

# Influence of Cluster Coherence on Efficiency of Logistic Process

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The clustering process is an innovation on the Polish market. The process concerns various market sectors. The logistic clusters and logistics of clusters result in minimization of expenses and prompt return of expenditure. The cluster is a form of network and its efficacy is very important for logistics. The logistic network presents a new opportunity for cluster and cluster offers new possibility for logistic network as well. The efficacy is necessary for various levels of logistic process.

## 1. INTRODUCTION

Influence of cluster coherence, interpreted as a particular network, on efficiency of logistic process can be investigated from various reference points. It can be a particular logistic system affecting cluster functioning and vice versa. In every situation it is possible to determine the efficacy of such action. However, with Polish conditions it presents an obstacle, since cluster operating time is considerably limited. This paper is an introduction to considerations on the subject matter and its purpose is to point out the possibility to form logistics within a cluster or a cluster as a result of a particular logistic system. The author vouches for potential use of logistics and cluster connections in order to achieve the goal of a specific undertaking.

## 2. NETWORK ORGANIZATION ON THE MARKET

Network organization can be defined by means of its features characteristics.

First feature of network organization is resources transfer between units comprising the network. Second feature are various connections between subjects, from hierarchical (connections with the head office are present) to free market relations. With a head office present, its function is

limited due to the independence of units interrelated within network.

Third feature of network connections is subjects limited integration, which results from the diversity of partial objectives and strategies. However, there are objectives and strategies of the entire system which improve its competitiveness.

Enterprises network connections can assume various forms. Network classification results from the evaluation of leading enterprise position, intensity and the direction of relations between partners as well as network accessibility.

It is possible to assume these determinants as an objective for cooperating subjects and then by achieving a goal e.g. minimizing hierarchical connections or creating an organization representing group's interests, group of subjects operates with a specific level of efficacy.

Enterprises network connections function through orderly cooperation, based in cooperation agreements. These connections vary as for their hierarchy degree (or generally) function based on long-term, repeatable contacts serving continuous adaptation to prompt changes. In network systems, it is possible to point out certain typical elements:

- small networks endeavour to acquire new enterprises,

- networks with strict membership requirements are usually distinctive for their vertical connections and are comparable regarding their extent (contrary to standard hierarchical suppliers structures),
- networks are based on solid relations built on trust, reputation and image,
- assumably, networks should be subject to legal formalization, but in practice it is never the case, though all networks base on some agreement due to mutually undertaken actions.

Taking into consideration the issue of network formation and the analysis results of enterprises networks in Europe, the author concludes that the cause for their occurrence can be found in:

- internationalization and globalization processes,
- increased competitiveness,
- increasing uncertainty of enterprise functioning, particularly of the SME sector,
- in considerable complexity of final products,
- in compound specialization,
- in the development of information-communication technology,
- in consumers diverse,

Network connections allow its participants to achieve tangible benefits. The case analysis enables to define these benefits on various levels – macro, mezzo, and micro, as well as in commercial and non-commercial system, but generally it is:

- diminishing the risk resulting from the introduction of new products,
- creating the synergetic effect in value for customers,
- exchange of technology, knowledge and potentials to acquire new development opportunities,
- increasing capabilities for adaptation to the environment,
- access to deficit resources and abilities,
- increasing activity,
- improving information acquisition,
- limiting opportunistic attitudes,
- partners increased innovative character with noticeable effects on the market.

On the market in Poland, various networks appear and mostly they operate as so called

standard networks, based on alliance. Next to alliances there are more frequently operating supply chain networks and clusters, including logistics clusters.

Considerations on clusters are a subject matter of the consecutive parts of the following paper. However, the author intends to focus on the fact that with issue evaluation it is significant to point out features differentiating clusters from networks and other enterprise centres. These are:

- local centralization of enterprises,
- enterprises affiliation to the same or several related branches,
- cooperation as well as competition between cluster participants,
- enterprise cooperation with subjects providing business services and with research-development and scientific centres,
- creating cluster distinctive identity,
- creating collaborative wspólnego,
- the presence of an organization with the duties of cluster leader or network broker – depending on relation type.

According to UNIDO ‘Networks can develop within a cluster or outside it. Clusters contribute to networks development. However, a network can also evolve towards a cluster if it develops business-oriented services, enterprises associations and gains public institutions involvement’<sup>1</sup>.

Issue resolution appears necessary for the subject matter of this paper since one cannot discuss network efficacy or cluster generally, without differentiating features corresponding with the abovementioned.

