

## Comparing Cluster Policies: An Analytical Framework

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## Abstract

This working paper is a part of the dissertation research and is determined to outline and deliver key triggers of a successful regional cluster policy. It first makes a broad reflection on the theory of cluster and cluster policy concepts and subsequently focuses on elaboration of an analytical scheme for policy analysis. The development of the framework is proceeded into two steps, first of all the stages of cluster policy process are defined. After that key factors affecting policy building are selected from various existing theoretical and practical cluster policy cases and later on attributed to a particular stage of cluster policy. The advantages of the designed analytical approach are in its ability to offer a deeper and more comprehensive view on different cluster policies while making comparisons and generating policy learning. Finally the framework can also be applied as a toolbox for policy makers keen to identify strengths and weaknesses in their cluster policies.

## Resumen

Este working paper forma parte de un trabajo de investigación que está siendo desarrollado para una tesis doctoral y que tiene como objetivo definir e identificar cuáles son los puntos de partida de una política clúster regional exitosa. Primero reflexiona sobre teoría de clústeres y sobre conceptos de política clúster para después centrarse en la elaboración, en dos pasos, de un marco analítico para el análisis de políticas. El primer paso es definir las etapas de los procesos de política clúster y seleccionar, de entre una gama de casos prácticos y teóricos de políticas clúster, factores clave que afectan al desarrollo de políticas. El segundo paso es atribuir dichos factores a una etapa concreta en los procesos de política clúster. La ventaja de dicho marco analítico es su capacidad de ofrecer una perspectiva más profunda y amplia sobre diferentes políticas clúster a la vez que hace comparaciones y genera aprendizaje de políticas. Este marco puede, por último, usarse como una caja de herramientas para policy makers que quieran identificar las fortalezas y debilidades de sus políticas clúster.

## Laburpena

Lan hau ikerketa tesi baten zati bat da, eta eskualdeko kluster politika arrakastatsurako gakoak laburtzea eta azaltzea du xede. Lehenengo, kluster teoriaren eta kluster politikaren kontzeptuen inguruko gogoeta zabala aurkezten digu eta, horretan oinarrituta, politikak aztertzeo eskema analitiko bat osatzeari ekiten dio. Lan esparru hori bi urratsetan garatzen da: lehenengo, kluster politikaren prozesuaren faseak definitzen dira; ondoren, politiketan eragina duten faktore gakoak aukeratu dira kluster politikako hainbat kasu teoriko eta praktikotatik, eta kluster politikaren zein faseri dagozkion zehaztu. Hurbilpen analitiko horrek aukera ematen digu kluster politikak ikuspegi osoagotik eta sakonagotik aztertzeo, eta, bide batez, alderapenak egiteko eta politiketatik ikasteko. Gainera, lan esparru hori lanabes erabilgarria izan daiteke politikak erabakitzen dituztenentzat, beren kluster politiketan indarguneak eta ahultasunak identifikatzeko.

## 1. Introduction

The importance of sub-national regions and localities in generating countries' economic strength and competitiveness is today widely acknowledged (Shearman, 1997; Storper, 1997; Porter, 1998b; Scott, 1998; Krugman, 1991; Fujita *et al.*, 1999; Baldwin, 2003; Morgan, 2004; Pike, 2007; Benner, 2012). The significance of sub-national regions has grown especially in the context of globalization processes, under which terms companies are able to locate their production and services more or less wherever they want. Moreover while firms must choose one location over another based on local conditions, it is these same firms that contribute to building the socio-economic strengths of the territories where they choose to position. Thus it is no wonder that a key focal point for regional competitiveness is the ability to offer appealing conditions to the private sector, in search of setting (and/or keeping) in motion a virtuous circle.

In line with this focus on regional competitiveness, increasing attention over the last twenty years has been given to industrial agglomerations or clusters, and the hypothesized advantages that these create for companies and places (Pitelis *et al.*, 2006; Karlsson, 2007; Maskell and Kebir, 2005). Their main potential benefits lie in the existence of positive externalities or spillovers and a special atmosphere, which emerge due to the spatial proximity of companies from the same and related industries. In particular, connections developed in clusters are argued to be fundamental for sophisticated competition, productivity enhancement, and, especially, the pace of new business formation and innovation. These location-based advantages are much bigger than those arising from flexible mobility or economic liberalization (Benner, 2012b; Porter, 1998a). Indeed, Bieger and Scherer (2003) are convinced that cluster-generated context match ideally with today's business needs (ability to learn and adapt fast to new market conditions), that face "hyperdynamic competition" (D'Aveni, 1995 cited in Bieger and Scherer, 2003).

Clustering is not only a reflection of spatial formations, it is also a new and complementary way of interpreting and analyzing the advantages of regional economies, of organizing economic development, and of constructing effective public policy for enhancing regional competitiveness (Porter, 1998a). Viewing a group of companies and institutions as a cluster highlights opportunities for coordination and mutual improvement in areas of common concern without threatening and distorting competition or limiting the intensity of rivalry (*ibid.*). Indeed, over time, a wide range of local and national stakeholders have started to realize these benefits and have turned to the application of such an approach for the enhancement of regional competitive strengths. The Basque Country and Scotland were among pioneer regions in the application of cluster policies in the early 1990s, and the popularity of the policy has since spread around the world and been implemented at all administrative levels from national to local city governments.

In the early years of cluster policy testing experts were primarily interested in analyzing the precise advantages of clustering (Brown, 2000; Rosenfeld, 2002a; Martin & Sunley, 2003; Sölvell *et al.*, 2003), so that research results could provide policy-makers with better arguments and recommendations on whether and how to implement cluster policy. There have since been many different approaches used to try to evaluate specific cluster policies (Uyarra and Ramlogan, 2012), although there remain significant challenges (Aranguren *et al.*, 2013; Schmiedeberg, 2010; Aragón *et al.*, 2013). Indeed, Perry (2005, p. 833) argues that "it has been possible to pick and mix research evidence too freely", which together with the relative imprecision of the cluster concept has helped fuel the burgeoning adoption of cluster policies around the world.

We are now at a point where it is important to take stock of the substantial theoretical and practical evidence base so as to identify successful cluster policy approaches and learn more about the reasons behind their success. Comparative studies of existing policy experiences is a particularly useful methodology, but requires first the development of a robust analytical framework capable of positioning different elements of what is a complex and heterogeneous set of policies. The aim of this paper is to develop such a framework. In Sections 2 and 3 we deal with the issues of clusters and cluster policy respectively. Section 4 then builds on this analysis to propose a new analytical framework. This framework represents the main contribution of the paper, and can be applied as a toolkit by policy-makers to support the development of cluster policies. We summarize and draw conclusions in Section 5.

## 1. Cluster concept and theory

In the literature dealing with regional development, innovation and entrepreneurship it is frequent to encounter a multitude of different terms describing similar realities of agglomerations of economic agents. Alongside ‘clusters’, we might also include ‘industrial districts’, ‘networks’, ‘innovative milieus’, ‘new industrial spaces’, etc.. While they each exhibit subtle differences, the blurred boundaries between them stem from the absence of a unifying theory of their significance for economic development. On the contrary they are built on numerous theoretical approaches descending from different scientific branches explaining the forces behind spatial agglomerations. Under such conditions, “clusters” can be seen as an “electric” concept with a very rough framework (Benner, 2012a, p. 7).

The first reference to these issues is traditionally attributed to Alfred Marshall (1890), who described a sensed “industrial atmosphere” in “industrial districts” of British cities. A renewed interest was sparked in the 1980s in the context of experiences in the Emilia Romagna region of Italy (Piore and Sabel, 1984; Becattini, 1991; Asheim, 2001; Paniccia, 2002; Isbasoiu, 2006). Since then different streams and theoretical concepts explaining such spatial concentration have been developed. For example, in California Allen Scott (1998) highlighted the rise of industrial spaces, while others have preferred to talk about local production systems (Crouch, 2002), local high-tech milieus (Keeble and Wilkinson, 2000), local and regional innovation systems (Asheim and Gertler, 2005; Cooke and Morgan, 1998; Cooke, 2001), or learning regions (Asheim, 1996, 2001; Morgan, 1997).

While researchers representing various scientific fields have contributed to the development of the concept, Karlsson (2007) argues that one of the most essential contributions has come from economic geographers in attacking the spatial issue. Indeed, all of the concepts rest on theories of agglomeration, which have primarily developed due to three empirical observations (Sölvell *et al.*, 2003, pp. 18–20):

- 1) regional concentration, which is reflected in companies’ preference for certain locations despite globalization;
- 2) spatial clustering, which is reflected in companies from the same industry tending to locate close to each other;
- 3) path dependence, which is observed in the robustness of these formations once they have been initialized.

Under these conditions two kinds of the agglomerations have been defined, one explained by urban or scale economics and the other by location economics (Sölvell *et al.*, 2003). The first arises purely due to geographical proximity and the second from the more specific advantages generated by agents from the same industry. Their constellation in each case varies,

which respectively leads to deviations in existing formations and types of agglomerations. Moreover, while each agglomeration type and concept reflects some peculiarities, their main foundations are the same – externalities.

Among numerous contributions made by different researchers, Michael Porter's notion of industrial or business clusters (Porter, 1998a, 1998b) is considered to be one of the most influential in terms of popularizing the cluster concept (Asheim, Cooke, and Martin, 2006; Martin and Sunley, 2002). This is largely because Porter has not only promoted it as an analytical concept, but also as a policy tool for strengthening regional/national competitiveness (Martin and Sunley, 2002, pp. 7–8), resulting in “a world-wide fad, a sort of academic and policy fashion item” (*ibid*, p. 4).

