

CLUSTER MANAGEMENT AND IMPLEMENTATION OF INNOVATIVE INFORMATION TECHNOLOGIES

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Abstract: The concept of clusters has been accepted as one possible solution for the survival of small and medium enterprises, as well as driving innovation and economic development. Since clusters can involve a large number of different subjects, it is crucial to the successful development of information systems and linking partners with clients in a cluster of clusters which should be based on innovative IT solutions. Innovative information systems can also dorinose and facilitate the development of new products and processes within the cluster, access to new markets and to ensure better efficiency of cluster management. In today's world, the use of modern computer includes access Internet services via mobile devices, from anywhere and at any time. A concept that still follows the trend in the IT industry is known as Cloud Computing. Users have the ability to easily and quickly access the resources they need when they need.

Key words: cluster, innovation, competitiveness, information technology, Cloud Computing

1. INTRODUCTION

In contemporary business conditions, the enterprises need to find new solutions on daily basis in order to sustain and increase their competitiveness, which is a basis for success or failure of each enterprise [5]. Achievement of enterprises' competitiveness, as well as development of sectors in which they operate, is possible by projects that are based on new knowledge, skills and innovations. SMEs sector is the carrier of development in the field of innovative activity, and medium size of an organization slowly become decisive for business success. Reduction of the average enterprise's size conditions the necessity of various forms of connection and cooperation between enterprises that appear in international market in the function of achieving synergetic effect. In the final outcome, this implies that the formation of alliances is a necessity not only for SMEs sector, but for big enterprises as well [6]. Small and medium enterprises choose strategic alliance into clusters in order to improve the competitiveness in the market. Joining together in clusters, SMEs try to make up what every enterprise lacks, and those are staff, finances, raw materials, new knowledge, technologies etc. However, the state as well has a significant role in the process of cluster formation. Namely, without its support in forms of laws that stimulate development of clusters, tax incentives, incentive means etc, the future of clusters is quite uncertain.

The concept of clusters is accepted as one of possible solutions for survival of small and medium enterprises, as well as the driver of innovations and economic growth [4]. Clusters are one of the possible responses to globalization process and uneven regional growth and development. Alliances can reduce operating costs, through joint procurements, joint deliveries, joint participation, sharing the costs of training, transport, marketing etc. [1]. Cluster is a geographically bounded concentration of similar or complementary businesses with active channels for business transactions, communications and cooperation.

If the enterprises, even economies of particular states, want to achieve competitiveness and success in global market, they need to find new ways of doing business; i.e. they need to be innovative. Innovations are certainly one of the main drivers of economic growth and competitiveness. Innovations can be considered through the following five forms [3]:

- New products,
- New processes,
- New markets,

- New resources,
- New organizations.

European Commission [2] has accepted the cluster concept as a significant driver of competitiveness and innovativity on the territory of entire Europe, because through clusters it is easier to achieve interaction between related enterprises, research and development sector, public sector etc. Precisely for the reason that clusters enable the creation of synergic alliance between a number of partner enterprises and accompanying institutions, development of innovations is a lot easier, unlike the enterprises that operate independently. In transitional economies, the way in which clusters appear is different than in developed countries, although the common denominator is all economies is the same, and that is the necessity and inevitability of clustering process, as the only way to increase competitiveness of enterprises and regions.

2. ADVANTAGES AND DISADVANTAGES OF CLUSTERS

Since each concept, idea, has its own good and bad sides, the clusters aren't an exception. In today's business world, clusters provide some incentives to enterprises, which they wouldn't have if they worked as separate legal entities. In contrast to incentives, there are certain constraints, particularly if the concept of cluster is understood as „the cure for all diseases“, i.e. the solution to all problems.

Advantages of joining the clusters are:

- Increase of production and employment,
- Increase of innovativity,
- Strengthening the expertise and know-how,
- Improvement of quality and productivity,
- Increase of export,
- Better use of potentials through cooperation,
- Costs reduction,
- Increase of flexibility,
- Access to new technologies,
- Successful changes management,
- Better access to global financial markets.

Disadvantages of joining the clusters:

- Attempts of government to develop clusters although business entities are not interested,
- Small matching between structures and business culture of partner enterprises,
- Lack of legal, i.e. financial opportunities,
- Lack of entrepreneurial spirit,
- Low level of confidence within clusters,
- Lack of partner's knowledge,
- Insufficient involvement of associates in the network,
- Lack of informal connections,
- Unclear i.e. unrealistic expectations of members who join the cluster.

Due to small production capacities and offer potentials, small and medium enterprises of transitional economies cannot compete with joint and globalized companies in the world, and they cannot get out to world's fairs or big markets, such as EU, Russia and Middle

East. The practice shows that only big enterprises, financially strong that can explore the market, apply innovative marketing and new technologies, can export. Reaching this level of business performances is possible precisely through clusters, which enable a series of advantages to enterprises, and primarily, a cheaper promotion, market research, joint procurement, integration of offer, cooperation with faculties, institutes and also, the development of common product and/or service, in the developed cluster phases.

