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**CLUSTER INITIATIVES WITHIN THE EUROPEAN CONTEXT:  
INTERMEDIARY ACTIVITIES and development process**

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**Abstract**

CLUSTER INITIATIVES WITHIN THE EUROPEAN CONTEXT: INTERMEDIARY ACTIVITIES and development process Inessa Laur, Doctoral Candidate (2010-2015), Linköping University, Sweden, inessa.laur@liu.se Aim of the paper Therefore the aim of this study is to investigate how cluster initiatives intermediate within a triple helix context through performance of intermediary activities. A specific interest is to identify a set of common intermediary activities carried out by cluster initiatives as well as factors influencing change in the activities. This aim leads to the following research questions: Which intermediary activities are most frequently performed by cluster initiatives and how do these change over time? Which factors do influence the change of intermediary activities in cluster initiatives? Contribution to the literature The aim of this study investigating intermediary activities performed by cluster initiatives serves as a ground for theoretical classification of cluster initiatives as particular type of intermediary, which was hardly addressed, in broader-focused intermediary studies. Furthermore, the identification of dynamic patterns and factors facilitating these provide insights in cluster initiatives organizational routines and can be used as performance indicators for other studies. The study contributes to the practically oriented literature through suggesting guidelines for cluster initiatives' management and assistance in reinforcement of delivered benefits from their activities. Methodology A sample of 253 European cluster initiatives has been identified for this study using databases such as

www.intercluster.eu; www.tci-network.org as well as World Wide Web sources. The "key respondents" approach with leading cluster initiatives individuals involved in every-day operations is applied. Structured telephone interviews on English are used for data collection in 2012-2013. Each interview lasted approximately 60 minutes and contained 39 questions (282 variables) regarding general characteristics, actors and activities of cluster initiatives. In total 136 (53%) initiatives have participated in the interviews. They operate in the following countries: Sweden, Germany, Belgium, Denmark, United Kingdom, Norway Netherlands and Finland.

The responses had been analyzed by means of SPSS (version 22) using methods such as ordinary-least-square regression, descriptive statistics and frequency tables. Results and implication Our study results show that Networking, Marketing, and R&D are most frequently performed intermediary activities by cluster initiatives. Hypotheses testing shows that cluster initiatives members are not the change-affecting agents what contradicts with previous belief. The primary agents, which actively change these activities, are cluster initiative leaders/central individuals, employees, external experts and sources of financial support. Some of these have shown correlation just with special types of activities while others are participative in all blocks of investigated activities as for example leaders. By well adapted to members' needs portfolio of intermediary activities would reinforce cluster initiatives' attractiveness and build reputation on the market arena. This might provide a basis to acquire prolonged financing from the policy-makers. The latter though might need to reconsider current approach of mainly finance initiatives start-ups to continuous support of initiatives, which fulfill their mission on all three fronts.

## **CLUSTER INITIATIVES WITHIN THE EUROPEAN CONTEXT: INTERMEDIARY ACTIVITIES AND DEVELOPMENT PROCESS**

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### **Introduction**

Clusters are concentrations of different actors, which facilitate inter-organizational networking and enhance technological advancements and innovative products (Porter, 2000; Muro & Katz, 2010). They are seen as units facilitating regional development through competition and cooperation between triple-helix actors (Lagendijk & Cornford, 2000; Etzkowitz, 2002; Simmie, 2004). Being positive contributors to development of regions, clusters are greatly supported by regional governments in terms of financial means, supply of competences as well as initiation of supporting organizations (Porter, 1998; Floeting, 2008; Flykfors & Jonsson, 2010). Supporting organizations are known one of crucial drivers of innovativeness, entrepreneurship and labor market development (Nedelmann, 1984; Benner, 2003; Bakici et al, 2013). These organizations can also be called intermediaries, brokers, promoters or facilitators (Fromhold-Eisebith & Eisebith, 2005; Intarakumnerd, 2005; Stewart & Hyysalo, 2008).

One special type of intermediary which can be launched and operate within clusters is called cluster initiative (Teigland and Lindqvist, 2007; Mills et al, 2008; Visser and Atzema, 2008; Nakwa et al, 2012). These small and fast-moving bodies, uniqueness of which is captured in their three main functions e.g. technology transfer, business support and financial support. These functions could previously be fulfilled by three different types of organizations (Laur et al, 2012; Ranga & Etzkowitz, 2013). The main mission of cluster initiatives is, first, they strive to contribute to public wealth through boosting up clusters and consequently regions of their location. Authorities with initiatives' assistance revitalize laid-back regions and stagnant clusters (Brown, 2000). Therefore the public push can be clearly observed in formation of cluster initiatives. Secondly, benefits created by cluster initiatives concern also different sized firms from focus industry. Businesses benefit by being a part of built interactive platforms and initiated collaborations with other firms-members (Hanusch et al, 2009; Turner et al, 2013). Moreover, businesses can gain from especially ordered middle-hands services such as marketing, educational and technical support (Dodgson & Bessant, 1996; Hallencreutz and Lundequist, 2003; Ketels and Memedovic, 2008; Laur et al, 2012). Thirdly, academic actors located in cluster space get the chance to acquire industry partners and more effectively translate research into practice, e.g. new products, processes and ways to organize work (Etzkowitz & Ranga, 2011). And lastly, the delivery of benefits by the initiatives is built on expectation to get something in return, e.g. financial contributions, supply of new firms interested in membership and participation in organized activities (Waxell and Malmberg 2007; Royer et al, 2009). This secures cluster initiatives' future and provides additional sources to improve quality of delivered services.

The previous shows that cluster initiatives involve the combination of private, public and academic actors which needs they aim to satisfy. Such combination is named as triple helix in the literature and is considered as a pillar for achievement of sustainable development (Leydesdorff and Zawdie, 2010; Rodrigues & Melo, 2013). Relations among these are established across institutional borders where one actor can take role of the other. Etzkowitz (2002) emphasizes that the most active pushing role in fostering clusters is taken by the academia, which sometimes covers governmental weaknesses. This role is sometimes fulfilled by creation of interlocking or hybrid organizations as for example cluster

initiatives. These entities are created for linking triple helix elements in a cluster space and accomplish new goals. Such academic role, according to triple helix regime, can instead be taken by governments and businesses which further enhances their traditional pulling and leading roles as formatters and supporters of new creations (Etzkowitz & Ranga, 2011; Etzkowitz & Zhou, 2008).