Amidst the rise in popularity of the concept over the last two decades, however, there remain some scruples in terms of the precise definition of ‘cluster’ as a term (Karlsson, 2007). There is often confusion for example around the distinction between ‘clusters’ and other related concepts such as ‘networks’, although a typical response in this case is that clusters require a geographical concentration of firms/institutions and not just the existence of connections between actors (Coulander, 2010). More generally we can consider a comprehension of the cluster concept following certain common features (Nadabán and Berde, 2009; Malmberg and Power, 2006; Boja, 2011; Ketels, 2004):

- *Spatial agglomeration of similar and related economic activity;*
- *Critical mass* of actors in order to make it work;
- *Proximity* among actors, that generates social and trust relations, allows the sharing of common resources, and accelerates knowledge spillovers
- Inclusion of both *vertical and horizontal links* among representatives from the same or related industries;
- *Interlinked relations* and interactions of local *collaboration and competition*;
- *Self-awareness* among participants;
- Seeming and sharing a *common goal*;

With regards more concrete definitions, among the main cluster definitions listed in [Appendix I](#) the most popular is arguably that of Porter (1998a, p. 197): ***“Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate”***. While we adopt this definition for the purposes of this paper, two main critical comments should be noted. The first deals with the property of the definition itself, and comments from some researchers (Linzenberger 2007) who consider that it doesn't belong to Porter, and rather comes from the works of Lasuén (1973), who referred to Perrou's (1964; 1955) theory of growth poles. The second is more theoretically and empirically important and refers to the blurriness of two important elements of the cluster concept (Martin and Sunley, 2002; Coulander 2010), namely “geographical scale and internal socio-economic dynamics” (Martin and Sunley, 2002, p. 9).

Taking first “internal socio-economic dynamics”, confusion rests on the precise definition of the origin of those actors needed to constitute a cluster. This is essentially due to difficulties in setting the activity boundaries of particular clusters, which usually don't fit with traditional industrial classifications. Thus some more specific clusters can fall within ‘big clusters’ and/or some actors can be left out from consideration (Martin and Sunley, 2002, p. 10), an issue that is exacerbated by the inherent dynamism of economic activity as new activities emerge in the intersection of existing ones. With regards “geographical

scale”, the is little clarity around the limits of proximity, in which sense clusters can and are defined at a whole range of scales, from towns/cities, through to regions, countries and even up to international extent.

Such openness in the definition of geographical scale and industrial linkages results in the attribution of clusters of different types depending on their structure, sizes, forms, industries, regions and countries (Porter 1998). Existence of such a variety of possible clusters can often lead to overlap with other agglomeration types and explains the blurriness of the concept. It has not surprisingly given rise to different cluster typologies, and in Table 1 we present a selection of these.

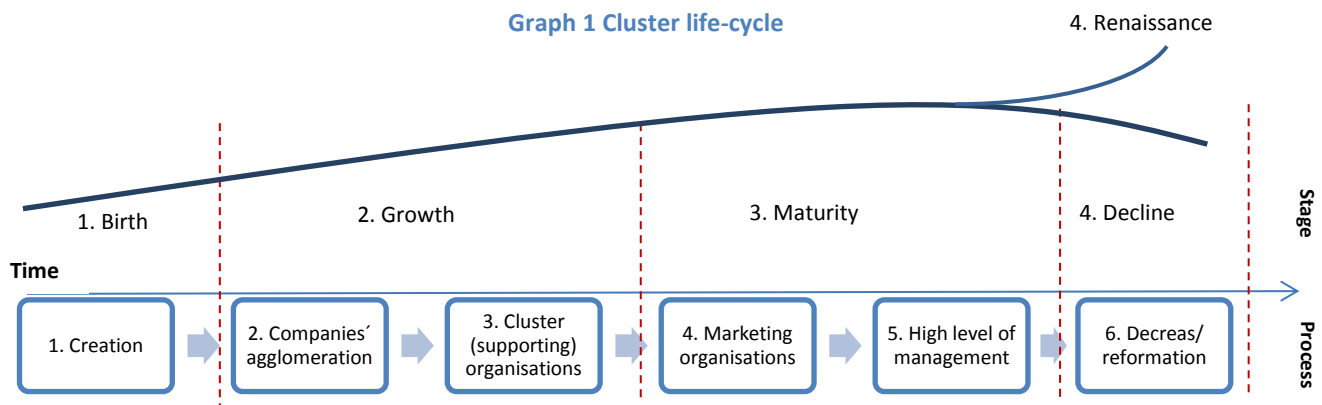
**Table 1 Different typologies for cluster differentiation**

Researcher	Type	Description
<b>Gulati (1997)</b>	Modern urban clusters	Serve for metropolitan areas and export markets
	Artisanal rural clusters	Serve only local/rural demands
<b>Sandee (2002)</b>	Dormant clusters	Production for only local/rural consumption
	Dynamic clusters	Deep cooperation and will to enter global markets
<b>Schmitz and Nadvi (1999)</b>	Incipient clusters	In an early stage of industrial development; located in poor areas; production mainly for local demand
	Mature clusters	Production for global markets; vulnerable to global change
<b>Altenburg and Meyer-Stamer (1999)</b>	Surviving clusters	Production is primarily conducted for local needs
	Advanced mass production clusters	Production is to serve the local market but there is strong external influence/competition
	Clusters of transnational corporations	Based around foreign companies, which settle in particular locations but have weak ties with local actors
<b>Markusen (1994)</b>	Marshallian	Small and medium sized local firms; substantial inter-firm trade and collaboration; strong institutional support; dependent on synergies and economies provided by cluster
	Hub and spoke	One or several large firms with numerous smaller suppliers and service firms; cooperation between large firms and smaller suppliers on terms of the large firms (hub firms); dependent on growth prospects of large firms
	Satellite platforms	Medium and large sized branch plants; minimum inter-firm trade and networking; dependent on ability to recruit and retain branch plants
	State-anchored	Large public or nonprofit entity and related supplying and service firms; restricted to purchase-sale relationship between public entity and suppliers; dependent on region's ability to expand political support for public facility
<b>Duque, J. C; Rey, S. J. (2008, p. 42)</b>	Regional industry clusters	The spatial location of industries is the important characteristic; clusters whose elements share a common regional location, where the region is defined as a metropolitan area, labor market, or other functional economic unit
	Functional clusters	Matters what companies produce; companies offering or producing similar services or products belong to the same cluster
	Value-added industry clusters	Focuses on products/services flows through companies, rather than location or activity; "a subset of industries of the economy connected by flows of goods and services stronger than those linking them to the other sectors of the national economy"

*Source: Authors' interpretations, based on Rosenfeld (1997) and Isbasoiu (2006)*

Regardless of the type or structure of clusters there are different stages of development, and thus we can also differentiate clusters relative to their evolution stage. Each cluster usually goes through all four stages of the life-cycle reflected in Graph

1. While a particular territory (city, region, country) can include clusters from all evolutionary stages simultaneously, some studies indicate that the level of countries development can strongly influence the number of existing cluster from a particular stage (Europäische Kommission, 2002, p. 15). Identification clusters life-cycle's stage is later decisive for the elaboration of effective cluster-based policy (Brenner, Schlump 2011).



*Source: Europäische Kommission 2002, p. 15*

Despite significant fuzziness and differences of perspective around the cluster concept, it is seen as a very effective basis for policy oriented towards enhancing regional competitiveness; one that has shown tangible economic benefits in many mixed cases. Nadabán and Berde (2009), for example, highlight positive effects for companies in terms of production, innovation and new business opportunities. The sources of these benefits emerge basically from the special environment created inside the industrial agglomeration and characterized by the simultaneous existence of strong competition and cooperation among actors.

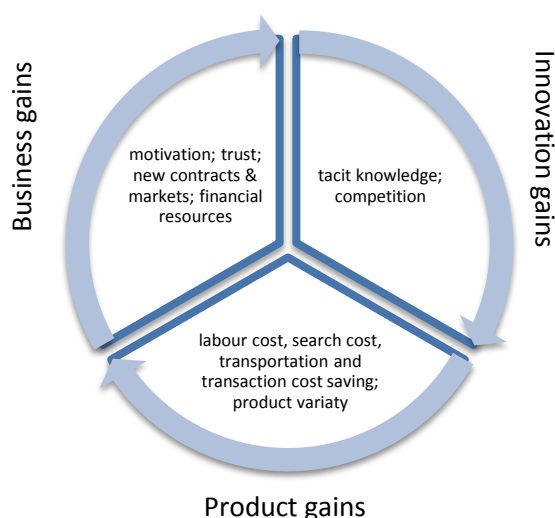
Exploring these positive effects in greater detail, under **production gains** we can specify advantages such as: the enhancement of the quality of human capital and labour cost savings due to access to specialized skills; search cost savings for the buyers of complementary products offered in proximity due to privileged opportunities for co-operation with nearby suppliers; transport cost savings, especially just in time contracts, due to geographic proximity; transaction cost savings due to an environment with cooperation and trust; greater product variety due to access to the local supplier base; and other broad-based opportunities from collaboration (OECD, 2007; Sölvell *et al.*, 2003; Борогеев, 2011). **Innovation gains** on the other hand arise essentially from knowledge spill-overs, which are formed through close interaction with specialized customers and suppliers and result in unintended learning, new innovative products and services (Rosenfeld, 1996; Isbasoiu, 2006; Sölvell *et al.*, 2003; OECD, 2007). Finally, **business gains** rest mainly on: greater options to broaden contacts and herewith develop new products and/or open up new markets through collaboration; strong motivation and creativity due to the sophisticated demand of highly competitive local customers in close geographic proximity; and easier access to financial resources due to an environment of trust and collaboration (OECD, 2007; Борогеев, 2011).

The positive forces within clusters tend not to lead to only one particular advantage, however, but rather are fundamentally inter-related as illustrated in Graph 2. In this sense clustering positively affects the development of the territory as a whole.



