

Business Process Development for Industrial Cluster

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Abstract: Small production companies frequently have only limited amount of customers, especially in country sides. To have more orders and to be more competitive, they need to cooperate and form Industrial Clusters. To manage Industrial Cluster, there should be firm Quality Management System. The current article proposes approach about handling that complicity, which is related to the Industrial Cluster Management.

1 INTRODUCTION

In Eastern Europe countries, there are lot of small and middle size (SME) companies in manufacturing domain. In most cases they have only few customers, they have quite weak sales team if any, thus they dependent on their own existing contacts. As these companies have limited possibilities in production (which mostly related with bench and personnel skillsets) it's also limits their availability to grow. Thus, the initiatives to the join these production companies as capability centre into the umbrella of Industrial Cluster (IC) are very important.

According to our research group understanding IC is formed by some production company or sometimes by some group of people acting as a broker. Company or this group of people, which creating such IC can be viewed as the IC Focal Players (FP). The core of IC has been developed in a way that it would be able to respond quickly to market needs and there would be no need to invest too much time to develop necessary network competencies and processes for each new business opportunity. These networks are mostly long term strategic alliances. In addition to the strategic alliances, there are also goal-oriented networks, which can be considered as extensions of the strategic alliances when needed competences / resources are missing or are not reachable, or they are not of a sufficiently high quality (Kangilaski, 2010a).

Current paper contributes to the IC planning phase focusing on business services, process management and related artefact identification.

2 PREVIOUS RESEARCH

IC research topic is also known as Virtual Enterprise, Virtual Organization, Virtual Organization in Breeding Environment, Virtual Corporation, Extended Enterprise, Collaborative Networks, Business Ecosystem etc and there are many research projects supporting that field.

Well-known are EU level projects in the Framework Programmes for Research and Technological Development – ECOLEAD, SPIKE9, GloNet, but there are lot of others initiatives in level of universities, companies, etc.

3 ENTERPRISE ARCHITECTURE

As known, quite often small companies fail to create an integrated vision about how business process should work across the company and how information, applications, and the technologies should enhance or even perform these processes. This means that it is a challenge also for FP forming the IC, as it will compose from several companies which do not have much cooperation experiences.

Thus, to develop such IC, the Enterprise Architecture (EA) based approach is very usable. EA serves as a ready reference that enables the

organization to assess the impact of the changes on each of the EA components (Kangilaski, 2010b).

From theory point of view, there are more than 20 different EA frameworks available (Kangilaski, 2010c), which mostly are oriented to the single organization. Thus, when there is a need to create IC then there are only few frameworks which support it, including SCOR, ARCON, VERAM, GLOBEMEN etc. Those frameworks will cover different aspects of IC lifecycle management. The main problematic related with these frameworks lies on the too high-level abstraction, which makes them implementation quite challenging.

4 FORMING INDUSTRIAL CLUSTERS

To be more attractive for companies, which potentially will join to IC, the FP has to provide surplus value for them. Thus FP must work out most critical services to be provided to the IC. According to our experiences, these services have to be as minimum of following:

Communication as a service – FP is a former of IC, which means that it has to perform actions to identify IC members impacts and needed competences, which have to be represented. In addition, it has to improve communications among companies belonging into IC. Having a cluster newsletter seems to be one option.

Purchasing as a service – this is one of the most frequently used services. Companies, merging their material purchase orders over IC, will get most probably lower price from market than purchasing independently. In addition, such cooperation will also strengthen buyer-supplier linkages.

Marketing as a service – to have better business opportunities, FP could collect IC companies' capabilities and promote the IC products or services domestically and even abroad.

Research and development as a service – FP having overview about IC companies' capabilities may conduct the research and development activities inside IC to develop new products and services that IC could provide.

Learning as a service – from FP's point of view, it is important that IC companies' employees are well educated (e.g. having needed certificates, modern skillsets). Thus, FP should analyse companies' needs and should prepare needed educational activity and training. To motivate companies to belong into IC, it is reasonable that these programs are sponsored by FP.

IT as a service – the small production companies have only limited possibilities to invest into the ICT. In most cases we have seen that the production planning is supported by MS Excel, and production processes are supported only by paper documents if any. The quite powerful approach is if FP could provide for IC companies in light weight mode production planning functionalities, inventory management functionality and work order management functionality. The functionality should be simplified, to minimize the implementation costs and time for IC members. Using such IT solution with analytical functionality will most likely extend company production effectiveness.

In addition, the FP provides an IT environment, where IC members could communicate.

Quality management as a service – to be more competitive, the companies, especially in production domain, should have to implement Quality Management System (QMS) and Environmental Management System (EMS). This is the reason why the companies have to meet the prerequisite demanded by FP to implement QMS and EMS to belong into the IC (ISO 9001, ISO 14001). In some cases also OHSAS 18001 is demanded.

4.1 Business Process Management

To manage IC, the FP has to establish policies for process management. As already described, FP proposes Quality Management as a service, thus it is reasonable to have an IT environment for process modelling. Process modelling environment gives major effect for QMS and EMS management.

Mostly, the companies have process models for three proposes:

1. to have an overview for an external observer who wants to understand how business processes are performed and to determine the improvement points
2. to define the desired processes and how company should/could/may perform its activities
3. to provide explanations about the rationale of processes, establishing link between business requirements and process models

Our research group has from previous projects good Software AG tool ARIS usage experience, together with its modelling methodology. This is the reason why we also implemented this approach in our current analyses.

4.1.1 ARIS House Approach

Commercial ARIS toolset supports several standards

such as Business Process Execution Language (BPEL), Business Process Modelling Notation (BPMN) 2.0, Event-driven Process Chains (EPCs), Unified Modelling Language (UML), ArchiMate etc (Business Process Trends, 2007).

