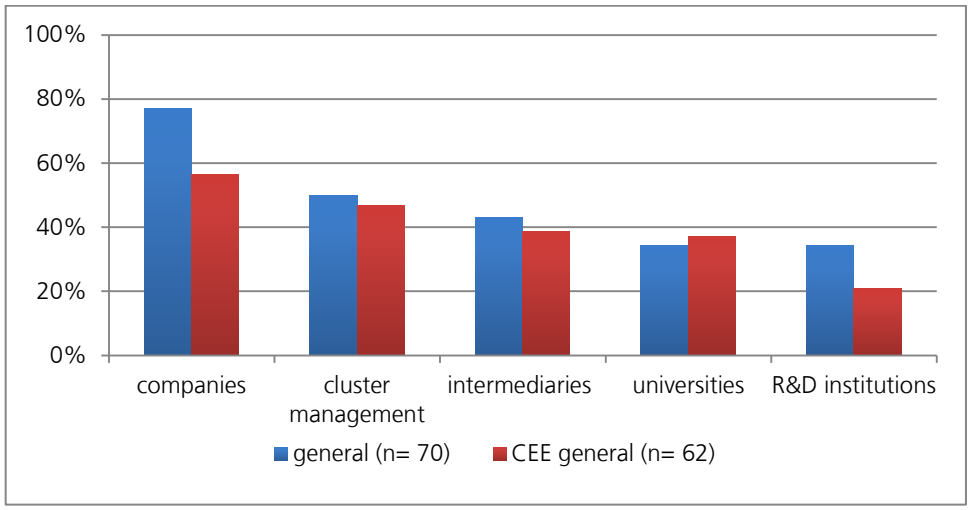
type of institution to analyze if cluster actors cooperate mainly with institutions of their respective type or if they cooperate mainly with one particular type of institution.

Generally, the responses for partner institutions follow the same pattern as for clusters actors implementing internationalization activities but with the one important exception that companies are the most often mentioned partner instead of cluster management. Overall, the respondents mentioned on average around two and a half partner institutions. Least often mentioned where research institutions with around 35% each for universities and extramural research and development institutions. The responses with respect to the CEE region are fairly similar with overall responses but companies and extramural research institutions were significantly less often mentioned without changing the order of institutions (compare Figure 10).

Figure 10:
Foreign partner institutions of international cluster activities

share of respondents mentioning the respective actor, multiple answers possible

n: number of observations



Universities and extramural research institutions as well as intermediaries have mostly foreign partners from the same area, i.e. universities and extramural research institutions or intermediary institutions. This is less the case for companies and for the cluster management no direct correlation is observable. That means that cluster managers enter cooperation activities with a variety of partner institutions while other cluster actors are more confined to their peers. Surprisingly, clusters and networks with the objective of knowledge and technology transfer or cooperation do not mention research institutions as partners significantly more often than other clusters and networks.

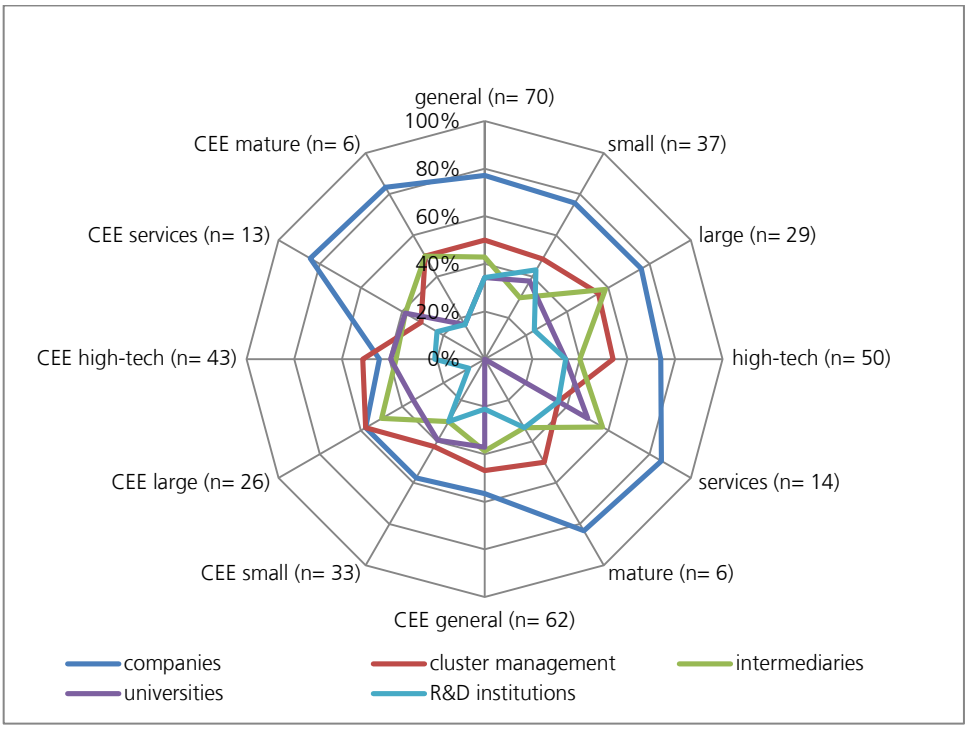
Similar to the differences for activities initiating and implementing cluster actors are intermediary institutions of comparably high importance as foreign partners in large clusters compared to small clusters which again is likely a result of their higher number in larger clusters. Contrary are extramural research institutions