The triple helices are actors actively initiating and often taking part in cluster initiatives. The model by Laur et al (2013) applies triple helix actors on cluster initiatives context and presents general actor-model, which is met in cluster initiatives. According to Etzkowitz & Leydesdorff (2000) and Solvell et al (2003) strong platform for intercourses created by cluster initiatives though brokering, facilitating, promoting and providing meeting places synthesizes triple helices and leads to establishment of trustful relations among these (Feser, 1998; Lundequist & Power, 2002; Hallström & Laur, 2011). Initiatives' services help their members to leave their own isolated space and relate them with other actors. Such function of the initiatives presents these organizations as professional delivery-supporters and places these in more beneficial position than usual networking organizations (Rosenfeld, 1996). They bridge gaps in the system by performance of intermediary activities, which would probably not be carried out by other actors (Burt, 2000; Sölvell et al, 2003; Ketels et al, 2006). That is why cluster initiatives in triple helix context are the main focus of this paper.

There is a broad portfolio of intermediary activities cluster initiatives deliver e.g. networking, lobbying, matchmaking, monitoring and coordination, provision and assistance in search for financial means, provision of facilities and meeting places, training and education as well as spreading of research results (Ahedo, 2004; Howells, 2006; Oxford research, 2011). The model by Solvell & Williams (2013) classifies these on three blocks striving for cluster initiatives attractiveness and identity, businesses development and innovativeness. The intermediary activities are seen as tools linking and sustaining relations with their members. Therefore these activities should be adapted to existing needs through close and continuous interactions with members (Visser & Atzema, 2008, Royer et al, 2009; Austenå, 2011; Turner et al, 2013). The modifications in demands of members should always lead to adjustment of initiatives' activities, and then they would assist involved actors in achieving innovative change (Wood, 2002). Therefore, dynamic of changes in cluster initiatives' activities have to follow dynamics of needs and demands of their members. Dynamical process being a success factor for achievement regional development is mentioned in studies by Stahle et al (2003) and Smedlund (2005). Similar to dynamic changes keeping regions alive and attractive, dynamics within cluster initiatives activities lead to high level of satisfaction of their members and catalyze attractiveness of these organizations for new comers. That is why the members' needs and demands have to continuously be tracked and then implemented by involved internal and external competencies including leaders/central individuals, employees, external experts as well as financiers of the initiatives.

### **Research focus**

There are studies presenting various activities, which can be performed by intermediary organizations (Van der Meulen et al., 2005; Wright et al, 2008; Moss et al, 2009; Katzy et al, 2013). Activities described include those, which can be performed by cluster initiatives; nevertheless scholars do not strive to assign the activities to different organization types but rather to generate lists of known intermediary activities. There also are scholars aiming to specify intermediary activities to particular organizations as for example to clusters (Med & Marvin, 2007). Others raise intermediary activities by cluster initiatives but only as a supplementary aspect while focusing on characteristics and policies of cluster initiatives, typology of their actors, and cluster initiative management (Sölvell et al, 2003; Cassidy et al, 2005; Ketels et al, 2006; Waxel & Malmberg, 2007; Teigland & Lindqvist, 2007; Muro & Katz, 2010; Laur et al, 2012; Klofsten et al, 2013; Turner et al, 2013). However, studies aiming to

primarily investigate intermediary activities performed by cluster initiatives are rather limited. That raises uncertainty about how cluster initiatives are organized and function (Mills et al, 2008). The uncertainty might, in our view, be reduced if the research focus would be specified from exploring general intermediary activities to intermediary activities performed by cluster initiatives. Moreover, knowing which activities initiatives perform would allow observing dynamics occurring while adaptation to members' needs and agents, which primarily drive this process. The aspects of dynamics are also hardly addressed in a comprehensive manner in management literature apart from highlighting the importance of dynamics within activities in these organizations (Hertog, 2000; Benner, 2003; Smedlund, 2005; Geels & Deuten, 2006).

Therefore the **aim** of this paper is to investigate how cluster initiatives intermediate within a triple helix context through performance of intermediary activities. A specific interest is to identify a set of common intermediary activities carried out by cluster initiatives as well as factors influencing change in the activities. This aim leads to the following research questions: Which intermediary activities are most frequently performed by cluster initiatives and how do these change over time? Which factors do influence the change of intermediary activities in cluster initiatives? The actor and activities models by Laur et al (2012) and Solvell & Williams (2013) serve as bases for analysis and conclusions drawing.

## **Literature review**

### *Defining cluster initiatives and involved actors*

Porter calls cluster initiatives as tools for adaptation of clusters to reality (Sölvell et al, 2003). Some see these organizations as novel view on clusters while others characterize these as entities located within clusters and promoting their development (Lagendijk, 1999). Lundequist & Power (2002) and Laur et al (2012) characterize cluster initiatives as entities acting as intermediaries through brokering, facilitating, promoting and providing meeting places. Meanwhile Hassink (1996) defines cluster initiatives as actual networks of firms and other organizations, which deal on daily basis with participants practical needs, cultural factors, time and resources limitations. Other similar definition is given by Ketels & Memedovic (2008) collaborative actions of different market actors to improve competitiveness of cluster through creation of interactions and initiation of dialogs. These definitions underline many of important cluster initiatives' characteristics as involvement of triple helices, assistance provided to members, facilitation of exchange among members as well as improvement competitiveness of the clusters.

One of the characteristics addressed in this paper is linkages created by the initiatives among various actors from triple helix, e.g. service, components, infrastructure and machinery suppliers, credit institutes, institutions providing information training technological support and governmental authorities (Etzkowitz & Leydesdorff, 2000; Tappi, 2005; Feser 1998). Authorities contribute to initiatives by provision of extended financing from regional and national funds as well as governmental subsidies (Smallbone, 1997; Hallencreutz and Lundeqvist, 2003). Private sector actors involve themselves in cluster initiatives operations and assure their operations by contribution of different resources, facilities and competencies. Both helices take active roles in initiation of cluster initiatives in regions of their location (Laur & Fayolle, 2013). Academic contribution is less visible when it comes to initiation and financing but it is an important provider of education and training, new knowledge and competencies, novel products and materials. They initiate and participate in collaborative events and even provide meeting places, research facilities and resources for these events (Laur et al, 2012).