Clustering of Serbian economy is at its very beginning, and the clusters contribute to development of competitiveness, through the growth of productivity and creation of innovative strategies. In due time, more intensive processes of cluster creation and functioning should be expected. Strategy of SMEs innovativity and competitiveness development for the period 2008 – 2013 positions clusters as one of the instruments for increasing the competitiveness in foreign markets. In the Republic of Serbia there is currently 25 clusters [8] that are classified by development phases, which was supported by Ministry of Economy and Regional Development of the Republic of Serbia through the „Support programme for cluster development“.

3. CLUSTER AS A FORM OF IMPROVING THE COMPETITIVENESS AND INNOVATIVITY OF TEXTILE SECTOR IN SANDŽAK

Economic recovery of Novi Pazar is closely associated with the recovery of its textile industry. Textile industry was once the foundation of local economy in Sandžak, and its products were sold throughout the region and Western Europe. In recent years, the number of factories that manufacture textiles is also significantly reduced. The largest companies are the only ones that survived. However, today they are also looking for a „last straw“, and they see it in merging into clusters, connecting with cooperants from other countries, as well as winning new markets. Due to the advantages that are, primarily, reflected in cooperation, interdependence and the exchange of information, knowledge and experiences, the enterprises that are the members of clusters can achieve better results than those who are not cluster members. And also, it is implied that enterprises from textile industry, connected to clusters, realize: cost savings – through joint marketing and branding, higher productivity of work, more rapid answers to market requirements, training and further education of employees, etc. Universities and research centers have an important role in the sense of training the necessary staff and support to innovations. In that sense, clusters are in the position to constantly improve the quality of products and, in that way, they lead over competition.

Textile Association „Asstex“, Novi Pazar is an association of textile manufacturers that was founded in March 2009, with the aim to build capacities and increase the competitiveness of cluster members. The established cluster - „ASSTEX“ slowly wins leadership position in the region, assuming the efforts to recover local textile industry. Members of this cluster, in cooperation with two universities that exist in Sandžak, already actively work on educating the modern labour and develop the knowledge necessary for the success in global market [9]. Clusters' courses of action:

- Joint participation of cluster members in the fairs,
- Development of Internet portal and WEB portal of «Asstex» cluster
- Implementation of the system for waste water treatment,
- Introduction of quality standards ISO 9000,
- Expansion of cluster network [7].

Basic data for the cluster – Textile Association „Asstex“, Novi Pazar

Number of enterprises in the cluster	14
Number of scientific, research and supporting institutions	3
Number of employees	779
Total turnover of the cluster	9.585.884 EUR

4. CLUSTER MANAGEMENT AND DEVELOPMENT OF INNOVATIVE INFORMATION TECHNOLOGIES

Cluster can exist and function without formal and legal standards setting, but it is most frequently institutionalized. Such a cluster has its own management headed by cluster manager. Tasks of cluster management should be the following:

- Promotion of cluster concept,
- Development of social relations between cluster members,
- Promotion of joint projects,
- Enhancing cooperation with existing institutions,
- Improvement of education and development of the staff.

Cluster manager manages the cluster in a way that is acceptable to all cluster members. He takes care of individual, but also of common interests of cluster members. Cluster manager is not a director. He is expected to be neutral and independent in cluster management. Precisely for the reason given, cluster manager should not be from the circle of any of the subjects who enter the cluster. It is recommended for cluster manager to be from private sector, to be familiar with technologies, services and conditions of the market and to possess all managerial skills. Cluster manager is expected to try to connect various cluster services into an integral system of cluster services.

Since clusters can include a great number of various subjects, the development of a successful system of informing and connecting partners in cluster with the clients is essential and it should be based on innovative IT solutions. Innovative systems of informing can also contribute and facilitate the development of new products and processes within the clusters, approach to new markets and to enable better efficiency of cluster management.

4.1. Cloud Computing and AppLogic and their impact on cluster operating

Savings in infrastructure and optimization of resources use

Compared with traditional infrastructure for hosting, (Figure 1.) AppLogic Cloud significantly reduces the costs and complexity of setting the „initial“ infrastructure. It significantly reduces the costs through the reduced use of hardware resources. Since the resources from the set of hardware resources in Cloud system are assigned to virtual applications, the life of hardware is significantly longer, observed in the long period. The older hardware can provide sufficient strenght for less demanding applications.

