

DEVELOPING A COLLABORATIVE MODEL SPECIFIC TO THE FIELD OF DEFENCE BASED ON THE LIFE CYCLE OF A CLUSTER

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Abstract: *Clusters represent one of the defining elements of the Europe 2020 Strategy of the EU in terms of sustainable regional development due to the organizational structure, to the sphere of representativity and, not least, due to the economic policies adopted in this respect at the European level. The present paper presents the manner in which one can design a cluster-type collaborative model, specific for defence, using methods specific to modeling. The basis for the achievement of this conceptual model is the model of the cluster life cycle, a model analog to the life cycle of the product.*

Keywords: Cluster, Cluster Life Cycle, modeling, collaborative model

1. Introduction

The Europe 2020 Strategy continues the principles of the Lisbon Strategy for growth and new jobs and aims at five measurable objectives that are to be translated into national targets, namely: *employment; research and innovation; climate change and energy; education and combating poverty* [1]. All these objectives are designed to direct the efforts of the member states in the mutually agreed upon direction and they also represent the means by which the obtained achievements can be measured.

The collaborative cluster-type of models represent the ideal instrument to put into practice these goals, in particular in terms of defence, especially due to the fact that if at the level of general economic policies level things are well established, when it comes to the defence industry, things get a little more delicate. This is because the realization of a future defence industry established at European level must be based on the adoption of policies and intelligent solutions for making weapons systems in

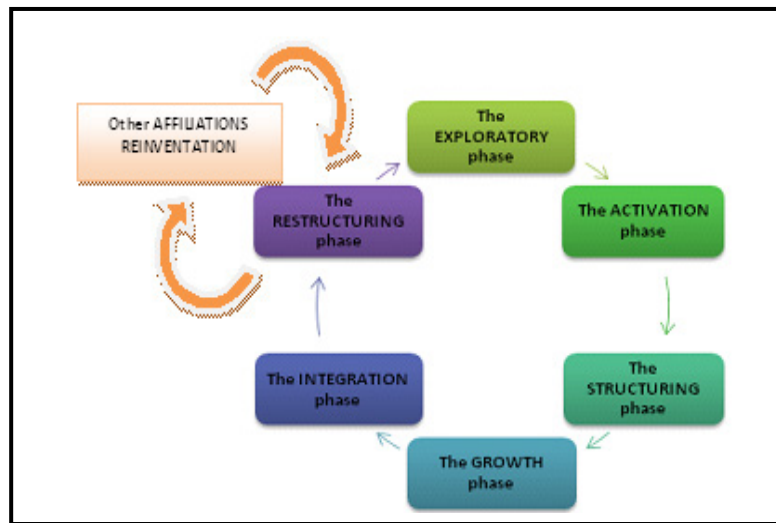
strict accordance with the resizing of the national defence structures.

2. The life cycle of the cluster

The most common definition of the cluster is given by the one who is responsible for the popularization of the concept, Professor Michael Porter: "Clusters are geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally, to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs "[2]. By analogy with the model of the life cycle of the product, Sonderegger and Taube [3] have developed a model of the life cycle of clusters.

According to them, the life cycle of clusters comprises several phases, each phase having a corresponding a set of activities

and instruments used by each of the parties involved in the initiative to form a cluster (Fig. 1).



3. The elaboration of a specific collaborative model specific for the field of defense using the IDEF0 method

The IDEF (Integration Definition) represents a family of modeling languages in the field of software engineering and systems. The IDEF methods are used for modeling activities and processes to support

the process of integration of the information (www.idef.com). The IDEF methods represent a set of independent methods that prove very useful when used in an integrated manner; hence their name of Integrated **DEF**inition [4].

The developed conceptual model (A0) is shown in Figure 2.

