

# Coherence of Cluster on Efficiency of Logistic Process

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The clustering process is innovation for the Polish market. The process concerns various market sectors. The logistic clusters and logistic of clusters give minimization of expenses and quick turn of expenditure. The cluster is form of network and his efficacy is very important for logistic. The logistic network give new possibility for cluster and cluster give new possibility for network logistic, too. The efficacy is necessary for various level logistic process. Material fatigue of parts of different technical systems belongs to the most frequent causes of boundary states rise and relating operation breakdowns. The objective of the article is general formulation of reliability of technical systems judging, brief characteristic of basic areas to be taken into account as input into calculated prediction of technical systems fatigue life and analysis of risk items by its practical application. An extraordinary attention is dedicated to the evaluation of fatigue life of structures parts of different technical systems and means in objects of critical infrastructure all over the world because breakdowns caused by a fatigue failure have often a nature of catastrophe.

**Keywords:** cluster processes, efficiency, logistic process, logistic network operation

## 1. INTRODUCTION

The influence of cluster processes, seen as a specific network, on the efficiency of logistic process may be considered from many viewpoints. It can be a precise logistic arrangement impacting the work of a cluster and the other way round. The efficacy can be determined in every single case, however, in Poland it is harder because the history of clusters is quite short. This article is an introduction to considerations regarding this topic. Its aim, in turn, focuses on the indication of possibilities of logistic creation in the cluster arrangement or a cluster as an effect of logistic network operation. The author presents the example of usage of the connection between logistics and clusters in order to achieve the goal of the given undertaking.

## 2. NETWORK ORGANIZATION IN THE MARKET.

Network organization can be defined by the determination of its characteristics. The first one is

the transfer of goods between the elements which constitute the network. Another feature focuses on the diversity of the link between the objects, from hierarchic (the relation with the central object appears) to loose market contacts. When the central element appears, its role is limited due to the independence of the object linked in the network. The third feature is the limited integration of the objects, which is a result of partial aims and strategies. However, there are goals and strategies common for the whole arrangement, which make its position more competitive.

The network links between enterprises may be varied. The network typology comes from the assessment of the position of the dominant company, its force, the direction of such connections and network accessibility. It is possible that the cooperating objects will treat these characteristics as an aim. Then, these objects will undertake an operation at a certain efficacy level, such as minimalization of hierarchic links or creating an organization representing the group's business.

Network links between enterprises exist owing to ordered cooperation based on contracts. The links are at varied levels of hierarchy (or not at all), they function based on long term repeatable contacts which are used for a continuous adaptation to rapid changes. There are some characteristic features in the network arrangements:

- small networks fight for new enterprises,
- networks whose conditions of membership are precisely determined are characterized by vertical links and are comparable sidewise (not like typical hierarchic structures of suppliers),
- networks base on strong bonds deriving from trust, reputation and image,
- networks should be legalized but it does not always happen. Nevertheless, they base on some kind of agreements resulting from common operations.

Taking into consideration the reasons of developing of such networks and the results of networks analysis in Europe, the author claims that the cause of their development lies in:

- the internationalization and globalization;
- the increase of competitiveness;
- the increase of the uncertainty of enterprises functioning, especially the SME sector;
- the complexity of the final produce;
- the developed specialization;
- the development of IT;
- the differences in consumers' preferences;

Network links help to achieve definite benefits. The analysis of this subject determines varied levels of those benefits - – macro, mezzo, micro, and if they are in the commercial and non-commercial arrangement. Generally speaking it relates to:

- the decrease of the risk resulting from the introduction of new produce;
- the creation of synergistic effects for clients;
- the exchange of technology, knowledge and the possibility of gaining new development skills;
- the increase of capacity of adaptation to changing surroundings;
- the accessibility to scarce resources and skills;
- the increase of operation pace;
- the improvement of information gaining;
- the restriction of opportunist behaviour;

- the increase of partners' attractiveness with its results for the market.

In the Polish market there appear varied networks which are of a traditional nature, based on alliance. Apart from them, more and more popular are networks of supply chains and clusters, including specific logistic clusters.

Considerations over clusters are the subject of further part of this article. The author, however, wants to pay attention to the fact that in the assessment of this phenomenon it is significant to point to the differences between clusters and other concentrations of companies, which are:

- local concentration of companies;
- the fact that enterprises belong to the same or a few linked branches;
- cooperation, but also competitiveness between cluster's members;
- cooperation with business units and research and development centres;
- creation of specific identity of clusters;
- common marketing building;
- leading organisations or brokers, depending on the connection model.

According to UNIDO „Networks can develop within and beyond the cluster. Clusters lead to the growth of networks, but network may also become a cluster, if it develops business services, enterprises associations and will get public institution engagement”<sup>1</sup>.

It is necessary to point to the differences between clusters and networks if we want to discuss their efficacy.

An effective network reaches its goals. The efficacy, however, can be high, medium or low.

These considerations may be related to a cluster, and additionally it may be seen as a factor improving the achievement of the specific aim. In this case, it is all about logistics.