First of all, clusters increase the overall level of innovativeness through knowledge generation and technology transfer due to resource leveraging, spill-overs and face-to-face contacts (Isbasoiu, 2006; Sölvell *et al.*, 2003). This is especially likely given that large parts of regional knowledge generation systems typically have collective characteristics, and thus investment in R&D in one industry/cluster has knock-on effects in others (Karlsson, 2007). Secondly, the productivity of regions is noticeably bigger where firms are spatially concentrated (Isbasoiu, 2006), with higher wages in clusters and associated higher income levels in general (Isbasoiu, 2006; Karlsson, 2007). Finally, due to openness to cooperation and trust among actors, as well as higher productivity, such regions tend to better respond to changes in global markets (Isbasoiu, 2006).

**Graph 2 Cluster advantages for companies**



*Source: Authors' interpretation based on mentioned sources*

Summing up, despite differences in defining clusters and distinguishing them from other similar concepts, the cluster concept is widely assumed to be effective for strengthening both companies' and regions' competitiveness. This field is very much a case of the development of theory in practice, however, with conceptual and empirical knowledge of clusters having emerged simultaneously to the real time application of cluster policies over the last two decades. In the next Section, therefore, we turn to analyze the complex set of processes that are labelled 'cluster policy'.

## **2. Cluster policy as an effective tool for strengthening regional competitiveness**

The widespread attention afforded to the benefits arising from clusters means that building clusters is currently seen as a natural condition for reinforcing regional productivity, innovativeness and welfare (Karlsson, 2007). It has become a popular policy tool with regional and national governments during an era in which many other means for a targeted reinforcing of competitiveness have become limited or obsolete (Feser, 2008, p. 192). Existing macroeconomic policies are not able to provide sufficient regional/local engines for development, and industrial policy has only recently started to come back into fashion after a period in which the dominant view was encapsulated by Gary Becker's assertion that "the best industrial



policy is none at all".<sup>1</sup> In this context, regional cluster-based approaches have filled a gap in terms of providing a focal point for analysis of local economic structures and the attractiveness of territories.

Cluster policies, labelled as such, began to be implemented in the early 1990s, and until now three main stages in their development can be observed (Europe INNOVA, 2012, 3.47 m):

1. Early 1990s: pioneer countries and regions attentively studied the cluster approach and took risks to develop competitiveness or innovation orientated policies based on it.
2. Mid 1990s to mid 2000s: this period of 'cluster policy entrepreneurs' was characterized by first results from pioneer countries and a general broadening of knowledge on the possibilities for developing a successful regional policy through clusters.
3. Mid 2000s onwards: cluster policy is increasingly mainstream as more and more regions and countries introduce the policy due to successful results of previous implementations. The question changes from whether or not to implement, towards how to implement to achieve the most effective results.

Today's popularity of cluster policy, which is employed at local, regional and national levels the world over and has been embraced by international organizations such as the OECD and World Bank, rests in significant part on successful cases from different regions that managed to enhance their socio-economic situation through application of cluster policy (Karlsson 2007). In the wave of such popularity it is important to clearly understand exactly what constitutes cluster policy. However, it is no surprise that the same blurriness that characterizes the cluster concept is also present with respect to policy. Despite its short history of around 20 years there are a huge amount of different programmes, tools and methods that have been and are being applied in different places (Andersson, 2004; Europe INNOVA, 2008).

The most common cluster policy definitions are extremely broad in their scope. Kiese (2008, p. 131) or Hospers (2002, p. 382), for example, see cluster policy as **all state measures** towards the support and development of clusters. Ketels (2011, cited in Benner, 2012b, p. 84) takes the even broader view that cluster policies contain not only **governmental** but also **in collaboration with** activities of **private actors** that are oriented to stimulate the cluster's efficiency. This is in line with Fromhold-Eisebith and Eisebith's (2005, cited in Benner, 2012b, p. 84) more precise definition of cluster policy as "**any coordinated set of measures, in whatever constellation** and style of implementation, that supports the development of regional industrial agglomeration towards ideal features of a cluster in terms of a specialized, competitive, collaborative and collectively innovated set of sector related industries, research/education and other organizations."

In order to grasp the existing differences in practice, Borrás (2008, pp. 16–19) has suggested grouping different existing comprehensions of cluster policies into several categories (visions):

- a. **Creationist** – a narrow approach to the understanding of cluster policy as a "policy for the creation of new clusters" (Swann *et al.*, 1998). The target of policy is to address problems and issues connected with the specific cluster dynamic. This involves state-society-economy interactions.

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<sup>1</sup> See Gary Becker, "The Best Industrial Policy Is None at All," *Business Week* (August 25, 1985), cited in Schrank and Whitford (2009): Industrial Policy in the United States: A Neo-Polanyian Interpretation. In *Politics & Society* 37 (4), 521 - 553.

- b. **Narrow** – this approach is mostly presented in the work of Andersson (2004), who sees it as actions being implemented exclusively by public authorities. Here unintended or indirect actions are excluded from the definition.
- c. **Top-down** – a contextual approach seeing cluster policy as “programmes and schemes developed at the national, regional and cluster level” (Boekholt and Thuriaux, 1999b; OECD, 2007).
- d. **Evolutionary** – cluster policy is seen as a “public-private interaction in the territory (...) [when, policy maker tries to upgrade the knowledge base, the competencies, and the learning abilities of the territory as much as the commercial exploitation of those in order to improve the competitive position of cluster as a whole” (Cooke, 2001).
- e. **Network** – in this case “policy links with the contemporary approaches to the traditional regulatory command-and-control at arm’s length approach, but a closer relationship between private and public actors in the territory trying to solve problems collectively” (Raines, 2000; Asheim 2001). It is a kind of a strong and efficient state society interaction, which is also reflected in the work of (Cooke and Morgan, 1998). This approach has become popular due to acknowledgement of the high effectiveness of collective forms of public action in terms of implementing and developing cluster-related programmes, such as public-private cluster initiatives.
- f. **Multi-level governance** – an approach developed by Borrás (2008, p. 1) herself, in which cluster policy is “associated with public action and involves all series of public and semi-public actions”. This concept reflects a kind of inter-governmental and cross-level dimension to public action. In order to better understand the targets, objectives and tools of the policy the author provides the reader with answers to the following policy related questions:
  - Object (what?) - cluster policy is a set of direct and indirect initiatives for enhancing cluster capabilities and adaptability;
  - Subject (who?) - policy is not confined to the activities of public authorities, but includes those activities designed and carried out by semi-public and/or private actors as well;
  - Tools (how?) - specific instruments used by public and semi-public actors to reach the objectives of the cluster.

In this paper we adopt the following broad vision of cluster policy: ***all governmental actions in collaboration with other public and private institutions, which are targeted towards cluster formation and/or development and efficiency strengthening***. This basically correlates with the cluster policy definitions of Raines (2000), Asheim (2001) and Fromhold-Eisebith and Eisebith (2005). Moreover, following Benner (2012, p. 85), no matter what is seen or understood by cluster policy, the key is to understand the differences with other existing policy approaches. This distinction lies in the main targets of the cluster policy, which is not oriented exclusively towards the development of any specific firm or industry, but rather towards the whole value chain of activities in which it is constituent.

It is also important to clarify the reasons for government intervention. Understanding the rationales behind cluster policy helps to build a clear vision with respect to its goals and the required policy instruments. In this regard, referring to cluster policy as part of regional structural policy enables us to identify the following justifications for public actions (Bénassy-Quéré et al., 2010; Heimpold, 2011; Ketels, 2009; Andersson, 2004; IRE subgroup "Regional clustering and networking as innovation drivers", 2005):

1. **Allocation argument.** This primary builds on microeconomic concepts of market failure, namely when specific conditions restrict the ability of normal market process to lead to optimal outcomes from an overall welfare

perspective (Sharp, 1997; Ketels et al., 2012; Folmer, 1986). Possible forces behind a reduction of market efficiency are:

- a. Lack of perfect competition, which is reflected in the existence of monopolies or collusion between firms, in turn leading to pricing and resource allocation that diverges from the social optimum;
  - b. The existence of positive or negative externalities such that the private costs/benefits of activities do not accurately reflect the costs/benefits to society, leading to underrepresentation of certain activities and a sub-optimal social allocation of resources;
  - c. Information asymmetries, which create uncertainty and distort the ability of agents to make optimum decisions;
  - d. Incomplete markets, under which the absence of all possible transactions at all existing levels can lead to the distortion of market equilibrium and reduce social benefits.
2. **Stabilization argument.** In contrast to the allocation argument, this has a short-term influence on market equilibrium and provides a weaker support for intervention due to differences among experts' opinions. It is rooted in the arguments of Keynes (1936) (Bénassy-Quéré et al., 2010) regarding:
- a. The "animal spirit" notion of human nature, which materializes in "spontaneous expectations leading to excessive optimism followed by the excess of pessimism" (Keynes, 1936, cited in Bénassy-Quéré et al., 2010, p. 30), thus causing instability in behavior of private actors;
  - b. The nominal rigidity of wages and prices, which hinder markets self-correcting mechanisms and herewith prevent the economy from being at or returning to equilibrium.
3. **Redistribution argument.** This rests on the concept of social justice rather than market inefficiency (given that Pareto-optimum can't guarantee the equitable distribution), and can be partially attributed to the political and legislative roles and responsibilities of the state. It refers to the goal of equality or the right of inhabitants to have more or less equal opportunities to reach a desired level of welfare.

With regards cluster policy it is market failures under the allocation argument that are typically used to justify intervention, particularly with respect to the existence of externalities and spillovers pertaining to agglomeration (Glaeser *et al*, 1992; Audretsch and Feldman, 1996; Greunz, 2004; Spencer *et al.*, 2009). However the last two decades have seen the rise of complementary 'evolutionary' rationales for policy intervention that are particularly appropriate for cluster policy. These perspectives question the linearity of knowledge generation implied by neoclassical approaches and justify intervention as a response to system problems that inhibit innovation (Edquist, 2001, 2008; Laranja *et al.*, 2008; Smith, 2000). Laranja *et al.*, for example, identify three groups of **systemic problems**: network failures; institutional failures; and lock-in failures. Each of these bears strong relation to the theoretical rationales underlying the cluster concept and alongside market failures are typically used to justify cluster policy.