more often mentioned by smaller cluster initiatives compared to larger ones. Essentially the same pattern for large and small clusters is observable with respect to the CEE region. Due to the generally lesser importance of companies as partner institutions are cluster manager as internationalization partner for larger clusters as important as companies. Figure 11 contains a complete depiction of the response shares of the specific partner institutions for different subgroups of respondents.

Figure 11:
Foreign partner institutions of international cluster activities, subgroups of clusters

share of respondents mentioning the respective actor, multiple answers possible

n: number of observations



Clusters from services industries show some marked differences with respect to their preferred partner institutions compared with clusters from other industries. They mention intermediary institutions and universities significantly more often while cluster managers are of considerably less importance for them. With respect to the CEE countries these differences are markedly less pronounced. The lesser importance of companies in the CEE region is solely the result of their smaller response share from clusters from high and medium tech industries. All other industries mention them as often in the CEE perspective as in general.

Cooperation topics

To augment the quantitative data survey participants were also asked to indicate fields of science and technology in which internationalization activities are

planned or already executed. The aim was to evaluate if clusters and networks pursuit more a strategy of broadening their scope or of strengthening core competencies. Due to the broad variety of surveyed clusters in terms of industries, technologies and products only some very general observations of the mostly short and very specific answers will be presented.

Overall fields of science or technology are in close accordance to the field of activity of the clusters. It seems that most internationalization activities aim at strengthening core technologies or products of the cluster. But there are also some areas which fit less well with the cluster description, therefore probably implying a broadening of scope of cluster activities. These are partly technological in nature and partly more concerned with specific or general aspects of the business environment like education and human capital or political aspects.

The responses for the CEE region suggest that for this region strengthening of core technologies, products and competencies are of more interest for German clusters than for all regions. The mentioned science and technology fields seem generally to be closer to the respective industry of the clusters. Nevertheless, a large part of respondents gave the same reply for the CEE region than without regional focus.

4.5 Potential and observed obstacles to internationalization activities

Potential obstacles are an important factor determining intensity and pace of international activities in general and also the nature of collaborations with single partners. The latter is especially influenced by the presence and amount of mutual trust as well as common interests between the partners. Furthermore, cooperation and thus internationalization activities are regularly associated with knowledge and technology exchange and following the risk of knowledge drain. This risk is the higher, the more distinct the know-how advantage is at the home location compared to collaboration partners.

International activities aiming at e.g. expanding markets or engaging in knowledge transfer require personal, financial and time resources. Restrictions on or lack of the necessary resources might limit the level or scope of international activities.