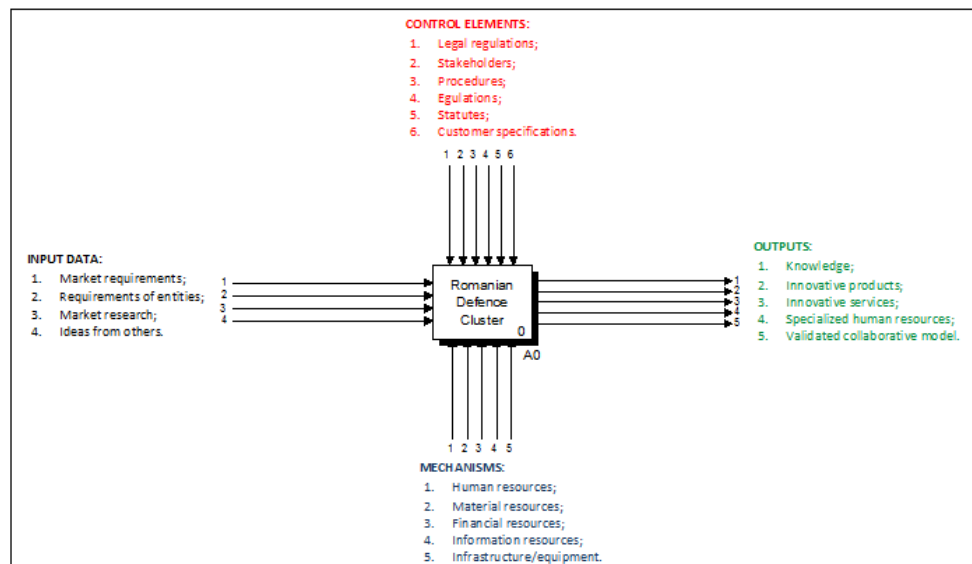


Figure 2: Collaborative model specific to the field of defence - Romanian Defence Cluster

In order to develop the conceptual model, we used the **2013 v.15.0 iGrafx** software, the menu of the application with the main

stages represented sequentially, being shown in fig.3.

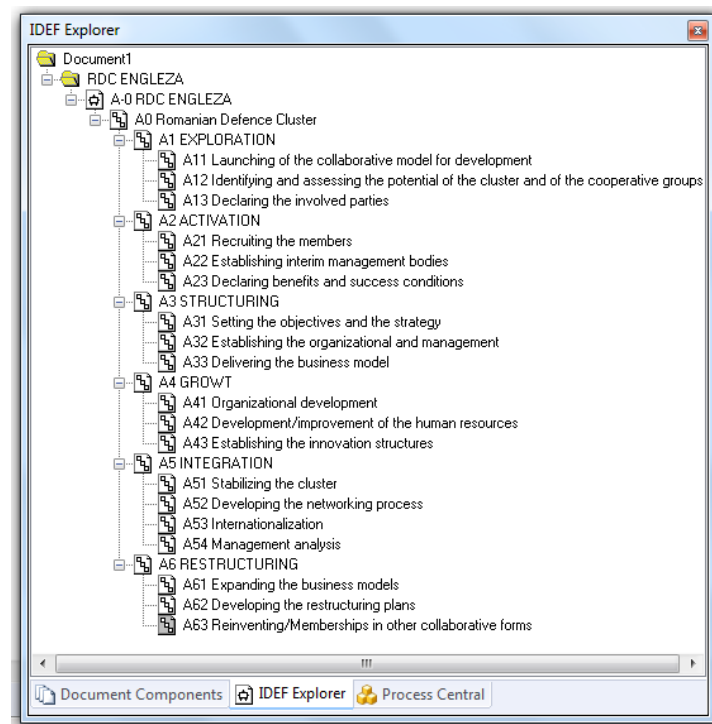


Figure 3: The decomposition of activities within the application

The adopted model allows for an efficient description of the functions of the system through the process of the decomposition of the functions and of classification of the relations between the functions (as inputs, outputs, control and mechanisms).

The use of this methodology has the advantage of allowing the decomposition of the functions up to three levels. Figure 4 presents the first level of decomposition.