All aforementioned actors can be classified when applying into cluster initiatives context on the following: Key players, support and target groups. Figure 1 shows how these types of actors are related to each other and to the initiative.

Insert Figure 1 about here

Key player/s come from public, private sectors or both. This actors' main role is strategies formulations, but they are also important contributors of resources to the initiatives (Laur et al, 2013). They strive to boost commitment in cluster initiatives as well as secure continuity of their operations. There also is a target group represented mainly by small, medium and large firms from specific sector/s, which support initiatives financially. These are cluster initiatives "customers", which needs are to be fulfilled. Finally, a support group can include all triple helices, e.g. regional development funds, science parks, research institutions and firms from same or different sectors. These contribute to the cluster initiatives by assisting in formulation of strategies, operational tasks, acquisitions and provision of resources, but are less involved than keyplayers.

Along with members, cluster initiatives have internal personnel such as leaders/central individuals; employees hired on full or part-time basis and temporarily involved external experts (Klofsten 2010). These actors are responsible for daily cluster initiatives' routines including organization of intermediary activities and support of its driving force and commitment. External experts function is most often limited to execution of some tasks, which cannot be handled by the personnel internally for example due to lack of competencies. They can provide assistance in organizing special marketing and advanced technology-focused campaigns as well as support delivery of motoring and coordinating services (cf Cragg, 2002).

To assure cluster initiative's long-term operations a large number of members should be attracted (Gordon & McCann, 2000; Floeting, 2008). Klofsten et al (2013) highlights the need to reach "critical mass" in terms of number and diversity of members into the initiatives in order to get greatest benefits from the exchange. To be able to achieve and maintain the "critical mass" the initiatives have to select a suitable portfolio of intermediary activities and adapt it to their targets' needs and demands. The insights about types of intermediary activities are provided in the next section.

### *Intermediary activities*

Ahedo (2004) names cluster initiatives as organizations, which visualize, explore and frame potential opportunities into a portfolio of formalized middle-hands activities. Turner et al (2003) defines vital aspects of cluster initiatives such as attraction of new investors, one-industry focus, provision of resources and other facilities, access to technical, legal and other competencies, as well as assistance in commercialization of technologies (c.f. Oxford research, 2011). These characteristics can be seen as cluster initiatives intermediary activities which according to the scholars primarily lead to short- and intermediate-term effects such as development of alliances, commercialization of products, improved export and marketing strategies. These can also facilitate long-term effects in teams of employment growth, new business formation and revenues' growth (Benner, 2003; Ahedo, 2004; Johannison & Lindholm Dahlstrand, 2009). Other intermediary activities carried out by cluster initiatives are described by Nakwa et al (2012). These activities are channeling resources to industry, brokering and linking triple helices, boundary spanning through knowledge circulation. These scholars see cluster initiative as an organization acting as an intermediary through performing aforementioned activities. There also is a whole block of literature discussing intermediary activities in common, which can also be applied to all types of intermediaries including cluster initiatives (Van

der Meulen et al, 2005; Stewart & Hyysalo, 2008, Moss et al, 2009). Some examples of these are matchmaking, lobbying, monitoring and coordination, training and R&D.

By carrying out these activities cluster initiatives provide to their members a whole set of benefits in terms of networking, coordination and assistance in a complex and dynamic markets. Each member has its own interest when joins cluster initiatives. For example small firms might be more interested in widening their networking channels while mature businesses might be concerned in acquisition of new knowledge, finding influential partners as well as being visible on regional arena. A satisfaction of members and good exchange among these can be enabled by well-defined and -organized intermediary activities. The types and intensity of activities have to be adapted to the needs of their members (Ketels et al, 2008; Moss et al, 2009). In order to fit intermediary activities to the needs a close dialog between the initiatives and members is vital (Visser & Atzema, 2008; Inkinen & Suorsa, 2010).

Sölvell & Williams (2013) divide cluster initiatives' activities on three large blocks – establishment of own identity and attractiveness, innovation focus as well as business development focus. The former block is directed to cluster initiative itself e.g. regional branding, general networking, building of trust while the latter is oriented on firms e.g. initiation of innovative projects, new product development. Regional innovation focus can be represented by the activities such as trade fairs, international promotion and commercial cooperation. Gretzinger & Royer et al (2014) state that the former is mainly to increase collaborations between cluster initiative with market actors through making them known and attractive while business- and innovation-oriented activities are facilitate exchanges between members and increase knowledge flows (cf Grannovetter, 1973; Uzzi, 1996; Jack et al, 2008).

Insert Figure 2 about here

Though the focus of the cluster initiatives on one or the other block of activities may either change or stabilize over time depending on their life-cycle, members' constellation and regional focus (Turner et al, 2013). These factors are seen as the ones driving dynamics in cluster and regions, which can be of importance even for cluster initiatives. Dynamical changes within and outside of cluster initiatives borders should by individual or collective actions implemented in order to come in practice. The following chapter presents main propositions where various agents (actors' model as well as personnel) as activities modifiers are to be tested.