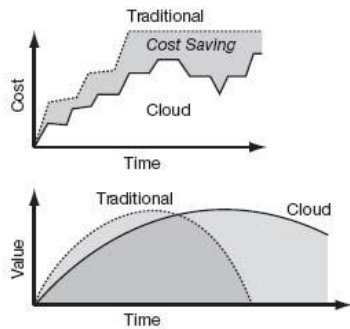


Figure 1. Costs of the system

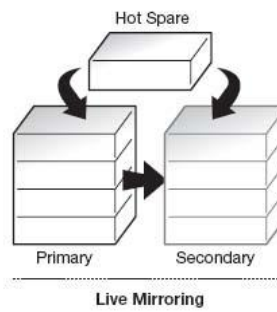


Figure 2. High availability of data

High availability of resources – with no losses due to Down-time

AppLogic Cloud platform has a built-in protection against hardware failure. If any server „falls“, the components of the application affected by it are automatically restarted on a healthy server. AppLogic will try to automatically recover the hardware that has fallen, and besides that, Private Cloud contains an additional protection system through ‘hot-spare’ policy. This does not imply the maintenance of availability of your application during server’s failure, but the status of high availability of all resources is still maintained (Figure 2.).

4.2. Costs rationalization and a simpler management of business function of cluster members

AppLogic provides you to reduce various IT resources, primarily different IT solutions of cluster members, under a single platform (Figure 3.), and to simultaneously simplify the infrastructure and reduce costs. Cloud computing solution provides costs reduction with achieving high availability of all resources, security and centralized management of each cluster member.

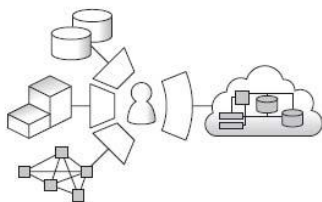


Figure 3. Various IT solutions

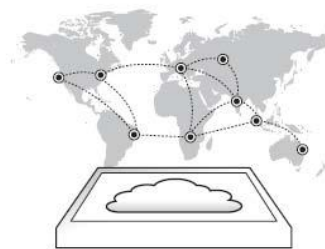


Figure 4. Rapid reaction to global changes

AppLogic can be installed anywhere on a standard server, as service in some data center or in the company itself. Cloud computing technology provides you with an opportunity to react rapidly in relation to global circumstances (Figure 4.). once installed, AppLogic provides you with the possibility to transfer, export, replicate and update, both the application and the virtual infrastructure, whenever it is necessary and from any location, using web browser only.

Advantages of Cloud applications

We live in time when a big evolution of hosting technology, as well as the way in which software is delivered to the end user, takes place. In recent couple of years, this

phenomenon was described in different ways: Hosted Applications, Application Service Provision (ASP), Software-as-Service (SaaS) and Cloud Computing. All these technologies have the same basis, and that is: *Use of the applications that can be found on hosting servers is certainly cheaper, more reliable, with more functionality and easier for managing than it is the case in traditional client-server environment.*

5. CONCLUSION

Connecting the companies into cluster and cluster development should play one of the important roles in achievement of economic growth and increase of competitiveness of transitional countries, in their accelerated path to European Union. Since clusters can include a great number of various subjects, essential thing is the development of a successful system of informing and connecting partners in the cluster with clients of the cluster, which should be based on innovative IT solutions. The concept that today follows such a trend in IT industry is known as Cloud Computing. Cloud Computing concept implies that a great number of users can share common infrastructure resources and, simultaneously, the costs that are paid precisely according to the current needs.

References

- [1] Đorđević D., Urošević S., Cvijanović J., Uloga klastera u unapređivanju konkurentnosti tekstilne i odevne industrije u Republici Srbiji, journal Industrija, Economic Institute, year XXXVIII, no. 2/2010. p. 177-198
- [2] European Commission; Europe INNOVA; PRO INNO Europe (2008). The Concept of Clusters and Cluster Policies and Their Role for Competitiveness and Innovation: Main statistical results and Lessons Learned. Luxembourg: Office for Official Publications of the European Communities
- [3] Hoolbrok, J.A. (2005). Quantifying Innovation. UNESCO South Asian Regional Workshop on S&T Statistics. New Delhi, 19-24.11.2005
- [4] Porter, M.E. (1990). The competitive advantage of nations. London: Macmillan
- [5] Porter, M.E. (2009). Konkurentnska prednost., Zagreb: Masmedia.
- [6] Urošević S., Đorđević D., Aspekti procesa upravljanja u malim i srednjim preduzećima, VI Majska konferencija o strategijskom menadžmentu, University of Belgrade, Technical Faculty in Bor, 30. May-1. June. 2010, Proceedings, p. 607-614
- [7] <http://klasteri.merr.gov.rs/>
- [8] <http://klasteri.merr.gov.rs/Klasteri-u-Srbiji>
- [9] http://www.compete.rs/files/fast-facts/Kratki_pregled_br16.pdf