Regardless of the justification for policy by theoretical rationale, the expected benefits must be weighed against the effects of possible **government failure** (Andersson, 2004; Hospers, 2002; Kiese, 2008; Ketels, 2009; Meyer-Stamer and Harmes-Liedtke, 2005). Indeed, due to lack of experience or resources government actions can have the effect of further inhibiting innovation and damaging competitiveness. Thus the rationale for government involvement is only one element of justification, and more important is their ability to undertake interventions that respond effectively to the specific needs of

the cluster actors based on those rationales (Ketels et al. 2012). This highlights important distinctions between policies that are top-down, bottom-up or mixed (OECD, 2007) and between different types of policy that are likely to be more or less appropriate depending on the nature of the identified problems. In this regard Andersson (2004) distinguishes between the following types of cluster policies:

- Broker policies: measures to develop a framework of consultation and cooperation between businesses, the public sector and NGOs;
- Demand side policies: measures by which the public authority encourages new ideas and innovative solutions. The public authority's own expenditure in the region is important, even though tendering procedures are subject to regulation;
- Training policies: improving skills and competences that are essential for effective clustering of SMEs;
- Measures for special promotion of international linkages: removing trade barriers and strengthening the transport and communication systems, combined with equalization of rules and regulations;
- Framework conditions: the preconditions that influence the success of clusters and innovation, such as macro-economic stability, properly functioning product markets and factor markets, a good educational system and physical institutional and legal infrastructure.

Along with Andersson (2004) Brenner and Schlump (2011) also divides cluster policies in similar categories – education, public research, supporting R&D and innovation culture, support of start-ups, network organisation and cooperation, infrastructure and local conditions - thus stressing the need to adapt them depending on the stage of the cluster life-cycle (Maskell, Kebir 2005). Empirical cases show that the application of specified activities can not only assist clusters in their development, but even help to escape the lock-in resulted by downfall of the core sector (Elola *et al.*, 2012).

A further key feature of debates around cluster policy is the significance of so-called 'cluster initiatives' (World Bank, 2009). These are a kind of a mediator/enhancer in clustering processes, defined by Sölvell *et al.* (2003, p. 9) as "an organized effort to increase growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community". Cluster initiatives can take a variety of forms; government led, business-sector led, research-sector led, formalized as their own 'associations', or as programs within broader organizations responsible for regional development, etc.. While there is an absence of a general study of worldwide cluster initiatives, Sölvell *et al.* (2003, pp. 10–11) have identified some main characteristics of European cluster initiatives:

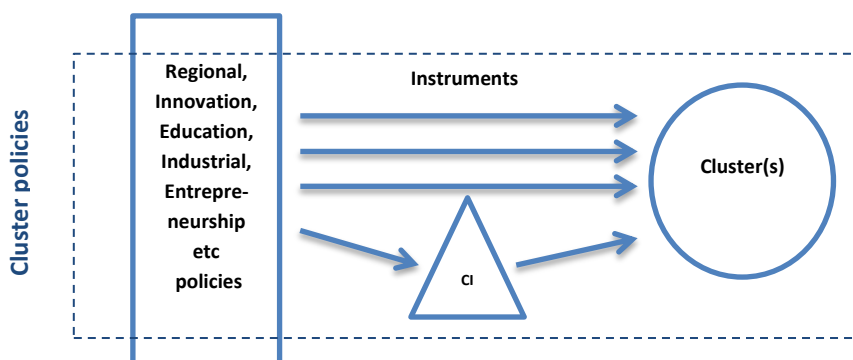
- depending on the nature of cluster, actors have their own unique objectives and narrow geographical focus
- initiation is 32% by government; 27% by business; 35% equally by both
- financing is 54% from government; 18% from industry; 25% equally and changes over time, usually with public reduction over time
- they tend to have a facilitator and a physical office
- they are often initiated by a single "clusterpreneur"
- they typically take around 3 years to build

The majority of cluster initiatives have very similar tasks or activities, which primarily center on such issues as strengthening cooperation and common vision among actors working in related economic activities. Again following Sölvell *et al.*'s (2003, pp. 15–16) European study, main activities typically include:

- building shared ideas among members
- a long term agenda to improve competitiveness of clusters (not each firm in particular)
- improving networking, trust-building, and enhancing dialog
- caring for a balanced input of resources from government and industry
- searching for a mix between small and large enterprises among members
- stimulating partnership across the triple helix of business, government and research

While cluster initiatives are an important feature of the cluster policy scenario, particularly in Europe, such institutionalized forms are not necessary for clusters to emerge and develop. Indeed in many places with sufficient environmental conditions they are not a feature of strong clustering processes (for example, Silicon Valley). We can interpret cluster (CI) initiatives therefore as a type of (public, private or mixed) policy instrument, that in practice is likely to exist alongside other types of policy instruments oriented towards strengthening clusters (see Graph 3).

Graph 3 Positioning cluster initiatives within cluster policies



Source: Own elaboration

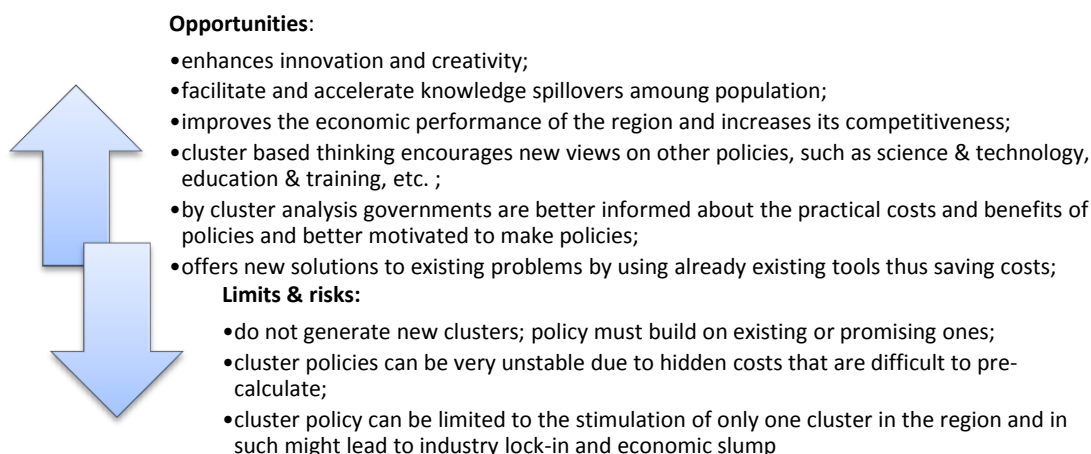
However no matter whether clustering processes are conducted in institutionalized or non-institutionalized form there are certain key things that governments need to be aware of when deciding whether and how to support clusters. Firstly, that clusters are a kind of an innate environment-based process, meaning that actions should be directed at providing the conditions for stimulating their development, and not just at the clusters directly. Secondly, that to employ instruments effectively it is critical to detect the types of failures or problems that are limiting the clusters' evolution. Finally, that each cluster is unique and exists within unique territorial, cultural, historical and institutional contexts, implying that policy actions themselves should be uniquely tailored.

More generally cluster policy, as any type of policy, has its own mix of benefits and costs, some of which are collected in Graph 4 (Genosko, 2006; Porter, 1998; Karlsson, 2007). Perhaps the main advantage is that it often doesn't require the implementation of something absolutely new. Rather, it can be a new way of organizing strands of existing policies. With few extra resources it can therefore generate the further development of externalities, whose effects can be high in comparison

to other policy options (Ketels *et al.*, 2012). Furthermore, the development of clusters works alongside and strengthens existing competitive market conditions, labelled “hyperdynamic competition” by Bieger *et al.* (2006). In these conditions companies are looking for a location that can offer the possibility to adapt fast and effectively to different changes, to access and upgrade their learning capacities, and to enhance their innovativeness and development possibilities. Cluster policy can therefore provide a complementary focus to other national/regional policies oriented towards generating these conditions.

Summing up, today cluster policies are generally seen as an effective tool for strengthening regional competitiveness and innovation, although there is considerable heterogeneity in the specific forms that cluster policy takes in different places. The main question is not therefore whether or not to apply cluster policy of some form, but rather how to develop a successful and effective cluster policy that fits the specific context. While many regions have started to apply cluster policies, there is variation in their results. This has led to an extensive search for the decisive triggers in existing clusters policies, which influence the success level of the policy outcomes. In order to understand these key elements both normative and positive approaches are being applied. Our aim in the next section is to develop a practical framework for comparative cluster policy analysis that will facilitate a more nuanced understanding of these issues and contribute to improving the application of cluster policy.

#### Graph 4 Advantages and disadvantages of cluster policy application



*Source: Authors' interpretation based on Genosko, 2006; Porter, 1998; Karlsson, 2007*

### 3. Defining key factors for successful cluster policy

The aforementioned importance of context in cluster policy development highlights the need for tailored policies as opposed to following a ‘blind-copy’ approach from other locations. This uniqueness on a case by case basis suggests that the search for a ‘perfect cluster policy’ is elusive. Moreover, it presents significant challenges for researchers interested in determining the triggers for successful cluster policies and providing policy makers with valuable recommendations. In particular there is a need to conduct comparative policy studies. This research method has a rich history and has grown to be very popular due to its significance in enriching existing knowledge on diverse elements of (public) policies (Rihoux and Ragin, 2009; Hammond and Wellington, 2013). Through the application of this approach to the cluster policy field the aim is to answer two main

questions: i) **how** are the policies different or similar; and ii) **why** are they different or similar? Answers to these questions across a range of cluster policies would contribute to enhancing our understanding around key success factors. A first step, however, is the development of an analytical framework that reflects the binding elements or features for comparison across policies.