### **Main propositions**

Ketels et al (2006) state that cluster initiatives tend to increase intensity of activities over time. This reasoning is also supported by Van der Meulen et al (2005) which state that intermediary may act differently with surrounding actors over time due to change of purpose and nature of relations. It means that focus of intermediary activities may move from cluster initiatives own identity to facilitating innovation or business support (Laur et al, 2012; Sövell & Williams, 2013). Eisingerich et al (2010) highlight the need to balance intermediary activities striving to fulfill different purposes. They mention that it is also important to be open to form new intermediary activities depending on demands of their members and other audience (Oxford Research, 2011). The activities suited to actors' demands would lead to benefits of both cluster initiatives as well as actors involved (Ahedo, 2004; Mattsson, 2009; Hassen et al, 2011). This means that cluster initiatives' members could be intermediary activities' change agents in case of modification of their demands. This leads to Hypothesis One:

*Hypothesis 1: Change in intermediary activities depends on cluster initiatives members – key players, target and support groups.*

Furthermore according to organizational theory internal routines, personnel, and other stakeholders can also be change facilitators (Barr et al, 1992; Feldman & Pentland, 2003). One of primary driving forces working for cluster initiatives is central individuals/leader: ambitious enthusiasts, which can originate from different helices (Brown, 2000; Teigland & Lundquist, 2003; Hallencreutz & Lundquist, 2003; Klofsen et al, 2014). Sölvell et al (2003, p.14) calls these individuals “clusterpreneurs.” They build basis for initiative’s survival through using existing needs as opportunities to exploit (Shane & Venkataraman, 2000; Chiesa & Chiaroni, 2004). This underlines central individuals as agents, which are expected to make changes within cluster initiatives. It is basis for the following Hypothesis Two:

*Hypothesis 2: Change in intermediary activities depends on central individuals involved in cluster initiatives.*

People employed by an organization are called as arms and legs of the organization they work for. Organization is linked to their behaviors, choices and decisions as well as mistakes (Nelson & Winter, 1982; Kotter, 1995). These employees are drivers either for adopting or for resisting changes (cf Krackhardt, 1992; Brousseau et al, 1996). Applying this on cluster context Meyer-Stamer (1998) state that change agents, showing a path for adjustment process, can facilitate changes in behaviors and routines (cf Feldman & Pentland, 2003; Muro & Katz, 2011). Applying this on cluster initiatives context these organizations are driven by their leaders and employees as well as other interested individuals and experts led by certain aims as for example willingness to increase cooperation and knowledge exchange (van Lente et al, 2003; Rosenfeld, 1996; Van der Meulen et al, 2005). One of changes that they initiative according to some scholars is adjustment of intermediary activities as a response to market, environmental and changes of members’ demands (Feldman & Pentland, 2003; Klofsen et al, 2013). The following Hypotheses Three and Four capture this:

*Hypothesis 3: Change in intermediary activities depends on employees involved in cluster initiatives.*

*Hypothesis 4: Change in intermediary activities depends on external experts involved in cluster initiatives.*

According to Ahedo (2004) most of regions strive to increase their innovative potential and there are numerous policy instruments supporting it (cf Lagendijk, 1999; Cooke et al, 2000; Austenå, 2011). Proactive institutions as cluster initiatives can be of great help for regional governments in achieving their goals through their great capacity to learn, adapt, integrate different actors and implement microeconomic strategies (Begg et al, 2003). That’s why national and sub-national governments finance cluster initiatives and become their members (Laur & Fayolle, 2013). Depending on constellations and needs of the members cluster initiatives forms portfolio of intermediary activities. In case of changes in members’ needs and constellation the portfolio of activities tend to also be changed in order to remain relevant and beneficial for the members (Klofsen et al, 2013). This adjustment might require additional financial and other support and therefore would probably require an agreement with the financiers. This thought is captured in Hypothesis Five:

*Hypothesis 5: Change in intermediary activities depends on cluster initiatives’ sources of financial support.*

## **Methodology**

### *Choice of methods and sample*

The idea for this project came from an interactive case study investigating several cluster initiatives in Sweden (Laur, et al, 2012). Based on the findings from case studies a survey questionnaire was designed for the current project. A quantitative approach is found to be well suited for the purpose of this paper due to its great possibility to capture diversity of the sample (Royer et al, 2009). At the same, well-known drawbacks of this approach have been taken under attention and addressed in study design. Some examples of this are we have organized phone interviews to increase response rate, testing of survey questions by practitioners to assure reliability, follow-up interviews to secure correctness of answers (Brown, 2000; Hair et al, 2009; Field, 2009). Furthermore, there are rather few studies using statistical methods to capture cluster and cluster initiatives' processes comparing with other fields as for example networking (Huggins, 2000; Cassidy et al, 2005).

A sample of 253 European cluster initiatives has been identified for this study using databases such as [www.intercluster.eu](http://www.intercluster.eu); [www.tci-network.org](http://www.tci-network.org) as well as World Wide Web sources. In order to be included in the sample each potential cluster initiatives underwent qualification process i.e. the presence of basic cluster initiative characteristics highlighted in definition by Ketels and Memedovic (2008) was necessary. In total 136 (53%) initiatives have participated in the interviews. They operate in the following countries: Sweden, Germany, Belgium, Denmark, United Kingdom, Norway Netherlands and Finland (see Table 1).

Insert Table 1 about here

The sample strategy was to collect a large sample including a variety of initiatives, e.g. different ages, geographical locations, belonging to different industries, visions and strategies. This strategy allows including all existing cluster initiatives from selected geographic territory independently of their age, industry belonging, number of members involved, and organization of work. That is why it is important to mention that all these different initiatives are not object for comparison rather a basis for visualization of general patterns as e.g. preparation and organization of activities, tasks assigned for members, functions of employees and other experts. To our knowledge the selected sample includes all registered cluster initiatives within eight European countries. All these countries prioritize cluster development policies (Broekholt & Thuriaux, 1999; Rouvinen & Yla-Anttila, 1999; Roelandt & den Hertog, 1999; Brown, 2000).

### *Study design*

Structured telephone interviews on English with cluster initiatives' leaders are used for data collection in 2012-2013. Each interview lasted approximately 60 minutes and contained 39 questions (282 variables) regarding general characteristics, actors and activities of cluster initiatives. The questions created have followed generated models by previous research e.g. typology of actors as well as typology of activities models (Laur et al, 2012; Sölvell et al, 2003; Sölvell et al, 2003 and Solvell & Williams, 2013). The "key respondents" approach with leading cluster initiatives individuals involved in every-day operations is applied. Each response had been quality-checked, completed using follow-up interviews, home pages, and operational manuals (if needed), and sent to the Webropol on-line platform. The responses had been analyzed by means of SPSS (version 22) using methods such as ordinary-least-square regression, descriptive statistics and frequency tables. The multicollinearity test by variance inflation factor analysis (VIF) have been performed before the actual analyses as well as several variables have been identified as controls, e.g. aim, origin of the initiatives and stage of development.