In addition to the notations, the ARIS framework not only describes processes but also includes other important information related to the process flow, such as Organisation and organisational structures, Business objectives and strategies, IT-systems and software applications, Data and data structures, Resources (e.g. people and materials), Information flow, Costs, Products and services related to the process, Skills and knowledge.

To handle such complicacy, the ARIS methodology provides an ARIS House structure to organize the different model types, objects and to define their relation to each other. This structure helps to organize all of the data and reduces complexity by offering five views – Organization View, Data View, Function View, Product/Service View and Process (Control) View.

By itself, the ARIS framework does not provide a detailed method for way how to perform business re-engineering or designing the IT systems necessary to support a business. The major focus areas should be products and services that IC plans to market, business processes, roles, documents and data in critical value chains.

4.1.2 Processes for Industrial Cluster

To put IC in operation, the FP with its strategic alliance partners should develop process architecture for IC (Fig. 1). The process architecture is a structure that describes the way the business will operate by determining clear responsibilities.

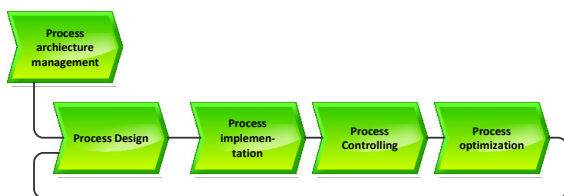


Figure 1: Process lifecycle.

After the process architecture has been established, the determined processes should be carefully designed. The first priority should be to have processes that are related to IC management. When there is an agreement in these processes, the companies may start to model their own processes to adapt additional demands accrue from IC management processes. The biggest change for IC

companies is that they need the Broker role. This role should identify new collaboration opportunities both inside and outside the IC.

During the process design, the ARIS toolset as well as methodology was quite valuable, as it gives us systematic way to communicate the agreed processes and principles via FP web environment which is opened for IC members.

When processes are designed, the process implementation phase is started. According to our approach, during this phase the FP's production planning environment, work order management and inventory management functionality should be implemented. As the IT solution is rather light-weight, the implementation process is quite short.

After process implementation, the process controlling activities should be started. Information for controlling can be collected by FP and provided by IC members. Basing on analyses, the IC FP may initiate with strategic partners process changes to be more effective or to adapt to changing market demands.

According to our experiences, the main processes that should be focused in level of IC are: Develop and manage Industrial Cluster; Design and manage products provided by Industrial Cluster; Purchasing; Marketing and selling products; Delivering products (incl. logistics); Managing customer services; Manage IT; Manage knowledge, improvement and change.

In level of IC companies, the main focus should be on the following processes: Information exchange within IC; Manufacturing process and Manage environment safety.

What is not listed is Risk management process. According to our understanding, it is important to emphasize it separately as it minimizes risk to be unsuccessful. It is not listed, because we have seen that small companies will do risk management quite casually during project preparation phase.

4.1.3 Information Management

Having modelled all needed business processes, it is possible to determine most critical artefacts that companies need to exchange in IC. Based on that information, the FP can consider extending its IT environment, to offer wider functionality to the IC members.

Our research group has access to the IC that covers more than 20 SME-s, which are also mostly small companies operating in Estonia as well as in neighbour countries.

Based on performed analyses, we have determined the major artefacts describing IC,

presented in Fig. 2. To make an architectural description, these artefacts are also interconnected via many-to-many connections. Amount of interconnections should be minimized to keep the documentation as simple as possible. One option is proposed in Fig. 2, where most critical artefacts are emphasized.

These emphasized elements should be also modelled in processes, because then it forms analysable set of information for FPs and gives the possibility to propose processes reengineering if needed.

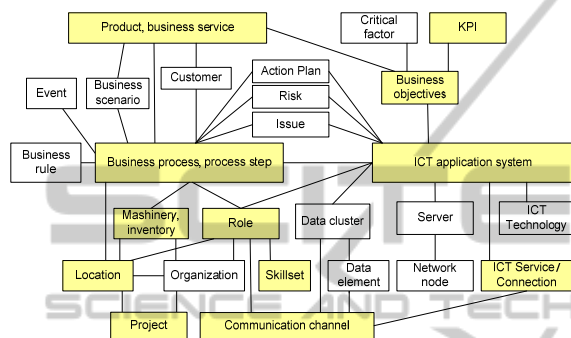


Figure 2: Key artefacts modelling IC.

The degree of simplification and abstraction of process model depends on the interest of the target audience and business uncertainty levels.

4.2 Major Risks for Focal Player Forming Industrial Cluster

To start to form IC, risk management is a significant topic. According to our team experiences, the following risk categories should be taken into account – luck of trust; companies’ economic stability; quality management; companies’ production capacity management; and lacking of technology and product development innovation.

In Eastern Europe, the major risk category is luck of trust. Companies are developing in the first phase of IC lifecycle. When their economic situation has been strengthened, they may start to extend their market share by their own, excluding the IC and overtaking the customers. This will influence IC microclimate and minimize the trust inside the IC.

Weak whole set capacity is the bottleneck and has resulted in difficulty in improving the overall size, economic effects and competitive power.

5 CONCLUSIONS

There are numerous small production companies in

production field in Eastern Europe.

Our team is convinced that the key approach to establish working IC is to start from business modelling and have to process based approach for quality management as well as for controlling the cooperation inside IC. Thus the FP should form Process Office for IC (Kangilaski, 2010b), and based on this unit contribution to concentrate to develop IT solutions for critical processes support. Our team has successfully managed the pilot projects using ARIS toolset as working environment for that.

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