At first in developing such a framework the conduct of an extensive literature review on cluster policy was needed. While getting acquainted with existing empirical and theoretical works an interesting feature was identified. Despite time or regional differences researchers have been partially giving some similar policy recommendations. This pattern led to the idea of gathering together and combining these similar recommendations in one scheme. In such a way it would be possible to offer a framework which, in contrast to creating a comparative structure based on the benchmark of some ‘perfect cluster policy’, would highlight key factors or triggers that appear to be important for the successful outcome of cluster policies. The advantage of such an approach is its ability to offer decisive factors for successful policy outcome despite time and location differences. Reflecting key factors in this way offers a comprehensive and precise look at existing recommendations and makes it possible to examine what distinguishes effective from non-effective policies rather than searching for the elusive ‘perfect’ one.

### *3.1 Determining the phases of cluster policy*

After defining the vision for building this framework a way of grouping key success factors needed to be determined. The creation and development of cluster policy is not a static moment, but rather a process formed of different stages. It was therefore decided to group identified key factors with regard to the phase of the policy process. Assigning key factors to different stages of the policy process gives a coherent view on these decisive elements, as the presence/absence of some factors at particular steps can strongly determine the policy outcome. Furthermore it corresponds well to the nature of the policy life-form and in all offers a structured approach for policy development for the target audience.

In terms of definition of the phases of the cluster policy process, a review of the main papers and studies (see Table 2) highlights some differences in the typologies employed. Cluster policy phases show strong similarities with public policies in general, containing different variations of Rist’s (1994) three key stages of formulation, implementation and accountability. However it is important to account for the distinctions that emerge in the cluster policy literature in presenting as nuanced as possible a representation of the commonly addressed stages. To this end we have developed the scheme presented in Graph 5 to reflect the main common and distinct features of typologies of cluster policy stages. Some stages are grouped together, as in the case of the “getting started” phase, as no radical differences were seen across typologies. However in other cases, where deviations were significant, these are expressly mentioned.

**Table 2 Different typologies of phases included in (cluster) policy process**

Policy	Researcher	Phases of cluster policy
Public	Hogwood (1987, cited in Raines, 2001)	<ol style="list-style-type: none"> <li>1. Analytical</li> <li>2. Development</li> <li>3. Implementation</li> <li>4. Evaluation</li> </ol>
	Hogwood and Gunn’s model of the policy process cited in Tansey and Jackson (2008)	<ol style="list-style-type: none"> <li>1. Deciding to decide (issue search or agenda setting)</li> <li>2. Deciding how to decide</li> <li>3. Issue definition</li> </ol>

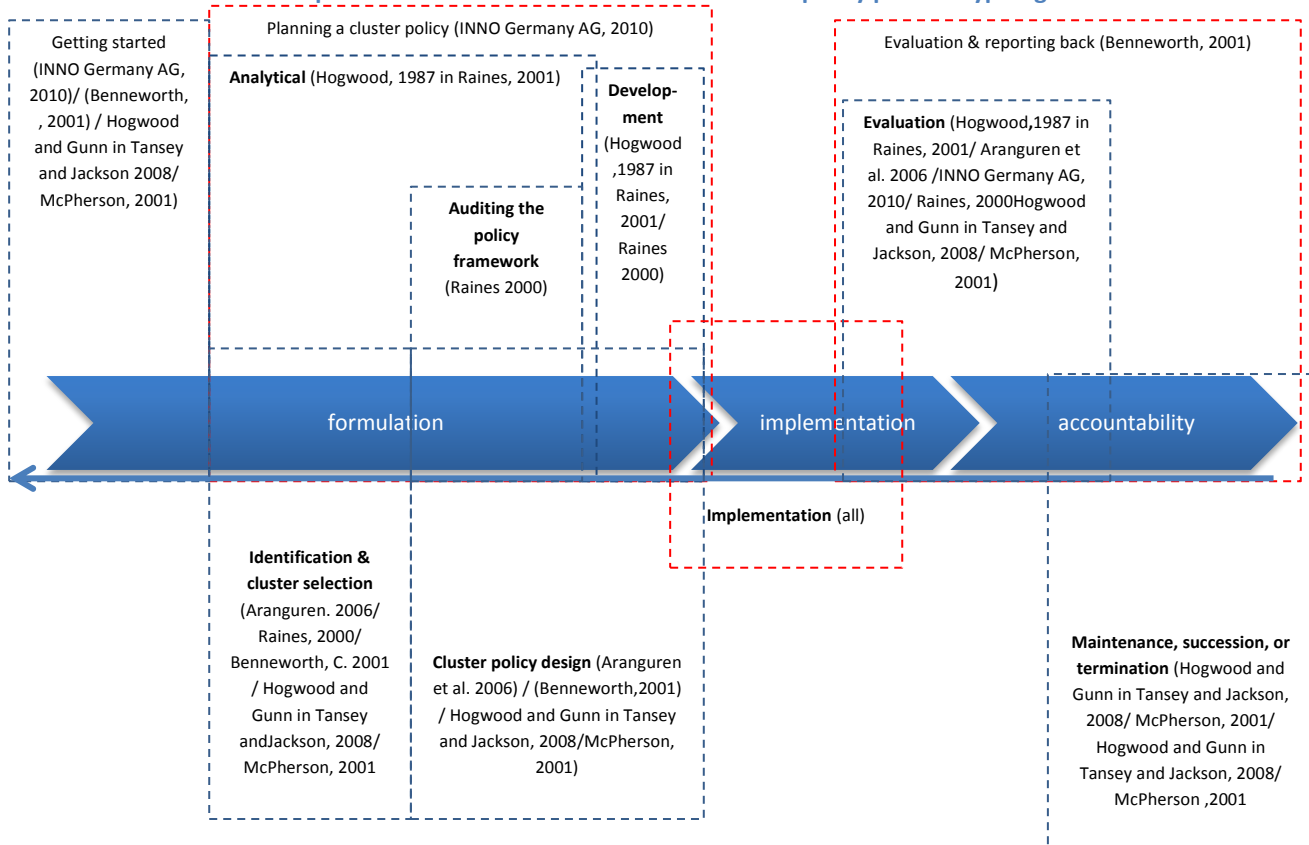


Policy	Researcher	Phases of cluster policy
		<ol style="list-style-type: none"> <li>4. Forecasting</li> <li>5. Setting objectives and priorities</li> <li>6. Options analysis</li> <li>7. Policy implementation, monitoring and control</li> <li>8. Evaluation and review</li> <li>9. Policy maintenance, succession, or termination</li> </ol>
	<b>Rist (1994)</b>	<ol style="list-style-type: none"> <li>1. Policy formulation,</li> <li>2. Policy implementation,</li> <li>3. Policy accountability</li> </ol>
Cluster	<b>Raines (2000)</b>	<ol style="list-style-type: none"> <li>1. Auditing regional economy <ol style="list-style-type: none"> <li>a. Cluster identification</li> <li>b. Cluster selections</li> </ol> </li> <li>2. Auditing the policy framework</li> <li>3. Developing a cluster-based policy <ol style="list-style-type: none"> <li>a. Making the policy=Articulating the policy itself</li> <li>b. Getting commitment=“Selling”</li> <li>c. Changing the policy=Set mechanism for revising cluster policy</li> </ol> </li> <li>4. Implementing a cluster-based policy <ol style="list-style-type: none"> <li>a. overall control (management of cluster policy)</li> <li>b. individual programme coordination</li> <li>c. project management</li> </ol> </li> <li>5. Monitoring and evaluation</li> </ol>
	<b>McPherson (2001)</b>	<ol style="list-style-type: none"> <li>1. Determine the overall goals and the scope of the policy initiative.</li> <li>2. Initiate discussion on the cluster development process</li> <li>3. Identify and map existing clusters and location-specific attributes in the economy.</li> <li>4. Strategic prioritization of efforts by clusters.</li> <li>5. Clarify the roles of the relevant public, private, and support entities with respect to the individual clusters</li> <li>6. Collect detailed information on each cluster</li> <li>7. Engage key groups and individuals to lead and drive the process</li> <li>8. Assess and plan direction and targets</li> <li>9. Co-ordinate the public and private activities including investment/co-investment in public goods</li> <li>10. Establish an appropriate cluster organization to oversee the process.</li> <li>11. Market and disseminate information about the cluster and the locational advantages it offers.</li> <li>12. Continuous evaluation of both the individual cluster and the national policy</li> <li>13. Decide whether to terminate or institutionalize mechanisms that have been successful.</li> </ol>
	<b>Benneworth (2001)</b>	<ol style="list-style-type: none"> <li>1. Decision to use a cluster policy approach</li> <li>2. Determination of the state role - debate on the state role in the approach has to be debated</li> <li>3. Selection and designation of clusters</li> <li>4. Strategy formulation (Policy tool kit decisions)</li> <li>5. Programme delivery (Policy tools for clustering)</li> <li>6. Implementing clusters</li> <li>7. Evaluation &amp; reporting back - learning of the lessons and possibilities for subsequent policy phases</li> </ol>
	<b>Aranguren et al. (2006)</b>	<ol style="list-style-type: none"> <li>1. Identification and selection of clusters</li> <li>2. Cluster policy design</li> <li>3. Cluster policy implementation</li> <li>4. Cluster policy evaluation</li> </ol>
	<b>INNO Germany AG (2010)</b>	<ol style="list-style-type: none"> <li>1. Getting started</li> <li>2. Planning a cluster policy <ol style="list-style-type: none"> <li>2.1. Assessing the existence of clusters</li> <li>2.2. Characterizing the cluster (cluster)</li> <li>2.3. Assessing a cluster market position (cluster)</li> <li>2.4. Assessing the need for cluster policy (policy development)</li> <li>2.5. Assessing the appropriate policy-mix (policy development)</li> </ol> </li> </ol>

Policy	Researcher	Phases of cluster policy
		3. Implementing cluster policy 3.1. Set up cluster programme 3.2. Set up cluster agencies 3.3. Selection and setting up cluster initiatives (fostering cluster initiatives) 3.4. Defining proper financial amount 4. Evaluation of cluster policy