The current survey reveals two central barriers that handicap initiation and implementation of internationalization efforts. The first and by far the most important one is the lack of personal, financial or time resources that can be devoted to internationalization activities which mention more than 90 percent of the respondents. Distance between participating actors of cooperating initia-

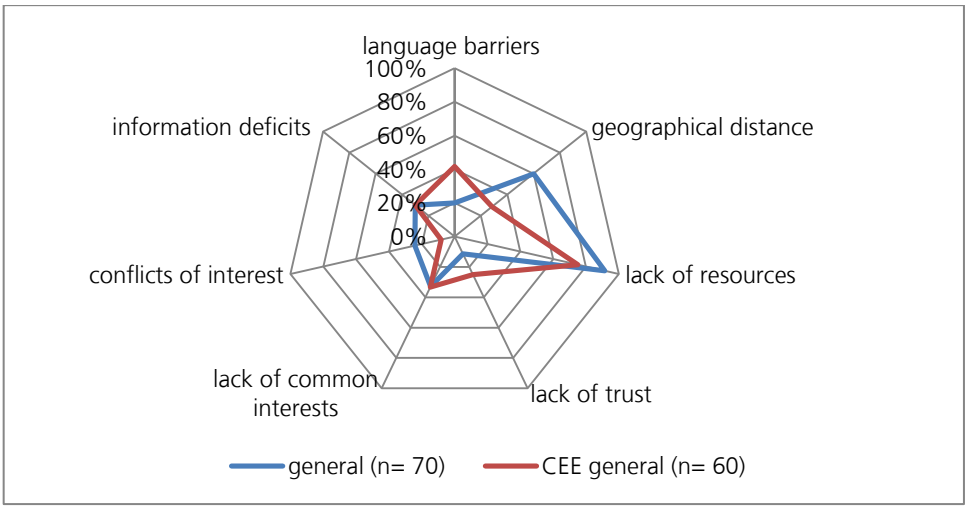
tives as the second central obstacle is named by 62 percent. Further, more or less intangible, obstructions like lack of trust or common interests or conflicts of interests are only by a minority of initiatives seen as obstacles. A possible interpretation is that drain of knowledge or technology is not recognized as an essential problem within international collaborations. This could be simply the result of a certain self-selection process of the respondents. As already mentioned before, almost all respondents have either internationalization activities started or are currently in the planning process. Therefore, it is highly likely that present and potential partner institutions have been or are being selected according to the specific requirements of the respective cluster or network initiative resulting in the observed high trust of the internationalization partners.

Internationalization activities in CEE face a partly different structure of barriers than in general (Figure 12). Geographical distance is naturally less of a problem for German cluster actors in CEE than worldwide (28% vs. 60%). Also the lack of resources is slightly less often mentioned for the CEE region, probably also caused by the smaller distances and the resulting savings in travel time and expenditures. Language barriers in contrast seem to be of higher importance which might be due to the generally lower English proficiency of partners in CEE countries. Lack of trust seems also of more importance while conflicts of interest appear as almost nonexistent.

Figure 12:
Barriers for international activities

share of respondents mentioning the respective category, multiple answers possible

n: number of observations



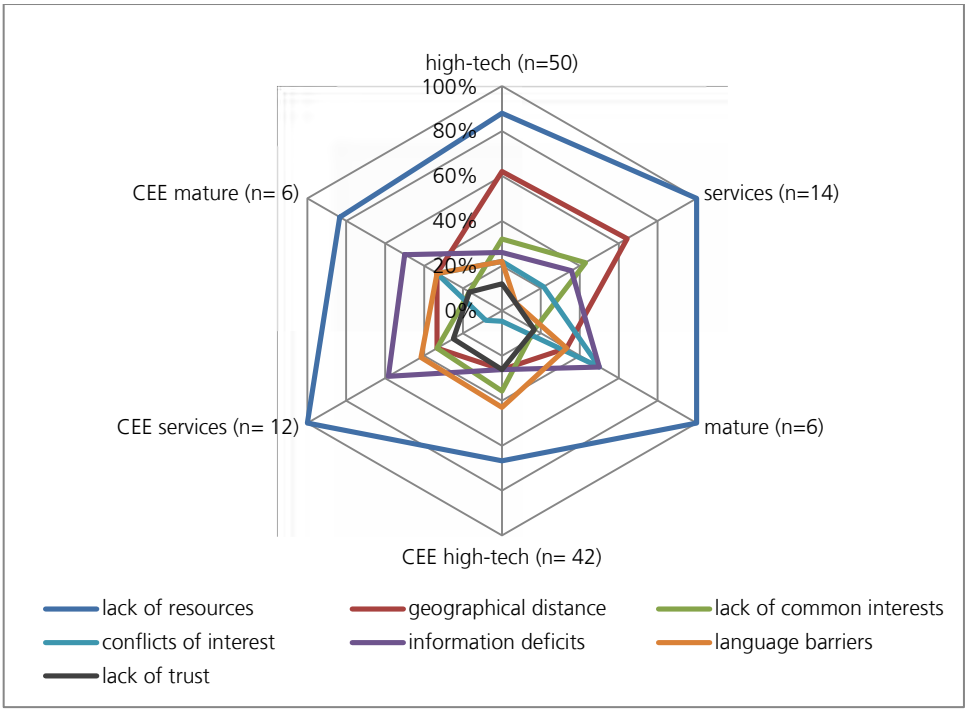
Between small and large clusters exist only few differences. Managers of large clusters mention lack of trust and conflicts of interest considerably more often than those for smaller clusters. With respect to the CEE region this remains true only for lack of trust but not for conflicts of interests. Also, for small clusters the decrease in importance of distance in this region is less than for large clusters (from over 60% down to 42% and 16%, respectively).