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<sup>1</sup> UNIDO, Development of Clusters of Networks of SME, The UNIDO Program, Viena 2001

### 3. THE CONCEPT OF A CLUSTER AND THE EFFICACY OF THE LOGISTIC PROCESS.

To define the idea of a cluster it has to be established that it is a limited network of enterprises, research and business support centres, local and/or central authorities. They all work to achieve the same aim according to the rules of cooperation and maintain competitiveness in the areas different than required by the common goal.

Depending on the interpretation, it is possible to focus on special, interaction, communicative or organisational elements or those related to the determination of so called critical substance, or highlighted role of social capital.

These consideration are only of theoretical nature and do not bring significant changes into the practical process, apart from the ability to order the operations within the same process. The author regards the process of cluster creation and its life cycle as clearly divided into phases. The phases remain in the casual connection, and the effect of this process as a whole or even further phases, is a define value for clients.

The analysis of cluster cases in Poland prepared by the author (41 clusters) and the studies of the European clusters show that first there is a creation of geographical concentration of enterprises operating in the similar field. A local competitiveness arises, which is a significant stimuli for innovation and initiative.

Then, concentrations of specialized suppliers and service companies appear along with a specific work market. Common expenses decrease. Owing to it, suppliers and clients will be able to take advantages from the production cost cuts. Another phase focuses on the creation of organisations which will do the services for the enterprises developing within the cluster. It can involve training, research, business or local administration units. A huge importance of non-economical factors influencing enterprises concentrations can be observed. In the fourth phase, organisations enhancing cluster's prestige and attractiveness appear. New companies and skilled workers come from the neighbouring areas, which impacts the attractiveness and more advantageous ground for new enterprises is created. Then, non-market bonds come into play which is beneficial for informal cooperation and coordination of businesses. The

communication is based on specific knowledge. It requires interpersonal contacts stimulated by the closeness of people and organisations. The decline of the cluster lies in the fact that local business is limited to its surroundings which used to be its strength. Qualified workers, unique knowledge, strong bonds with other elements may become an obstacle for innovation. Clusters may be trapped by stiff specialisation. The analysis in the Polish conditions reveals that the third phase is being closed (it regards single clusters) with precise advantages (increased profit, turnover, decreased unemployment, creating of unified brand, improvement of network's identity). However, most clusters, especially focused on services are just starting their life cycle.

The presented actions performed at a certain level of the process are effective. The effectiveness of logistic processes may be supported by a cluster as well.

### 4. CONNECTIONS BETWEEN A CLUSTER AND LOGISTICS.

World and European experiences show that in the aspect of logistic cooperation, clusters may be beneficial. The aim of the process is a decreased turnover, profitability, produce or organisational innovation or other quantity or quality factors. A cluster is to help to achieve the aim by participating of the logistic process in the cluster or creating a cluster to achieve this goal quicker and better.

In Poland, first attempts to improve the effectiveness by means of a cluster can be observed in the area of marine, food, motor or furniture industry, and others. The author has focused on the marine industry due to the planned impetus covering northern Poland.

Creation of the West pomeranian Marine Cluster is an example where within the InMor project, the building of communication system and cooperation of marine and research units have taken place. There are created conditions which will make the introduction of innovation to the marine industry easier. The operations aim at enhancing the attractiveness of the region. The cluster will gather transport, shipment and logistic companies. Most likely it will use similar experiences of Norway, Denmark and Finland. In

these countries there are created institutions focusing on the organisation of cooperation between shipbuilding industry, dockyards and transport and shipment companies. The West pomeranian Cluster is to become a whole with the Pomorskie Cluster in the cooperation with the networks of the Baltic euroregion and Pomerania within the frames of the protectionist politics of the government and local administration. It will be a macro network based on cooperation of varied smaller networks, such as: fishing, port, dockyard, tourist and logistics.

The Logistic Centre in Gdynia will be crucial for the project. The port in Gdynia is determined to develop logistic functions which will provide services to enterprises in the region due to the structure and size of trans-shipment, the usage of advanced containers and the scope of possibilities to provide services<sup>2</sup>. In order to meet the requirements of competitiveness, the structure of services is being intensely worked on. Due to this the Logistic Centre is to be nearby the container terminals, which will become a part of the Pomorskie Cluster. The location of the centre will guarantee the access to trunk roads. The detailed analysis<sup>3</sup> indicates that Pomorze, especially the ports, have the potential to become an international logistic centre. Studies show that Tricity needs storing areas. Therefore, the decisions regarding financing and creating first storing areas have been made and logistic operations have started taking place in the areas already developed. The logistic centre should cover the whole area of the Gdańsk port in order to meet the growing expectations and it should offer a full range of logistic services connected with national and international shipment. The central location will allow to provide services both to foreign and Polish markets. The offer will regard rendering services to the supply chain and standard logistic operations, especially creating the value added.