*Source: Authors' interpretation based on the mentioned literature sources*

**Graph 5 Similarities and distinction of different policy process typologies**



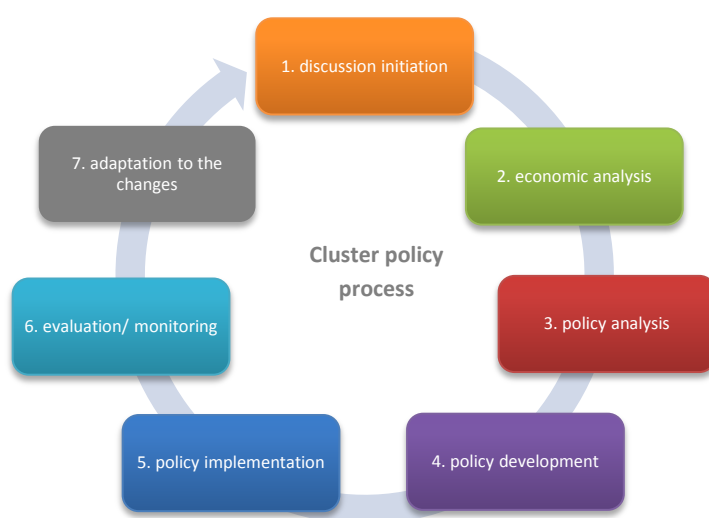
*Source: Author's interpretation based on the reviewed sources*

The scheme in Graph 5 allows us to see clearly the commonly-analysed steps in the cluster policy process, which intersect, distinguish or repeat among the previously listed typologies. The biggest similarity in studied approaches occurs in the 'implementation' stage. Further similarities, with one major deviation, arose in the final 'accountability' phase of the policy process. Here there is general acceptance of the necessity for the monitoring/evaluation step, including policy adaptation, but in some cases researchers emphasized the necessity for their explicit division in two. The biggest differences across typologies were observed in the steps required before the implementation of the policy. The unification of several more discrete steps under "cluster policy planning" is controversial. In large part this is because the formulation of cluster policy is far from a linear process, making a clear separation of steps especially difficult in this phase. Several key distinctions were identified in the literature, namely the existence of a phase of economic and cluster analysis and a further division into review of the old policies and development of the new one. In some cases the last two were also be grouped under one, e.g. "cluster policy design". Finally, the first stage, labelled "getting started" and based on INNO Germany AG (2010), Benneworth

and Charles (2001) and Hogwood and Gunn's model of the policy process (cited in Tansey and Jackson, 2008), was also explicitly highlighted several times. This step is often left out of analysis of the policy process, but the above indicated sources show that it can often play a determining role for the successful outcome of the policy.

After reviewing the main typologies of the cluster policy process and considering their similarities and differences, we propose the definition of seven cluster policy phases on which to base the development of an analytical framework for comparative policy analysis. These are: 1) discussion initiation; 2) economic analysis; 3) policy analysis; 4) policy development; 5) policy implementation; 6) evaluation / monitoring; and 7) adaptation to change. They are set out in graphical form in Graph 6.

**Graph 6 Defined phases of cluster policy**



*Source: Author's interpretation*

The first stage of 'discussion initiation' refers to idea that at the very beginning of the policy process the idea of the policy has to be brought to the table among different stakeholders. The conversation might include the explanation of the main ideas behind the policy, the goals, actions, outcomes, advantages and disadvantages. Moreover, the reasons for starting the discussion can have different origins – economic slowdown, mandate from higher administrative levels, international popularity of the concept, etc. – and depending on the administrative structure, division between authorities and grade of civil participation, the actor first bringing up the topic and form of discussion can vary widely.

The second and third stages of the cluster policy process are analytical. Stage two concerns analysis of the economy as a whole, and existing/nascent clusters in particular. Again the approaches taken to conduct the studies identify the clusters, and highlight current gaps can be diverse depending on regional structure, financial resources and existing knowledge. This step provides policy-makers with a solid information base for further stages of the policy process. In such a way the time period for this phase can last from several months to years depending on the complexity of the collected information. Stage three – 'policy analysis' – is conceptually very similar. Here policy makers are reviewing existing policies and trying to determine in what ways they stimulate/hinder defined regional opportunities and strengths or are closing existing gaps. The review of the existing policies can also take quite a long time because regional economic development and clusters can be linked to multiple instruments and programmes in a scenario of policy complexity (Magro and Wilson, 2013).

The 'policy development' stage is the most saturated in the policy process. At this point the actors are building the foundations for the further actions intended to improve the economic environment, enhance clustering processes and stimulate economic growth. Different actors from research institutions to companies are likely to take part in this development, although much of the burden and the final say typically rest with the government authority responsible for public policy within the region. This phase of policy development materialises in concrete programmes, activities, task division among actors and actions at the 'policy implementation' stage. Here the responsibilities are typically divided among different actors, although again the number of actors and the implementation mechanisms (policy instruments) vary strongly depending on regional context, financial resources, organizational structures, etc..

The final two stages refer to 'monitoring and evaluation' and 'adaptation to changes'. These appear after the implementation phase, but in practice many of the associated actions are set down in previous phases and are already in process by this point. It should be mentioned, however, that while different types of evaluation (ex-ante, ex-post, ...) and ongoing adaptation to change can take place at any time in the policy process, monitoring typically happens during and after the implementation stage. The main idea of monitoring and evaluation is to analyse, understand and learn whether the planned actions are working or going to work in order to achieve policy outcomes. The main aim of adaptation to changes is to be responsive to the results of these learning processes, and to general politico-economic changes, and introduce alterations to the policy where needed.

Finally, it should be emphasized that all stages are considered equally significant and important for the successful policy outcome. Herewith, the exclusion of one might result in a reduction in policy efficiency.

### *3.2 Identifying key success factors for cluster policy*

Having set out a set of policy phases, the next step is to identify and group those key factors at each phase that are associated with the successful outcomes of cluster policy. To do this we have conducted a thorough literature review of existing cluster policy recommendations. The key success factors were mainly gathered from empirical (and in some cases theoretical) literature around cluster policy written published over the last 20 years. The search was done using mainly virtual publication databases such as IDEAS (<http://ideas.repec.org/>), ECONBIZ (<http://www.econbiz.de/>) and the European Cluster Observatory (<http://www.clusterobservatory.eu/>). Different points of view concerning the factors considered as decisive for successful cluster policy were identified and listed, repetitions were noted, and the factors were then grouped into corresponding cluster policy stages.

The results of this work are presented in Table 3, which consists of three columns: the first specifies the phase of the policy process; the second details the key success factors identified; and the last one lists the sources where these success factors were found. During the course of the literature review some factors were seen as exclusively generally important, making it impossible to sort them to only one stage. We therefore added a further process category that refers the policy process as a whole. Despite the clarity of the key elements presented in Table 3, the process of their grouping can be considered as quite complicated and ambiguous, especially due to occasional blurriness of authors' attitudes towards factor characteristics and position in policy. Thus there is an element of subjectivity and we recognize that there may be some inconsistencies or omissions of factors. Nevertheless, we suggest that this systematic exercise reflects the major results presented in the

principal sources on cluster policy analysis and thus can be justified to be used as a basis for developing an analytical framework for comparative policy studies.

**Table 3 Key factors of the successful cluster policy with the source reference**

Policy Phase	Success elements	Authors
<b>1. Discussion Initiation</b>	Established forum/ network for communication between all affected actors	IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Andersson 2004; Christensen et al. 2011; Ketels 2009; Rosenfeld 2002a; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
	Awareness of the cluster issue and its potential advantages/disadvantages for the region between main regional participants	Andersson 2004; Brenner 2003; Wolfe 2008; Sölvell 2008
	Trust building	Andersson 2004; Rosenfeld 2002b; Cluster Navigators Ltd. 2001
	Existence of previously adopted "trendy" policy	Benneworth, Charles 2001
<b>2. Economic analysis</b>	Organized group for managing economy & clusters analyzes	Aranguren et al. 2006; Andersson 2004; Benner 2012b; Cluster Navigators Ltd. 2001
	In-depth cluster-based analysis for evaluation & understanding of current situation and perspectives of regional economy	Raines 2000; Aranguren et al. 2006; Brown 2000; Benner 2012a; Rosenfeld 2002b; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Application of a variety of methods for cluster analysis, emphasizing the combination of qualitative and quantitative approaches	Raines 2000; Andersson 2004; Benner 2012a; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001
	Clear understanding of main principles and advantages of a cluster-based approach to analysis	Raines 2000; Andersson 2004; Benner 2012a
	Clusters have been chosen from existing or promising ones	Aranguren et al. 2006; Ketels et al. 2012; Andersson 2004; Porter 1998a; Council of competitiveness website, p.4, <a href="http://www.compete.org/nri/clusters_innovation.asp">www.compete.org/nri/clusters_innovation.asp</a> ; Christensen et al. 2011; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Karlsson 2007
	Choice of clusters is based on unique regional characteristics	Raines 2000; Aranguren et al. 2006; DTI (Department of Trade and Industry) 2001; Benneworth, Charles 2001; Europe INNOVA 2008; Ketels et al. 2012; The High Level Advisory Group on Clusters 2006; Brown 2000; Andersson 2004; Benner 2012a; Porter 1998a; Kleinhardt-FGI Corporate Advisors 2002; Ketels 2009; Brenner 2003; Martin, Sunley 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Chosen clusters (their sectorial orientation) overlap and have good market connections	Raines 2000; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; The High Level Advisory Group on Clusters 2006; Christensen et al. 2011; Ketels 2009; Brenner 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001
	Choice of clusters is done based on the opinions of internal and/or external expert analysis, actors within clusters and then combined with instincts of policy makers	Raines 2000; Andersson 2004; Brenner 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
	Political fairness and publicity in choosing clusters	Raines 2000; Benneworth, Charles 2001; Ketels 2008; Andersson 2004; Benner 2012a; Brenner 2003; Meyer-Stamer, Harmes-Liedtke 2005
	Selected clusters fit in with existing policy priorities	Raines 2000; Andersson 2004; Christensen et al. 2011; Wolfe 2008
	Chosen clusters have consensus within public and private sector actors	Raines 2000; Europe INNOVA 2008; IRE subgroup "Regional clustering and networking as innovation