An effective network realizes determined objectives. The degree of network efficacy varies according to the extent of goal achievement, which is manifested in full, partial or poor efficacy.

These considerations can also refer to a cluster and additionally – one can regard a cluster as an improving agent for realization of a determined objective. In this situation it is logistics.

<sup>1</sup> UNIDO, Development of Clusters of Networks of SME, The UNIDO Programme, Vienna 2001

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

Defining the concept of cluster means presenting it as a spatially limited network of enterprises, science and business-support centres, considering the influence of agents of municipal and/or central authorities functioning to realize shared objectives within cooperation principles, with competence rule maintained in areas different than common objective requirements.

Assuming various manners of interpretation, one can concentrate on spatial, interactive, communication, organization factors or those regarding critical mass determination or prominent role of social capital.

However, these considerations are purely academic and do not contribute any significant elements to the practical functioning of a cluster, apart from the possibility to organize actions within the process itself.

The author regards cluster creation and its lifecycle as a process with distinctive phases, remaining towards each other in cause-effect relation, and the effect of which, either as a whole or even within consecutive phases, is a particular value for customer.

The analysis of particular clustering cases in Poland, conducted by the author (41 clusters) as well as research on European clusters allow to recognize that what follows first is the development of prior enterprises leading to geographical concentration at a similar stage of activity. Increased local competition occurs which is a significant stimulant for innovation and enterprise.

What follows next is the emergence of specialized suppliers centres and service companies as well as the creation of particular job market. It is possible to observe costs reduction of shared input. Owing to that suppliers and recipients can benefit from savings in operating costs.

Next phase is the creation of organizations which will be responsible for attending enterprises developing inside a cluster. They can be training, scientific, business, municipal authority establishments. A fundamental role is that of supra-economic agents affecting enterprises concentration.

In the fourth stage appear organizations increasing the prestige and desirability of a cluster. New companies and skilled workforce are acquired from neighbouring areas which increases the appeal of a territory and prepares more favourable ground for new enterprises.

Afterwards, non-market connections in favour of informal cooperation and business activity coordination emerge. Communication is based on specialized knowledge, requiring frequent interpersonal relations stimulated by close relationships and organization.

A final stage means that local industry encloses in its own environment, which once accounted for its strength e.g. skilled workforce, unique knowledge, firm relations with other subjects can constitute an obstacle for innovation. Clusters can become a decoy of rigid specialization.

In Polish conditions the analysis of such a network leads to assert that the third phase is terminated (it undoubtedly refers to single clusters) with clearly determined benefits (increased profit, sales, reduced unemployment, creating a uniform brand, network identity improvement), however for most clusters, particularly in service sector, it is the opening stage in the lifecycle of that network.

Presented actions, performed at a given stage of the process with determined objective, are effective. Moreover, the logistic process efficacy determined by the degree of performed actions with a particular objective can be supported by means of a cluster.

### 4. CLUSTER-LOGISTICS CONNECTIONS

Global and European experiences indicate the potential to increase the efficacy of logistic processes with cooperation through clusters. The objective then for logistic process can become increased sales, profit, product innovation or organization, or other quantity and quality factors. The function of a cluster is to support achievement of the objective. Thus through logistic process participation in a cluster or creation of a cluster to realize that process, determined goal is achieved more promptly and completely.

In Poland first attempts to improve logistic efficacy by means of a cluster can be observed

through activities in maritime economy, food, automotive, furniture industry and other.

Regarding the anticipated grand scale of the enterprise, encompassing the entire area of northern Poland, the author concentrates on maritime industry.

The example case is the creation of West Pomeranian Maritime Cluster where, after the InMor project, communication and cooperation system of maritime economy enterprises and research-development field has been started and favouring conditions have been created for implementation of innovative solutions into maritime economy. These actions are expected to increase competitive value of West Pomeranian region. The cluster will encompass transportation, forwarding and logistics enterprises. Probably it will apply experiences of analogous networks in Norway, Denmark, Finland, where are established institutions for creating reciprocity among enterprises of shipbuilding industry cooperating with production and repair shipyards, ports, logistic, forwarding and transportation companies. West Pomeranian Cluster is expected to compose a whole with Pomeranian Cluster in cooperation with small networks of the Baltic Euroregion and Pomerania as a part of government and local authorities protectionism.

It will be a macro network based on cooperation of smaller networks of various type including fishing, port, shipyard, tourist and logistic clusters.

A considerable place for these activities will be the Logistics Centre of the port in Gdynia.

The port in Gdynia, considering its dimension and transshipment structure, high degree of containerization and a wide range of logistic services, is particularly predisposed to develop logistic functions for servicing enterprises cooperating in the region<sup>2</sup>.