Among different industries differences in perceived obstacles are generally small. Clusters from mature industries[14] have comparably few problems with geographical distance or lack of common interests. The latter is probably the cause of the higher number of responses for conflicts of interests. In services cluster language barriers seem of less importance than in the other industries.

Figure 13: Barriers for international activities, subgroups of clusters

share of respondents mentioning the respective category, multiple answers possible

n: number of observations



In the CEE region, partly other differences between the respective industries emerge. Lack of resources is considerably smaller for high-tech clusters than for the other industries and, associated, the decrease in importance from the assessment without regional focus to that with CEE focus is the most pronounced. Also information deficits are of less importance for high-tech cluster while it is the second most often mentioned obstacle for cluster from other industries. The different assessments with respect to interests of foreign partners between clusters from mature and other industries are even more pronounced in CEE than in general.

In summary it seems that lack of resources is the main obstacle for an increase in internationalization activities. Most of the other problems like geographical distance or language barriers are essentially some specific result of the lack of resources and could be overcome by employing more of them. Interestingly,

14 Again, it has to be mentioned, that with only six responses this subgroup is probably too small to draw general conclusions.

conflicts of interests and lack of trust are scarce, which could be the result of good management and preselection of potential partners, and in turn implies that increasing internationalization activities is relatively easily feasible through the provision of resources.

5 Summary and Conclusion

International activities of clusters and regional networks are often regarded as integral and indispensable parts of their strategic considerations and might thus be crucial elements for their successful development. To gain some first empirical insights into possible internationalization activities, their respective objectives and preferred partner regions or countries as well as existing obstacles around 220 cluster and network managers were asked about their opinions. They were selected as participants and winner of regional and federal cluster funding competitions. Around 70 responses could be fully evaluated, while a number of those not responding mentioned the lack of internationalization activities or planning as reason for not completing the survey.

The presumed importance of internationalization activities is confirmed by the fact that almost 95 percent of responding clusters have already taken steps towards internationalization activities. The most important objectives associated with internationalization in general as well as targeting CEE constitute market entry and development as well as research and technology cooperation and transfer. Target regions of the respondents are primarily regions with a high innovative capacity or a large market such as Western Europe, the USA/Canada, China as well as certain Central and Eastern European countries like Poland and the Czech Republic.

Despite the fact that internationalization is regarded to be of considerable importance and to affect a wide range of success factors, a lack of personal, financial, or time resources determine and restrict the scope and thus the intensity of international collaborations. Therefore it is eminent to strike the right balance between limited resources and the possible benefits of an expansion of international activities. Although, the questions of quantification of benefits and—closely coupled—of how to strike that balance are still open and demand further inquiries. Nonetheless, clusters and regional networks might have to reconsider resource restrictions in order to exploit new and upcoming opportunities.

Surprisingly, only a minority of respondents follow an elaborated and formalized strategy in their international activities. While overall in this survey the differences in responses from clusters with and without a strategy are small, it would be important to know, why only few clusters have a strategy and, even more, why only around half of those without one plan to develop one. To understand this question it has to be investigated also, if the formulation of a strategy increases the success of internationalization activities or otherwise fur-

thers the targets of the cluster. Additionally, a comparison of clusters with and without a strategy could reveal structural differences to explain the existence of a strategy.