The discussed example shows that logistic undertakings are accomplished through simple

<sup>2</sup> In the past few years there can be observed a boom in container and ferry terminals, and for example between 2005 and 2006 in the ports of Poland there were reloaded 53.8 mln t of freights. 2007 was record-breaking for container shipment.

<sup>3</sup> Information of Institute of Logistics and Warehousing in Poznań, Poznań 2008

network of cooperation. However, as a chain of operations they are a wider regional or international phenomenon. They are supported by the authorities and are a part of a cluster linked to other clusters, which as macro network may constitute a huge regional cluster. In this case - marine industry (see drawing no 1).

The above indicates that the accomplishments of regional logistic goals is tightly connected within the frames of cluster macro network, consisting of smaller networks where goals and actions pervade. The efficacy of a cluster works on the efficacy in logistics and the other way round. The arrangement as a whole makes the region more competitive, which increases the national and international effectiveness of the undertaking.

If clusters are varied in terms of technology, it can be observed that some of them do not create a common logistic arrangement, and single enterprises have their own logistic policy. A separate logistics is typical for beginners and technical advancement of clusters is not important.

Assessing the benefits for the logistics, the effects are as follows:

- strengthening the position toward local units;
- cost decrease;
- innovation increase;
- services extension;
- distribution channels extension;
- increase of operation specialisation along with the simultaneous bonding of cooperation; - increase of produce quality;
- improvement of organisational processes, especially customer service;
- increase of the funds accessibility;
- increase of the scope of enterprises completion.

These advantages are typical for the arrangements of developed markets. However, they may be an inspiration for Poland, especially that 53,8%<sup>4</sup> of enterprises operate in the field of logistics.

There are three ways of considering when it comes to the phenomenon of clusters. The first case will base on the fact that cluster as a network works out its own logistic system. The rule applied is the same as the one used in the creation of

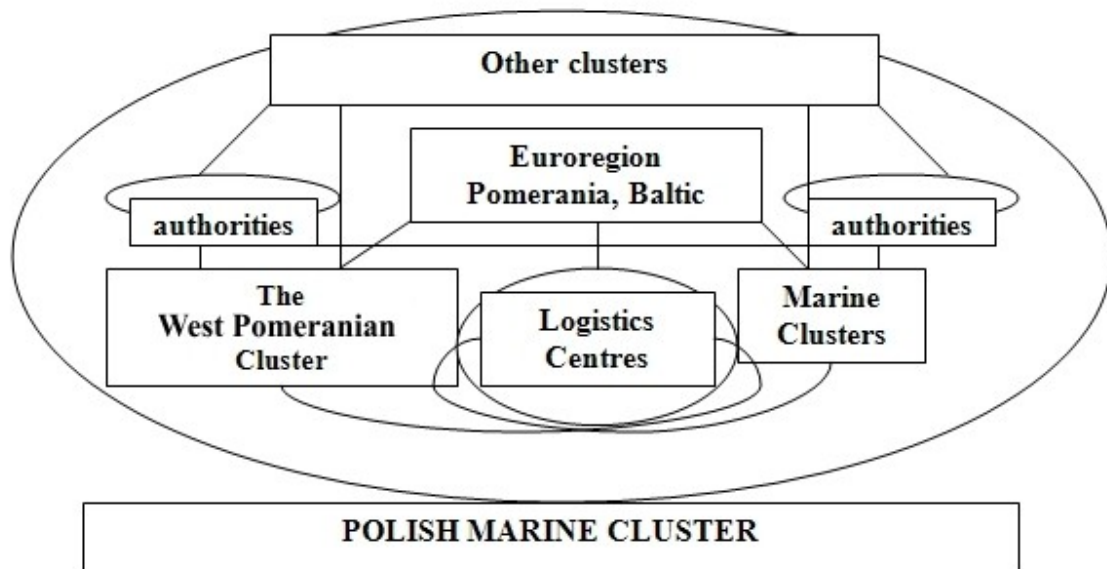
<sup>4</sup> Information of Institute of Logistics and Warehousing, Poznań 2003

common network produce, performing marketing operations or working out the whole cluster's brand.

Second approach focuses on the fact that each enterprise has its own logistics. Third approach, in turn, shows that the whole arrangement of the cluster is connected with the completion of the logistic process. These are the cases which can be

taken into consideration when analysing logistic processes with the respect to a cluster.

According to the author, the greatest chances in Poland has the third case since there is no need of advanced cluster back-up. Second solution seems to be useful as well for it enables the enterprises to apply autonomic, partly modified logistic system.



Drawing 1. The cluster phenomenon and logistics illustrated with an example of marine industry.

Source: a self-study

## SUMMARY

Considerations regarding the influence of clusters on the efficacy of logistic process need to be related to the longer period of time. Hitherto experiences in the Polish market are quite poor and therefore the assessment should be done again in few years. It is not possible today since Polish cluster are at the beginning of their life cycle and it is necessary to wait for further phases. The concept of logistic clusters extends, however, the view on the effects of innovating regional management, which is a novelty in Poland.

## LITERATURE

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