## **Results and analysis**

### *Leading cluster initiatives' activities and change over time*

The results of this study show that there are multiple intermediary activities, which can be performed by cluster initiatives. Depending on aims as well as on unaddressed needs of current and potential members the initiative selects a portfolio of specific intermediary activities. Despite specific activities there also are general ones which all of them organize as for example networking (see Table 2). It may include formal and informal, local and national as well as social and development driven network-building activities as for example organization of conferences, seminars, and common lunches. In average cluster initiatives organize this type of events from 10 to 20 times per year. Networking is classified as an activity mainly aimed for building cluster-initiative identity and attractiveness in and outside of regional borders (Solvell & Williams, 2013). Apart from this networking can also lead to improved exchange among members and commercialization of new products, but these outcomes seem to be rather positive consequences of the networking which is not straightly-driven.

Marketing activity is also very popular among cluster initiatives and almost all initiatives from the sample organize marketing events (see Table 2). This activity is aiming for satisfaction of businesses' needs (cf Solvell & Williams, 2013) and is often specially ordered by the interested members on their own or on the expense of the initiative (Laur et al, 2012). Similarly to previous initiation of joint projects is organized by large share of the initiatives. The other activities from this block such as providing financial resources and facilities, coordinating and monitoring investments are run by approximately half of the initiatives from the sample (see Table 2).

Training and R&D organized by most of cluster initiatives are seen as innovation- and regional development-driven activities (cf Solvell & Williams, 2013). Other activities following similar purpose can be labor matchmaking and lobbying and these are performed by slightly more than the half investigated initiatives (see Table 2).

Insert Table 2 about here

Cluster initiatives may carry out activities with higher and lower intensity depending on their capability as well as demands from their members (Klofsten et al, 2013). They can stress focus on some and depart from others activities, which often depend on internal or external factors, e.g. market trends, technology changes and change in policies regulations. Table 3 shows that intermediation through networking changes in half of the investigated initiatives: they organize networking events more intensively. This shows that with time the initiatives focus more on establishing their identity and put more effort on making them attractive to potential members (Laur & Fayolle, 2013, p.8).

Marketing campaigns become also more intensive in one third of the initiatives while providing financial resources and facilities, coordinating and monitoring investments are run more intensively in only one tenth of the initiatives. The rest of the sample works with businesses' demands according to the preliminary prepared plan. The reason for this can be that the organization of such specific events might require special resources and competencies, which should be found and booked in advance. It might also require additional financial means in case if the initiative plays a role of sponsor of the event. In such situation this financing has to be obtained with its key provider (e.g. key player) beforehand.

Innovativeness and regional development-driven activities as matchmaking and lobbying increase in just one tenth of initiatives, while training and R&D are more exposed to changes in intensity. One

fourth of the initiatives intensify organization the former two. All of the intermediary activities investigated in the study can be organized less intensively in some initiatives but their number is very small and does not exceed 10%.

Insert Table 3 about here

These results underline that focus of cluster initiatives rests on the identity block probably due to strong competition and fight for resources. Initiatives work hardly to become more visible and attractive to potential members especially to key players and to target groups. These two are vital components which can assure well-functioning and long-term survival for initiatives (Laur et al, 2013). Then the initiatives' focus moves to businesses needs where two main activities are in the focus which are marketing and initiation of projects. Lastly, initiatives work with regional development mainly in terms of organizing training and R&D. Almost all activities tend to more intensively be performed over time and probably lead to other than only direct effects. This helps to achieve balance between all three blocks and remain attractive as an intermediary for all helices (Rosenfeld, 1996; Leydesdorff & Zawdie, 2010).

#### *Factors influencing change of cluster initiatives' activities*

The results of this project show that there are several important factors, which influence change of intermediary activities (see Table 4). Existing theory underlines factors for change as the following: members' involved, central individuals/leaders, employees, external experts, sources of financing.

Insert Table 4 about here

After testing these factors on the data it shows that cluster initiative's members in a face of key players, support and target groups are not factors significantly correlating with the change of intermediary activities ( $p > .05$ ). This finding does not support Hypothesis One and detects that number of key players, support and target group do not have direct influence the change of intermediary activities (see Table 4).

#### ***Hypothesis 1: Change in intermediary activities depends on cluster initiatives members.***

This does not go along with the literature that emphasizes members' needs as important factor which influences change within intermediary activities in cluster initiatives (Oxford Research, 2011; Laur et al, 2012). One of explanations of this finding can be that members are rather seen as active communicators of their needs and demands then actual change agents. The messages from the members considered as unexploited opportunities by the initiatives and are addressed by adjusting intermediary activities (cf Shane & Venkataraman, 2000; Ahedo, 2004). In such situation members cause rather indirect effect and cannot directly be characterized as change agents.

The other factor that according to organizational theory that enables changes is central individuals or leaders (Feldman & Pentland, 2003; Barr et al, 2007). The results reveal that central individuals/leaders are change facilitating factor when it comes to modifications of some intermediary activities as for example networking ( $p < .05$ ), lobbying ( $p < .001$ ) as well as monitoring and coordination of investments ( $p < .05$ ). This factor is one of the strongest predictors of aforementioned activities changes in the regression models (Beta=-.27; .39 and .24 respectively). The Table 4 contains also B coefficients which in this factor case demonstrate that the greater number of central individuals

is the less networking activities are organized ( $B=-.01$ ). The opposite picture can be seen with lobbying activity: The greater number of central individuals is the more lobbying activities are organized ( $B=.02$ ). Finally, the greater number of central individuals is the more monitoring and coordination of investments activities are organized ( $B=.01$ ). This means that Hypothesis Two is supported but only for certain types of activities.

***Hypothesis 2: Change in intermediary activities depends on central individuals involved in cluster initiatives.***

If to classify the activities which are correlated with central individuals variable it is revealing that these individuals are change agents in all three blocks of activities, e.g. aiming to improve cluster initiatives attractiveness, innovativeness and growth of businesses (cf Sölvell & Williams, 2013). Interesting finding is related to change in networking and central individuals. The one of possible explanation of this fact is that probably large number of leaders pushes toward stricter specialization of the initiative on some particular services, e.g. the ones paid by the ordering party and prescribed by supporting authorities. More unfortunate interpretation of the finding can be that the initiative has lost key leader and development course. The newly placed leaders keep changing courses in order to find a new niche but, as a consequence, either have no time to focus of networking activities or have no more interested members in participating in such (cf Cragg, 2002).