Another interesting point the survey revealed is that cluster management and participating companies are by far the most active actors in the context of internationalization. This raises the question why universities and non-university R&D institutions as well as intermediaries only act in such a minor role and if greater activity of these actors would be desirable and beneficial? If so, what could be done to integrate them in strategic internationalization considerations and to assure active involvement of all stakeholders at all stages of the cluster and network development?

Sound and applicable answers to these questions could be worthwhile contributions towards forward looking, long term development strategies of existing clusters and networks and thus ensure global competiveness.

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7 Appendix

Table A.1 Detailed Cluster Profile

	High-tech (n=52)	Services (n=14)	Mature (n=6)					
Industry Focus (%)	**72,2**	**19,4**	**8,4**		Small (n=37)		Large (n=31)	
Participating Actors	min.	max.	mean	**median**	mean	median	mean	median
Enterprises (n=68)	10	50,000	975	**98**	52	59	2077	320
thereof large scale (n=59)	0	500	26	**7**	9	5	56	25
University Entities (n=66)	0	85	12	**5**	6,5	3,5	18	9
Extramural R&D Institutions (n=66)	0	48	7,5	**5**	5,5	3,5	10	7
Intermediary Organizations (n=65)	0	100	12	**6**	4,5	4	21	12
Cluster/Network Employment (n=37)	500	503,000	54,600	**20,000**	47,000	10,000	69,000	27,500

	High-tech (n=52)		Services (n=14)		Mature (n=6)	
Participating Actors	mean	median	mean	median	mean	median
Enterprises	206	90	4197	120	282	273
thereof large scale	14	6	79	7	15	7
University Entities	10	5	22	10	5	5
Extramural R&D Institutions	8	5	6	5	5	5
Intermediary Organizations	8	6	23	6	20	8
Cluster/Network Employment	46000	15000	/	/	/	/

Table A.2 Questionnaire

General information about the cluster/network

Industry focus	
Number of participating enterprises	
Thereof: Number of large-scale enterprises (>= 250 employees)	
Number of employees in the cluster	
Number of participating universities	
Number of participating non-university research and development institutions	
Number of participating intermediary institutions/multipliers (e.g. chambers, economic promotion agencies, associations etc.)	

1. How do you rate the importance of international co-operation/networks for your cluster/network?

Regarding the following factors:	no importance				very high importance
Job security in Germany	☐	☐	☐	☐	☐
Participation in international knowledge and technology transfer	☐	☐	☐	☐	☐
Market development	☐	☐	☐	☐	☐
Strengthening own competitive position	☐	☐	☐	☐	☐
Income security	☐	☐	☐	☐	☐
Turnover increase	☐	☐	☐	☐	☐

2. To your knowledge, have actors of your cluster already taken measures to initiate international activities or to conclude concrete co-operation agreements?

yes	no
☐	☐

3. Which world regions are particularly significant with regard to international activities of your cluster? (multiple answers possible)

Western Europe	☐	North America (USA/Canada)	☐
Eastern Europe	☐	Australia/New Zealand	☐
Russia	☐	Central and South America	☐
Central Asia	☐	Brazil	☐
China	☐	Africa	☐
India	☐	Middle East/ Arabian Peninsula	☐
(Southeast) Asia	☐		
other			
other			

4. Who are the main actors initiating international activities of your cluster?
(multiple answers possible)

Cluster management	☐
Enterprises	☐
Universities	☐
Non-university research and development institutions	☐
Intermediary institutions/multipliers (e.g. chambers, economic promotion agencies, associations etc.)	☐
other	
other	

5. Who are the main actors implementing international activities of your cluster?
(multiple answers possible)

Cluster management	☐
Enterprises	☐
Universities	☐
Non-university research and development institutions	☐
Intermediary institutions/multipliers (e.g. chambers, economic promotion agencies, associations etc.)	☐
other	
other	

6. Which actors were main co-operation partners while performing international activities in the target countries? (multiple answers possible)

Cluster management	☐
Enterprises	☐
Universities	☐
Non-university research and development institutions	☐
Intermediary institutions/multipliers (e.g. chambers, economic promotion agencies, associations etc.)	☐
other	
other	

7. Which main scientific fields/scientific topics can your co-operation partner in the target countries be assigned to? (multiple answers possible)

1.
2.
3.