To meet the requirements for competitiveness, intensive work is performed to adapt services structure to increasing goods supply. Hence the idea to create Logistic Centre in the vicinity of

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<sup>2</sup> In the last few years one could observe a boom in container and ferry terminals. For example in 2005-2006 Polish ports transhipped 53,8 mln tons of bulk cargo. Year 2007 was also record-breaking regarding container sales.

container terminals which will comprise Pomeranian Cluster.

The planned logistics centre will be located in a place which guarantees access of potential customers of the region and Northern Poland to national road network, whilst detailed analysis indicates<sup>3</sup> that Pomerania region has necessary potential to establish an international logistics centre, with sea ports being particularly predisposed.

Conducted market research indicates that in Tricity there is a high demand for storage space. Taking that into consideration a decision has been made to finance and execute first storage places in order to initiate and concentrate logistic activity on already developed land. Meeting customers growing expectations and tending to improve services quality, the Logistics Centre should enclose the entire port of Gdynia offering a full range of logistic services concerning goods handling in international and national relations. The Logistics Centre located in port-urban area will acquire widespread relations, allowing to service national, local and international market. The offer will regard supply chain servicing and performing all standard logistic services, especially those creating added value.

The case study points out that logistic enterprises are realized in simple cooperation networks. However, as a series of actions they constitute an element of extensive enterprise, operating within regional and international relations. They are supported by authorities and are included in a cluster related to other clusters which as a macro network can comprise one large regional cluster enclosing the entire sector, this particular case being maritime industry ( see fig.1).

The observations above point out that logistics objectives realization of the region is precisely related within cluster macro network comprised of smaller networks, where mutual merging of actions and objectives occurs. Cluster efficacy prospers the efficacy in logistics and vice versa. As a whole the system improves competitiveness of the entire region both nationally and internationally which automatically increases the extent of achieved degree of efficacy of the entire enterprise.

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<sup>3</sup> Data by Logistics and Storage Institute in Poznań, 2008

The analysis of logistic systems in clusters of various technological degrees reveals certain regularity – some clusters do not generate common logistic system, whilst particular cooperating enterprises maintain their own, individual logistics. It seems that retaining separate logistics of enterprises participating in a cluster is typical for new clusters, operating on under-developed markets. At the same time it is irrelevant whether a cluster belongs to a group of low, medium or high technology.

Evaluating the benefits of clustering for logistics one can recognize the effects in:

- enhancing the position before non-local subjects,
- cost reduction,
- increasing innovation,
- enhancing services offer,
- extending distribution channels,
- increasing the degree of actions specialization while at the same time strengthening cooperation,
- increasing attention towards products quality,
- improving organizational processes, mainly customer service,
- increasing the availability of financing means,
- extending enterprises integration.

These benefits, estimated indeed for developed markets relations, can be inspiring for actions performed in the interest of clustering in Poland. It is all the more substantial since 53,8%<sup>4</sup> of contractors enter in Poland into logistic cooperation.

In regard to preliminary considerations and through the analysis of the relation between clustering process and logistic system, one can view this issue in three different ways.

First approach means that, at some point of its functioning, a cluster as a network develops a logistics system. On the very same basis as the creation of common product of a network, managing common marketing, or developing individual brand of product of the entire cluster.

Second approach points out that it is possible to maintain individual logistics by any enterprise participating in a cluster. Third approach refers to a situation when an entire cluster system is associated with the realization of a logistic process, and on such levels one can analyse the efficacy of a logistic process within the context of a cluster.

According to the author of this paper, the highest opportunity to prosper in Polish conditions lies before the concepts of the third approach – on account of no necessity to possess an advanced cluster base, which is indispensable in the first approach.

Second approach also appears simple in Polish conditions as it allows enterprises to apply current, only partially modified, independent logistic system.

## 5. CONCLUSION

Anticipating the influence of cluster relations on the efficacy of logistic process needs to be far-reaching. Previous experiences on the Polish market have been very modest, therefore after a few years time it seems reasonable to return to the issue and evaluate it through notable effects. Why is it not possible at the present moment? The cause lies in Polish clusters which, in majority of cases, are at the very beginning of their development and it is necessary to wait for consecutive phases in their lifecycle. However, it appears indisputable that the concept of logistic clustering broadens the regard on innovative management effect area over a particular region, which for Polish conditions on the market is a sheer novelty.

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<sup>4</sup> UNIDO, *Development of Clusters of Networks of SME*, The UNIDO Programme, Vienna 2001