Policy Phase	Success elements	Authors
		drivers" 2005; Andersson 2004; Brenner 2003; Meyer-Stamer, Harmes-Liedtke 2005
<b>3. Policy analysis</b>	Cluster policy developers demonstrate competence through existing policies	Raines 2000; Aranguren et al. 2006; Benneworth, Charles 2001; The High Level Advisory Group on Clusters 2006; Christensen et al. 2011; Rosenfeld 2002b; Brenner, Fornahl 2003; Wolfe 2008
	Strong engagement of private sector in review of the existing policy	Raines 2000; Aranguren et al. 2006; Christensen et al. 2011; Cluster Navigators Ltd. 2001; Wolfe 2008
	External organizations participate in the policy analyzes & development	Brown 2000; Christensen et al. 2011; Rosenfeld 2002a
	Understanding & defining key reasons/rationales for the choice of using cluster policy	Raines 2000; Ketels 2008; Andersson 2004; Martin, Sunley 2003; Wolfe 2008
	Strong commitment to the cluster concept by key actors	Raines 2000; Andersson 2004; Cluster Navigators Ltd. 2001; Wolfe 2008
<b>4. Policy development</b>	Cluster policy has a clear defined strategy & vision	Andersson 2004; Benner 2012b; Ketels 2009; Rosenfeld 2002b; Martin, Sunley 2003; Wolfe 2008
	Cluster policy is directed toward more than one cluster	Ketels et al. 2012; Andersson 2004; Genosko 2006; Christensen et al. 2011; Wolfe 2008
	Cluster policy aims at creating spill-overs &/or developing networking, agglomerations, reducing market failures and enhancing fair competition	Raines 2000; Aranguren et al. 2006; Ketels et al. 2012; Ketels 2008; Andersson 2004; Benner 2012a; The High Level Advisory Group on Clusters 2006; Council of competitiveness website, p.4, <a href="http://www.compete.org/nri/clusters_innovation.asp">www.compete.org/nri/clusters_innovation.asp</a> Kleinhardt-FGI Corporate Advisors 2002; Christensen et al. 2011; Brenner, Fornahl 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
	Cluster policy highly considers the peculiarities of clusters (especially their evolution stage) and the region	Raines 2000; Aranguren et al. 2006; DTI (Department of Trade and Industry) 2001; Benneworth, Charles 2001; Europe INNOVA 2008; Ketels 2008; The High Level Advisory Group on Clusters 2006; Brown 2000; Andersson 2004; Benner 2012a; Porter 1998a; Kleinhardt-FGI Corporate Advisors 2002; Ketels 2009; Rosenfeld 2002a; Fornahl, Brenner 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Karlsson 2007; Brenner and Schlump 2011
	Cluster policy fits (political resources) in within existing responsibilities and powers of the regional policy making authorities	Raines 2000; Andersson 2004; Christensen et al. 2011; Fornahl, Brenner 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Ultimate goal of cluster policy is strengthening regional competitiveness	Ketels et al. 2012; Porter 1998a; Christensen et al. 2011; Cluster Navigators Ltd. 2001; Wolfe 2008
	There is a good mix of existing other policies, which also address clustering & stimulate the development of business environment in general	Raines 2000; The High Level Advisory Group on Clusters 2006; Aranguren et al. 2006; Benneworth, Charles 2001; Ketels et al. 2012; Brown 2000; Andersson 2004; Europe INNOVA 2008; Porter 1998a; Ketels 2009; Brenner 2003; Martin, Sunley 2003; Wolfe 2008; Sölvell 2008
	Engagement in cluster policy appears at different administrative levels	Raines 2000; The High Level Advisory Group on Clusters 2006; Brenner 2003; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Policy makers realize the advantages of the concept and are willing to adopt the change	Benneworth, Charles 2001; Brown 2000; Benner 2012a; Cluster Navigators Ltd. 2001; Wolfe 2008
	Development of cluster policy is conducted in dialog between different affected actors	Raines 2000; Europe INNOVA 2008; Ketels 2008; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Brown 2000; Andersson 2004; Christensen et al. 2011; Ketels 2009; Brenner 2003; Cluster Navigators Ltd. 2001; Wolfe 2008

Policy Phase	Success elements	Authors
<b>5. Policy implementation</b>	Implementation is done by efficiently using/combining already developed programmes and institutions	Raines 2000; Ketels et al. 2012; IRE subgroup Regional clustering and networking as innovation drivers; Ketels 2009; Brenner, Fornahl 2003; Wolfe 2008; Sölvell 2008
	Understanding the reasoning for cluster policy	Raines 2000; Ketels et al. 2012; Andersson 2004; Benner 2012a; Brenner 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Following aspects of cluster are highly taken into consideration: a. Spatial proximity; b. Critical mass (number of actors); c. Cluster life-cycle; d. Nature of cluster actors; e. Dynamics and linkages within the cluster: Connection between cluster actors, Mutual trust, Common vision and strategy, Institutionalization, Balance between cooperation and competition	Raines 2000; DTI (Department of Trade and Industry) 2001; Aranguren et al. 2006; Benneworth, Charles 2001; Ketels et al. 2012; Ketels 2009; Brown 2000; Christensen et al. 2011; Ketels 2009; Rosenfeld 2002b; Martin, Sunley 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
	Methodological indicators for evaluation has been defined and are collected during the implementation by affected actors	Raines 2000; Andersson 2004; Cluster Navigators Ltd. 2001; Sölvell 2008
	Early action	IRE subgroup Regional clustering and networking as innovation drivers; Ketels 2009; Cluster Navigators Ltd. 2001
	Multilevel cooperation	IRE subgroup Regional clustering and networking as innovation drivers; Andersson 2004; Brenner, Fornahl 2003; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Existence of leader or leading organization	Benneworth, Charles 2001; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Andersson 2004; Christensen et al. 2011; Cluster Navigators Ltd. 2001
	Implementation is institutionalized in a form like a cluster initiative, whose aim is to increase the clusters competitiveness	Raines 2000; DTI (Department of Trade and Industry) 2001; Ketels et al. 2012; Europe INNOVA 2008; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; The High Level Advisory Group on Clusters 2006; Brown 2000; Andersson 2004; Christensen et al. 2011; Ketels 2009; Rosenfeld 2002a; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Cluster organization has a clear & sizable vision for the participants	Ketels et al. 2006; IRE subgroup Regional clustering and networking as innovation drivers; Andersson 2004; Christensen et al. 2011; Rosenfeld 2002a; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Timeframe of the funding is formulated	Raines 2000; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Meyer-Stamer, Harmes-Liedtke 2005
	Clusters are primarily supported by public money with constant reduction over time	Raines 2000; Europe INNOVA 2008; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001
	Cluster initiatives are led by representatives from industry	Raines 2000; Ketels et al. 2012; Nauwelaers, Wintjes 2008; Ketels et al. 2006; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; The High Level Advisory Group on Clusters 2006; Andersson 2004; Cluster Navigators Ltd. 2001; Wolfe 2008
	Cluster management has highly qualified personal with multiple competences and very strong motivation	Raines 2000; Ketels et al. 2012; Christensen et al. 2011; Rosenfeld 2002b; Martin, Sunley 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Sölvell 2008
	Cluster participants are motivated & interested to participate	Raines 2000; DTI (Department of Trade and Industry) 2001; Aranguren et al. 2006; Europe INNOVA 2008; Ketels et al. 2006; Andersson 2004; Rosenfeld 2002b; Brenner, Fornahl 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008



Policy Phase	Success elements	Authors
<b>6. Monitoring &amp; evaluation</b>	Evaluation is an integral part of the cluster policy	Raines 2000; Ketels et al. 2006; Andersson 2004; Cluster Navigators Ltd. 2001
	Evaluation has clear idea about the results that must be reached	Raines 2000; Andersson 2004; Meyer-Stamer, Harmes-Liedtke 2005; Sölvell 2008
	Key stakeholders are involved in the evaluation process	Raines 2000; Andersson 2004
	Evaluation has a long-term perspective	Benneworth, Charles 2001; Andersson 2004
	Policy makers have developed a balanced range of methodological approaches to be used for cluster evaluation	Raines 2000; Andersson 2004; Meyer-Stamer, Harmes-Liedtke 2005
	Control indicators are formulated	Ketels 2008; Andersson 2004
	The results increase the awareness of the cluster situation and policy approach	Andersson 2004; Meyer-Stamer, Harmes-Liedtke 2005; Sölvell 2008
<b>7. Policy modification</b>	Lessons driven from the evaluation are considered and integrated in cluster policy	Benneworth, Charles 2001; Meyer-Stamer, Harmes-Liedtke 2005; Sölvell 2008
	New assessments are explained and understandable, and correlate with participants needs	Benneworth, Charles 2001
<b>For the whole process</b>	Political support	IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Andersson 2004; Rosenfeld 2002b; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008; Sölvell 2008
	Presence of strong regional government/authority	Ketels et al. 2012; Andersson 2004
	Political stability	Raines 2000; Andersson 2004
	Participation of all actors from the triple helix: companies, research institutions and policy actors	Raines 2000; Europe INNOVA 2008; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; The High Level Advisory Group on Clusters 2006; Rosenfeld 2002a; Fornahl, Brenner 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Wolfe 2008
	Long term commitment of actors & motivation	Raines 2000; Ketels et al. 2012; Europe INNOVA 2008; Ketels 2008; Christensen et al. 2011; Brenner 2003; Cluster Navigators Ltd. 2001; Wolfe 2008
	Collaboration & dialog	Ketels et al. 2012; Ketels 2008; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Andersson 2004; Rosenfeld 2002a; Brenner 2003; Martin, Sunley 2003; Meyer-Stamer, Harmes-Liedtke 2005; Wolfe 2008; Sölvell 2008
	Trust between actors (achievement & sustaining)	Europe INNOVA 2008; Ketels 2008; IRE subgroup "Regional clustering and networking as innovation drivers" 2005; Andersson 2004; Rosenfeld 2002a; Brenner 2003; Meyer-Stamer, Harmes-Liedtke 2005; Cluster Navigators Ltd. 2001; Sölvell 2008

*Source: Authors' interpretation based on the reviewed literature*

Several general trends have been identified while associating key success factors with phases of the policy process. The first concerns the diversity in the number of sources that can be attributed to different triggers. This gives an indication of their perceived relevance for the outcomes of cluster policy. The second concerns the unevenness in the dispersion of key success factors among phases. The explanations for this can be diverse, and are likely to include: the different amounts of time and resources dedicated to each phase in practice; the difference in scientific attention afforded to each stage; and the large regional or national diversity in effectively conducted actions in certain phases (e.g. economic analysis). A third general trend concerns the different levels of precision across factors. There are factors which can give an exact understanding of what should be done and how, while there are others that are open to different interpretations. The main reason behind this is the

spatial and regional differentiation among the studied cases or developed approaches. The meaning of ‘strong’, for example, in the key factor ‘presence of strong regional government/authority’ can deviate from place to place, whereas whether or not the ‘timeframe’ is formulated in the implementation phase is more precise to capture.