8. What was your motivation for initiating/implementing international activities?

(multiple answers possible)

Expanding the contact basis	☐
Increasing international recognition	☐
Co-operation in research and development/ technological co-operation	☐
Joint project acquisition	☐
Joint project activities	☐
Access to local markets	☐
To complement own technology, product or system components	☐
other	
other	

9. What obstacles hindered the internationalization efforts of the cluster? (multiple answers possible)

Lack of resources (personal, financial, time)	☐
Lack of mutual trust among the international partners	☐
Conflicts of interests: the partner is a direct competitor	☐
Lack of common interests for a co-operation	☐
Lack of information regarding other clusters	☐
Language barriers	☐
Distance	☐
other	
other	

10. Which specific measures have been implemented in the course of internationalization efforts? (multiple answers possible)

Research marketing	☐
Joint public relations/external communication with international partners	☐
Development of information and communication platforms	☐
Mutual/official visits	☐
Joint project acquisition	☐
Joint project work	☐
Exchange programs (e.g. experts/staff/students)	☐
other	
other	

The described research project focuses in particular on co-operative relations between German and Central and Eastern European clusters and networks. For this reason, this perspective is explicitly emphasized in the following questions.

11. How do you rate the importance of international co-operation/networks with partners from Central and Eastern European countries for your cluster/network?

regarding the following factors:	no importance				very high importance
Job security in Germany	☐	☐	☐	☐	☐
Participation in international knowledge and technology transfer	☐	☐	☐	☐	☐
Market development	☐	☐	☐	☐	☐
Strengthening own competitive position	☐	☐	☐	☐	☐
Income security	☐	☐	☐	☐	☐
Turnover increase	☐	☐	☐	☐	☐

12. Which countries of Central and Eastern Europe (CEE) are of particular importance for your cluster in establishing international co-operation arrangements? (multiple answers possible)

Estonia	☐	Ukraine	☐
Latvia	☐	Hungary	☐
Lithuania	☐	Slovenia	☐
Poland	☐	Romania	☐
Czech Republic	☐	Bulgaria	☐
Slovakia	☐	Croatia	☐
other			
other			

13. Who are the main actors initiating international activities of your cluster with partners from CEE? (multiple answers possible)

Cluster management	☐
Enterprises	☐
Universities	☐
Extramural research and development institutions	☐
Intermediary institutions/multipliers (e.g. chambers, economic promotion agencies, associations etc.)	☐
other	
other	

14. Who are the main actors implementing international activities of your cluster in CEE? (multiple answers possible)

Cluster management	☐
Enterprises	☐
Universities	☐
Non-university research and development institutions	☐
Intermediary institutions /multipliers (e.g. chambers, economic promotion agencies associations etc.)	☐
other	
other	

15. Which actors were main co-operation partners while performing international activities in the target countries? (multiple answers possible)

Cluster management	☐
Enterprises	☐
Universities	☐
Non-university research and development institutions	☐
Intermediary institutions/multipliers (e.g. chambers, economic promotion agencies associations etc.)	☐
other	
other	

16. Which main scientific fields/scientific topics can your co-operation partners in CEE be assigned to? (multiple answers possible)

1.
2.
3.

17. What was your motivation for initiating/implementing international activities?
(multiple answers possible)

Expanding the contact basis	☐
Increasing international recognition	☐
Co-operation in research and development/ technological co-operation	☐
Joint project acquisition	☐
Joint project activities	☐
Access to local markets	☐
To complement own technology, product or system components	☐
other	
other	

18. What obstacles hindered the internationalization efforts of the cluster? (multiple answers possible)

Lack of resources (personal, financial, time)	☐
Lack of mutual trust among the international partners	☐
Conflicts of interests: the partner is a direct competitor	☐
Lack of common interests for a co-operation	☐
Lack of information regarding other clusters	☐
Language barriers	☐
Distance	☐
other	
other	

19. Which specific measures have been implemented in the course of internationalization efforts? (multiple answers possible)

Research marketing	☐
Joint public relations/external communication with international partners	☐
Development of information and communication platforms	☐
Mutual/official visits	☐
Joint project acquisition	☐
Joint project work	☐
Exchange programs (e.g. experts/staff/students)	☐
other	
other	

20. Does an elaborated/a documented internationalization strategy exist?

yes	no
☐	☐
proceed with question 22	Proceed with question 21

21. Do you want to elaborate an internationalization strategy in the medium term?

yes	no
☐	☐

22. Any comments/additional remarks?