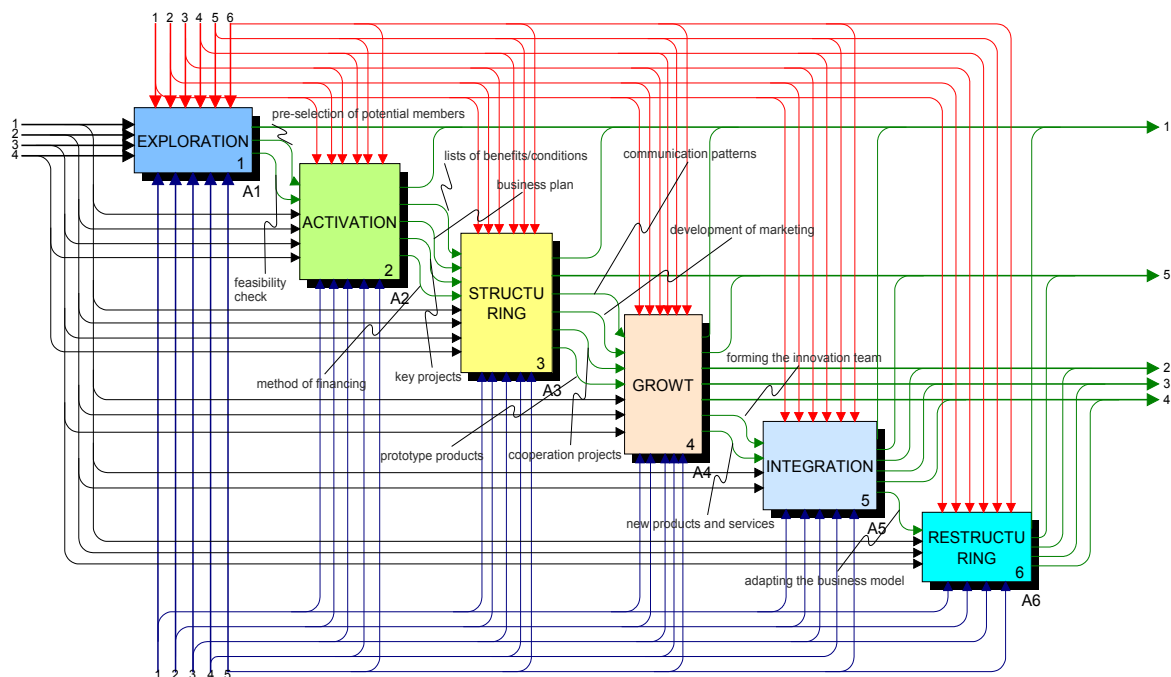


Figure 4: The collaborative RDC model. Steps

The *exploratory phase* involves identifying and evaluating the potential of the cluster and of the cooperation groups. During this phase, local opportunities that can be exploited by attracting local resources or other conjunctural factors are identified.

The second phase, the *activation phase*, which involves recruiting the members and the corporations first. After the appointment and the launching of the local leaders, it is necessary to attract a large number of partners that are bound to the cluster through a cooperation agreement. During the activation phase, there appear the first negotiations between the partners who are able to take risks and invest in new products. One factor that may contribute substantially to the establishment of the cluster is given by the availability of universities and/or other research infrastructures in the area.

During the *structuring phase* the objectives and the strategy of the cluster are defined. At the same time, the necessary financial and human resources for a determined period of time are provided. The structuring phase is characterized by the development of reliable social relations between the partners in the area. The cluster acquires a specialization, which is promoted through the regional policy. The products are in the phase of prototype development.

During the *growth phase* with the expansion of the network, the importance of its configuration also increases from an organizational point of view and from the point of view of human resources. Particular attention is given to the selection of network actors, especially for the promotion of the innovation process. During the growth phase, the innovative enterprises of the cluster begin to create a system of innovation. This is explained by the lowering of the benefits offered by the original local conditions, by the need to develop and improve the specific local factors.

The research of the enterprises is focused on product differentiation. Thus, the network is successful when it obtains the

consensus of the regional actors regarding the importance of the regional cooperation and of increased performance.

The *Integration phase* can be considered as the critical point of the life cycle of the clusters, the moment when the enterprises within the cluster have the advantages of flexibility and of openness to novelty higher than in the case of a hierarchical organization. The cluster enterprises can react in time to the changes in the economic environment and can make the leap to a new phase of growth. The previous relations of cooperation lose importance due to the development of the enterprises, and the implicit initial knowledge disseminates outside the cluster. The cluster enterprises look for new fields of activity, and some even manage to develop innovation systems, most often on the structure of the former domains.

The *restructuring phase* marks a radical change for the cluster. The phenomenon of the regression of the cluster can occur, which may be due to the relocation of the actors that represent the core of the cluster to better regions in terms of cost or as a result of economic events that have major effects, such as wars or crises.

There also exists the possibility of affiliation within other collaborative forms in order to be able to adapt to changes in the market.

Conclusions

The model of the life cycle of the cluster provides a support (adaptive and perfectible) to initiate and develop collaborative cluster-type models.

The implementation of this model by using the IDEF methodology ensures the representation of all the essential aspects needed to run the activities specific to a cluster in the field of defense under optimal conditions. Through this methodology, one can detail and customize the functions of the model and the relations between these so as the model could meet the most demanding requirements of the possible entities participating in the initiatives of forming clusters.

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