The results presented in table 3 form the basis for an analytical framework designed for application in comparative studies of regional cluster policies. The key factors, organized as such in phases, provide a valuable structure for comparing existing regional experiences and deepening learning around how they work in practice in different contexts. As a general assumption, the more key factors in place, the more likely a given policy will be successful or effective. Thus a first goal of comparative studies applying this framework is the definition of missing key factors in the process of each particular policy. The absence of some triggers can be explained by specific circumstances, and thus a subsequent research question is to find out possible causes for the revealed differences.

To reflect the main findings in a better visual overview of the identified key factors, a more structural scheme has been developed and is presented in Table 4. It is built up of three parts, reflecting key factors that were seen as: 1) **unique** for each particular stage of policy process; 2) **common for several stages** of policy process; and 3) **common for the whole process** of the policy. This synthesis highlights a number of further conclusions. Firstly it shows that all phases of cluster policy except ‘policy analysis’ have exclusive key triggers contributing to the successful outcome of the policy. Their exclusiveness indicates their decisiveness for the policy effectiveness as these key factors can’t be covered in any other policy stage. As such, the absence of these key factors, unique for particular phases, might result in a reduction of overall policy effectiveness.<sup>2</sup>

A similar grade of importance could also be attributed to the triggers that were revealed as significant for all policy stages. The necessity to be applied in all phases of policy process indicates that their overall exclusion could lead to the creation of a missing chain and thus brake or significantly reduce the effectiveness of the policy results. Herewith if some of the actors from the triple helix are not involved in one of the stages, e.g. monitoring & evaluation, it might reduce the integrity of achieved results and as such cause an information failure. This in its turn could lead to misinterpretation of findings and misleading changes in existing policy. It is also interesting that where triggers are present in several phases, they are frequently consecutive ones (e.g. engagement of external organization and experts, which is simultaneously presented in 3 phases, starting with “economic analysis”), again highlighting the importance of this continuity in certain success factors.

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<sup>2</sup> Although we should bear in mind that all of the gathered factors were equally treated despite the number of sources in which they were cited.

**Table 4 Key factors for the success of the cluster policy**

Key success factors/ Stages	1. discussion initiation	2. economic analysis	3. policy analysis	4. policy development	5. policy implementation	6. evaluation/ monitoring	7. adaptation to the changes
<b>A. Factors, which are unique for each policy stage</b>							
	Existence of previously adapted trendy policy	Existence of an organized group for managing analysis; Clusters are chosen from existing or promising ones; Chosen clusters overlap, have good market connections & consensus from private & public side; Political fairness and publicity by choosing clusters; Selected clusters fit in with existing policy priorities		Cluster policy measures consider each focused cluster evolution stage;; Ultimate goal of policy is strengthening competitiveness; Cluster policy is directed toward more than one cluster; Cluster policy fits within existing powers of the policy making authorities;	Existence of leader or leading organization; Timeframe of the funding is formulated; Clusters are primarily supported by public money with constant reduction over time; institutionalized; early action; peculiarities of each cluster(s) are taken in the consideration	The results increase the awareness of the cluster situation and policy approach; existence of control indicators	Lessons driven from the evaluation are considered and integrated
<b>B. Factors, which are common for several policy stages</b>							
Awareness on the cluster issue and its advantages/ disadvantages for the region							
Choice of cluster(s)/ policy is based on unique regional characteristics							
Engagement of an external organization/ experts							
Application of variety of research methods							
Clear understanding for chosen policy approach							
Strong participation of private sector							
Leading & developing personal is highly competent in region & cluster issues							
Multilevel cooperation & coordination							
Strategy & vision is clearly defined							
Good mix of existing policies & programmes is developed							
Measuring indicators are well defined and long-term integrated in the policy							
<b>C. Factors, which are common for the whole process</b>							
	long term commitment & motivation; establishment of network for communication; trust between actors; participation of all actors from triple helix; political stability & support; strong regional government						

Source: Authors' interpretation

#### 4. Summary and Conclusions

During the last two decades the importance of regions as drivers of national competitiveness has come to the fore, and yet paradoxically globalization and mobility have led to a sharpening of regional disparities. In the search for answers behind heterogeneous regional performance the role of agglomeration economies has emerged as a central theme. The additional advantages created outside of the company level, created in a special industrial atmosphere (Marshall, 1890), have been the focus of much attention. In particular, this attention has been channeled into the concept of clusters, which itself draws on multiple academic sources and lacks a unique theory. Analysis of clusters has correspondingly often been confusing, although their potential gains at the firm and territorial levels have been widely embraced by governments, firms, and other institutions.

The tangible realization of these benefits in some regions, like the Basque Country, Bavaria or Northern Italy, has encouraged more and more territories towards a cluster-based approach to their economic development, innovation creation and reinforcement of competitiveness. In reality the applied instruments and measures are very diverse and range from direct financial support for cluster initiatives, to creating platforms for communication, to wider measures to enhancing the business/cluster environment. Moreover the type and form of the intervention is strongly regionally specific, responding to the unique context of each territory. This has made it difficult to compare cluster policies and advance our understanding and learning around the determinants of positive outcomes. While the peculiarities of each region mean that the search for one 'perfect cluster policy' is elusive, in this paper we have developed an analytical framework to facilitate the comparative analysis of cluster policies with the aim of fostering greater policy learning.

The framework identifies seven phases in the policy process, namely 1) discussion initiation; 2) economic analysis; 3) policy analysis; 4) policy development; 5) policy implementation; 6) evaluation / monitoring and 7) adaptation to change. A thorough review of 20 years of literature on cluster policy has identified a series of success factors or triggers that correspond to each of these phases. The resulting framework is designed to facilitate comparative studies and offer an alternative way to look for a perfect cluster policy, as it is based on the key factors needed for the successful outcome of cluster policies. Hereby policies are to be compared along the key issues decisive for achieving policy targets attributed to a particular stage of a policy process, thus providing a more structured and informative approach for making comparisons and generating policy learning. In its current form, based on extensive previous research, the framework can be used as a toolbox for policy makers keen to identify strengths and weaknesses in their cluster policies. Furthermore, as comparative studies take place and further feed the framework, it is likely to change and evolve with the new learning and results.

### I: Cluster definitions

- Crouch, Farrell (2001, p. 163): “The more general concept of ‘cluster’ suggests something looser: a tendency for firms in similar types of business to locate close together, though without having a particularly important presence in an area.”
- Enright (1996, p. 191): “A regional cluster is an industrial cluster in which member firms are in close proximity to each other.”
- Feser (1998, p. 26): “Economic clusters are not just related and supporting industries and institutions, but rather related and supporting institutions that are more competitive by virtue of their relationships.”
- Krugman (1991) in (Boja, 2011, p. 35): „Clusters are not seen as fixed flows of goods and services, but rather as dynamic arrangements based on knowledge creation, increasing returns and innovation in a broad sense.”
- Linzenberger (2007, p. 156): „Regional (industry) - cluster - a concentration 'interdependent' firms within the same or related industries in a limited geographical area. “
- Morosini (2004) in (Boja, 2011, p. 35): “Cluster is a socioeconomic entity characterized by a social community of people and a population of economic agents localized in close proximity in a specific geographic region”
- Roelandt, Den Hertog (1999, p. 9): “Clusters can be characterised as networks of producers of strongly interdependent firms (including specialized suppliers) linked each other in a value-adding production chain.”
- Rosenfeld (1997, p. 4) “A cluster is very simply used to represent concentrations of firms that are able to produce synergy because of their geographical proximity and interdependence, even though their scale of employment may not be pronounced or prominent.”
- Swann et al. (1998, p. 1): “A cluster means a large group of firms in related industries at a particular location.”
- The “Community Framework for State Aid for Research and Development and Innovation” in Nadabán, Berde (2009, p. 774): Innovation clusters are “groupings of independent undertakings — innovative start-ups, small, medium and large undertakings as well as research organizations — operating in a particular sector and region and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination among the undertakings in the cluster.”
- UNIDO in Nadabán, Berde (2009, p. 774): clusters are “sectoral and geographical concentrations of enterprises that produce and sell a range of related or complementary products and, thus, face common challenges and opportunities. These concentrations can give rise to external economies such as emergence of specialized suppliers of raw materials and components or growth of a pool of sector-specific skills and foster development of specialized services in technical, managerial and financial matters.”
- Van den Berg, Braun and van Winden (2001, p. 187): “The popular term cluster is most closely related to this local or regional dimension of networks ... Most definitions share the notion of clusters as localized networks of specialized organizations, whose production processes are closely linked through the exchange of goods, services and/or knowledge.”

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