Furthermore, employees hired by cluster initiatives is an important factor correlating with change in networking activities ( $p<.01$ ). Looking at correlation coefficients in the regression model it can be observed that the greater number of employees is the more networking activities are organized ( $B=.01$ ). It is the strongest predictor of changes in networking activities ( $Beta=.41$ ). No other changes in activities are significantly correlated with the employee variable (see Table 4).

***Hypothesis 3: Change in intermediary activities depends on employees involved in cluster initiatives.***

Hypothesis Three is supported in the only case of changes within networking, which is directed towards improvement of own cluster initiative identity and attractiveness (cf Solvell & Williams, 2013). This is rather expected finding supporting theoretical arguments that the more individuals are working for the cluster initiatives the more capability it possess to capture external changes and actors demands (cf Feldman & Pentland, 2003).

The next factor influencing change in intermediary activities tested was external experts (see Table 4). The results show that the variable external experts is significantly correlating with networking ( $p<.05$ ) as well as with monitoring and coordination of investments activities ( $p<.01$ ). Correlation coefficients show that the greater number of external experts the more networking activities are organized ( $B=.01$ ). The pattern is identical with the monitoring and coordination activities: The greater number of external experts the more monitoring and coordinating activities are organized ( $B=.01$ ). Beta coefficients show that external experts variable is one of three strongest predictors of changes in networking ( $Beta=.26$ ) and the strongest predictor of monitoring and coordination activities ( $Beta=.47$ ).

***Hypothesis 4: Change in intermediary activities depends on external experts involved in cluster initiatives.***

Hypothesis Four is supported in case with networking and monitoring and coordination activities, which aim business growth and improvement of own cluster initiatives attractiveness (cf Solvell & Williams, 2013). The pattern here looks similar to previous hypothesis and highlights increased capability and competence level within the initiatives when large number of external actors is involved. This causes visible an effect on adaptation of intermediary activities to changing demands of their members (cf Van Lente et al, 2003; Van der Meulen et al, 2005).

The last hypothesis tested is about financial sources of support of the initiatives. The results highlight that financing is an important factor influencing change of intermediary activities within cluster initiatives. As in previous cases not all of investigated activities show the significant correlation with this variable. The ones which do so are matchmaking ( $p < .01$ ), lobbying ( $p < .001$ ) and marketing ( $p < .05$ ). Correlation coefficients show that the more sources of financing cluster initiatives have the more labor matchmaking activities they organize ( $B = .11$ ). The same pattern is with lobbying: The more sources of financing cluster initiatives have the more lobbying activities they organize ( $B = .13$ ). The opposite pattern is with changes in marketing which shows that the more sources of financing cluster initiatives have the less marketing activities they organize ( $B = .11$ ). Beta coefficients demonstrate that financial source is a strong predictor of changes within the three significantly correlated activities (Beta = .29, .35, -.28 respectively).

***Hypothesis 5: Change in intermediary activities depends on cluster initiatives' sources of financial support.***

Hypothesis Five is supported in case with matchmaking, lobbying and marketing activities. These strive for businesses' growth, innovativeness and development in regions. Interesting relation is observed between the sources of financial support and marketing activities. This might take roots from the origin of activities where marketing is business-oriented but lobbying and matchmaking are regional enhancing. If the large share of financing is provided by the state from all involved sources of support than it is obvious that regional enhancement would occupy first position among all intermediary activities (cf Laur et al 2012; Solvell & Williams, 2013). This finding pinpoints this path where a mix of financial sources is present but the state is probably a major financial contributor.

The summary of the hypotheses testing results is as the following in the Table 5.

Insert Table 5 about here

**Conclusions and implications**

This study provides insights into different types of intermediary activities organized by cluster initiatives and their changes over time as well as underlines factors influencing changes in these activities.

Cluster initiatives are multitasking organizations, which are simultaneously occupied with multiple intermediary activities aiming to boost their identity and attractiveness, improve business growth, innovativeness and regional development. These aims they most often strive to achieve through organization of networking events, marketing campaigns and by initiation of joint projects. This highlights their broad specialization and willingness to fulfill numerous unaddressed needs of market actors (Laur et al, 2012; Klofsten et al, 2013). These market actors can include different kinds of constellations of triple helices and become potential cluster initiatives' members (Etzkowitz & Leydesdorff, 2000; Leydesdorff & Zawdie, 2010). Through intermediary assistance the initiatives

create win-win situation for all involved parties including their own and regional performance (Ahedo, 2004; Ketels et al, 2006). In order to sustain such positive outcomes the intermediary activities can be modified to better-fit changing demands of the members. The modification is often applied by increase of intensity as well as quality of focus activities.

Relying on existing research as well as empirical observations from previous projects this study investigated seven factors which potentially influencing changes in intermediary activities such as cluster members including key players, support, target groups, central individuals, employees, external experts as well as sources of financing (Van der Meulen et al, 2005; Ahedo, 2004, Laur et al, 2012; Klofsten et al, 2013). From these seven factors only four have shown the effect on changes in intermediary activities performed by the initiatives. These are central individuals/leaders, employees, external experts and sources of financing.

- Activities boosting cluster initiatives identity and attractiveness (e.g. networking) depend on their leaders, employees and competencies invited from the outside to carry on special tasks. This conclusion supports previous findings generated within the fields of organizational theory and intermediary organizations (Barr et al, 2007; Chiesa & Chiaroni, 2004). It shows that changes in cluster initiatives activities are personnel driven and their primary purpose is to improve well being of their own organization. Furthermore, the activities leading to well being of the initiatives do not depend on sources of financial support. It means that independently from financiers cluster initiatives would continue refining this type of activities relying just on efforts of the personnel.
- Activities aiming to improve innovativeness and regional development (e.g. matchmaking, lobbying, R&D) depend on cluster initiatives' leaders but also on their financiers. This conclusion shows that leaders are also facilitators of this type of activities; they support initiative's external focus and secures that it fulfills the mission to support regional development (Hanusch et al, 2009; Sölvell & Williams, 2013; Turner et al, 2013; Klofsten et al, 2013). Moreover, it does play a role of guarantor keeping balance between internal and external focus, which is very important for the initiative aiming for long-term survival and sustainability (Eisingerich et al, 2010). In order to hold this balance and generate advantages for all involved parties, initiatives apart from emotional boost coming from the leaders seek for financial support coming from multiple sponsors.
- And lastly, activities leading to growth of businesses (e.g. marketing, monitoring and coordination) can be changed by the inputs from leaders/central individuals, external experts and financiers. Leaders in this block of activities, as in previous, play a role of guarantor that mission of cluster initiative as business assistant is fulfilled (Eisingerich et al, 2010). Cluster initiatives strive, by adjustment of intermediary activities, to satisfy actual needs of the businesses (Rosenfeld, 1996; Etkowitz & Leydesdorff, 2000; Lundequist & Power, 2002).
- However, members either from key players, support and target groups are not the factors influencing change of intermediary activities – there is one-sided stream affecting change. It means that cluster initiatives are expected to be creative and proactive in changes of their activities but the members' interest is to exploit the outcomes from the delivered activities through paying fees for their organizations (in many cases) and participation in these. Negative correlation between financial sources and activities belonging to this block could be the reason underlining that members finance organization of self-initiated campaigns.

The “activity by cluster initiatives” model proposed by Sölvell & Williams (2013) collaborated with the outcomes of this study enrich the model by adding drivers to changes within three blocks of activities. This model can be seen as main contribution of this research project. Identification of

factors facilitating changes provide guidelines for cluster initiatives' management and reinforce benefits attained from intermediation. Therefore the target group of this paper can be scholars as well as authorities occupied with regional and cluster development. The particular interest this paper can rise within practitioners, as for example leaders, working with improvement of internal routines in order to sustain cluster initiatives operations. Moreover, the outcome of the study might serve as a ground for theoretical classification of cluster initiatives as particular type of intermediary depending on the sphere of activities it is leaning to as well as agents affecting dynamics within the spheres.

The conclusions lead to the following implication for the cluster initiatives that while changing intermediary activities it is always good to first define a purpose of doing it and goals to be achieved (Gretzinger & Royer, 2014). These goals should cover needs of three sectors private, public and academic because there no other actor which can assist in building interactive platforms within as well as between these three sectors (Rosenfeld, 1996). By successfully satisfying all these needs cluster initiatives reinforce their own attractiveness and build reputation on the market arena. This might facilitate attraction of new members as well as provide a basis to acquire prolonged financing from the policy-makers. The latter though might need to reconsider current approach of mainly finance initiatives start-ups to continuous support of initiatives, which fulfill their mission on all three fronts.

This study results might inspire cluster initiatives to become even more proactive in adapting their activities to actors needs through for example acquiring feedback on previously performed activities. This feedback might then be used by the initiatives to improve either the content of the intermediary activities or the mode of their delivery. Their pro-activeness may also be applied while hiring of well-educated and experienced in the focus area personnel and external experts; these are active agents facilitating changing in the activities. The measures of pro-activeness as well as level of the satisfaction of members with adjustments of intermediary activities should be part of model evaluating cluster initiatives (cf Oxford Research, 2011). This would serve as a basis for measuring their effectiveness and eagerness to sustain their operations. This would also ease decision-making process for cluster initiatives financiers.

## **References**

## **Figures and tables**

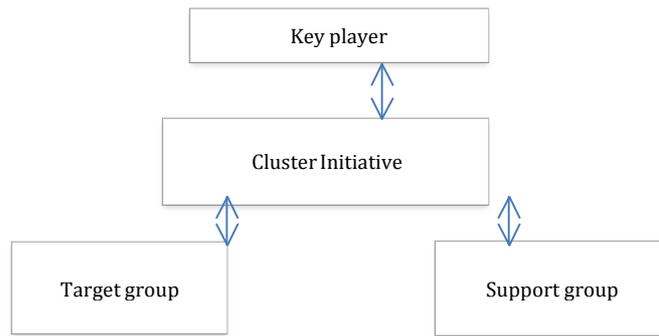


Figure 1: Typology of actors in cluster initiatives (Laur et al. 2012, p. 1917).

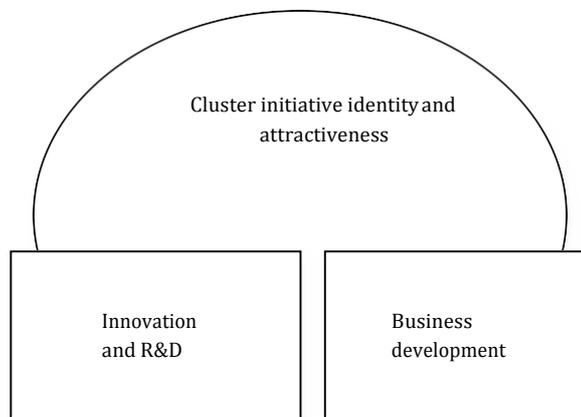


Figure 2: Activities performed by cluster initiatives (Sölvell & Williams, 2013, p.10)

Table 1: Sample characteristics

Cluster initiatives profile	% of valid responses (number in brackets)
<b>General characteristics</b>	
Start year (N=136)	
1911-1990	5.9 (8)
1991-2000	18.4 (25)
2001-2010	72 (98)
2011 and later	3.7 (5)
Country of operation (N=136)	
Belgium	16.2 (22)
Denmark	11.8 (16)
Finland	7.3 (10)
Germany	16.2 (22)
Netherlands	8.8 (12)
Norway	10.3 (14)
Sweden	17.6 (24)
United Kingdom	11.8 (16)
Origin (N=136)	
Started from scratch	64.7 (88)
emerged from another cluster initiative	35.3 (48)

Industry belonging (N=128)	
<i>Automotive</i>	0.8 (1)
<i>Electronic</i>	10.2 (13)
<i>Environment</i>	15.7 (20)
<i>Food processing</i>	10.2 (13)
<i>ICT</i>	8.6 (11)
<i>Paper and pulp</i>	2.3 (3)
<i>Pharmaceutical</i>	19.5 (25)
<i>Textile</i>	0.8 (1)
<i>Transport and logistics</i>	8.6 (11)
<i>Tourism</i>	3.0 (4)
<i>Other</i>	20.3 (26)
<b>Actors involved</b>	
Number of central individuals (N=135)	
<i>One</i>	7.3 (9)
<i>More than one</i>	92.7 (126)
Number of employees (N=123)	
<i>0-5</i>	51,2 (63)
<i>6-10</i>	27,7 (34)
<i>11-20</i>	8,9 (11)
<i>21-100</i>	12,2 (15)
Number of external experts (N=117)	
<i>0-5</i>	41,9 (49)
<i>6-10</i>	26,5 (31)
<i>11-20</i>	11,1 (13)
<i>21-100</i>	20,5 (24)
Number of key players (N=132)	
<i>1-5</i>	57.6 (76)
<i>6-10</i>	20.4 (27)
<i>11-20</i>	12.9 (17)
<i>21-100</i>	9.1 (12)
Number of support group members (N=131)	
<i>1-5</i>	32.8 (43)
<i>6-10</i>	17.6 (23)
<i>11-20</i>	25.2 (33)
<i>21-150</i>	24.4 (32)
Number of target group members (N=130)	
<i>1-10</i>	8.5 (11)
<i>11-20</i>	8.4 (11)
<i>21-100</i>	42.3 (55)
<i>101 and more</i>	40.8 (53)
<b>Support</b>	
Financing (N=120)	
<i>Public</i>	20 (24)
<i>Private</i>	5,8 (7)
<i>Self-financing</i>	3,3 (4)
<i>Mix of public and private</i>	60 (72)
<i>Public and self-financing</i>	3,3 (4)
<i>Private and self-financing</i>	3,3 (4)
<i>Mix of public, private, self-financing</i>	4,2 (5)
<b>Activities</b>	
Intermediary activities (N=134)	
<i>Lobbying</i>	60.4 (81)
<i>Marketing</i>	86.6 (116)
<i>Matchmaking</i>	57.5 (77)
<i>Monitoring and coordination of members</i>	59.0 (79)
<i>Networking</i>	98.5 (134)
<i>Provide resources and facilities</i>	49.3 (66)
<i>R&amp;D and Training</i>	79.9 (107)
<i>Start-up common projects</i>	82.8 (111)
<i>Other</i>	23.9 (32)

Table 2: Activities performed by cluster initiatives (N=136). Adopted from Laur & Fayolle (2013, p.7).

Activity	Networking	Labour matchmaking	Lobbying products	Marketing	Coordinating and monitoring investments	R&D and training	Initiating of new joint projects	Providing facilities and financial resources
Execution of activity %	98,5	56,6	59,6	85,3	58,1	78,7	81,6	48,5
n	134	77	81	116	79	107	111	66

Table 3: Change of intermediary activities in cluster initiatives (N=136). Adopted from Laur & Fayolle (2013, p.7).

Activity	Networking	Labour matchmaking	Lobbying products	Marketing	Coordinating and monitoring investments	R&D and training	Initiating of new joint projects	Providing facilities and financial resources
<b>Had Changed</b>	70,7% (87)	26,0%(32)	22,8%(28)	55,3%(68)	25,2%(31)	48,0%(59)	49,6%(61)	25,2%(31)
<b>More intensive</b>	50,4% (62)	14,6%(18)	10,6%(13)	32,5%(40)	10,6%(13)	26,8%(33)	23,6%(29)	13,0%(16)
<b>Less intensive</b>	8,1%(10)	1,6%(2)	1,6%(2)	4,1%(5)	2,4%(3)	0,8%(1)	3,2%(4)	2,4%(3)

Table 4: OLS models – factors influencing change of cluster initiatives' activities

Type of activity	Networking (B)	Labour matchmaking (B)	Lobbying products (B)	Marketing (B)	Coordinating/monitoring investments (B)	R&D and training (B)	Initiating of new joint projects (B)	Providing facilities/financial resources (B)
Aim of initiative	-,05	,01	,02	-,05	,05	,03	,03	-,02
Phase of development	-,02	-,01	-,01	,02	,04	-,01	,03	-,01
Origin of initiative	,02	,32**	,20	-,23	-,02	-,05	-,03	-,05
Number of central individuals	-,01*	,01	,02***	-,001	,01*	,01	,01	,001

Number of employees	,001**	-,001	,001	-,001	,001	,001	-,004	,001
Number of external experts	,01*	-,001	-,001	-,01	,01**	-,002	,01	-,002
Number of key players	-,003	,001	-,01	-,02	-,004	-,01	-,001	-,01
Number of support group	-,001	-,003	-,002	-,003	-,01	,001	-,001	,01
Number of target group	,01	,00	,00	,002	-,001	,001	-,001	,001
Source of financing	-,08	,11**	,13***	-,13*	,06	,04	,07	-,06
Model summary	F(10,60)=2,9 p<.01 R2=,33	F(10,73)=1,7 p<.09 R2=,21	F(10,74)=2,2 p>.03 R2=,25	F(10,62)=1,2 p>.3 R2=,18	F(10,72)=2,6 p<.01 R2=,30	F(10,65)=,4 p>.9 R2=,07	F(10,62)=,5 p>.08 R2=,09	F(10,74)=,52 p>.8 R2=,08

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001

Table 5: Results of hypotheses testing

<b>Hypothesis 1:</b> Change in intermediary activities depends on cluster initiatives members.	Not supported
<b>Hypothesis 2:</b> Change in intermediary activities depends on central individuals involved in cluster initiatives.	Supported for networking, lobbying as well as monitoring and coordination of investments  All three blocks
<b>Hypothesis 3:</b> Change in intermediary activities depends on employees involved in cluster initiatives.	Supported for networking  One block – CI identity and attractiveness
<b>Hypothesis 4:</b> Change in intermediary activities depends on external experts involved in cluster initiatives.	Supported for networking as well as monitoring and coordination of investments  Two blocks - CI identity and attractiveness as well as business growth
<b>Hypothesis 5:</b> Change in intermediary activities depends on cluster initiatives' sources of financial support.	Supported for matchmaking, lobbying and marketing  Two blocks - innovativeness and regional development as well as business growth