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DETERMINATION OF COMMODITIES SUITABLE FOR COORDINATION WITHIN THE CLUSTER

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ABSTRACT: In this paper we introduce a matrix for the classification of commodities, whether they are suitable to coordination within the cluster or not. Coordination of commodities within the cluster can reduce the cost of acquisition of these commodities. Commodities in matrix are divided into four groups. This dividing is based on two groups of criteria: importance of commodity within the cluster and availability of commodity on the market. The contribution of this paper is to recommend suitable commodities for coordination within the cluster. Then cluster can focus on these commodities more in detail.
KEYWORDS: cluster, commodity, company, classification, matrix

INTRODUCTION

This paper is focused on clusters on enterprises. Clusters are created especially for the purpose of making benefits for individual members of the cluster. One of these benefits can be saving of costs for companies in the cluster. This can be reached by different methods. One of these methods is joint commodity management (in the cluster). It means a joint purchasing and distribution of commodities to all cluster members. This joint management can be achieved using the proposed methodology for the selection of appropriate joint management of commodity clusters. This methodology is described in this paper. The aim of this paper is the establishment of basic commodities which are suitable for joint management of the cluster.

ANALYSIS OF THE COMMODITY

This chapter explains what does commodity mean and how we are looking on commodity. Further, there is the distribution of relevant categories of commodities - capital goods. Generally, suitable commodities for joint management are next part of this chapter. At the end of this chapter is an analysis of parameter types of commodities.

Approaches to commodities

Commodities are goods, which are traded on market with no differences in quality. Supplies from different suppliers are mutually substitutable. In this case, commodities considered are: energy, metals, agricultural products, meat and livestock. We can also see a commodity as a tangible property. Tangible properties are material objects in nature.

We are using the second approach to commodities in this paper, so commodities will be understood here as material goods. Property will be understood as results or human activities which serve or meet needs. Material goods as the good we understand the nature of the material (machine ...). Relevant categories of commodities for the cluster joint management and this paper are capital goods. Capital goods are characterized by their application in economic practice. These are goods that are used for other business activities (e.g. production).

Distribution of capital goods

Relevant category of commodities for the cluster is capital goods. Characteristics, examples and specifics of individual commodity groups are listed in Table 1 based on the literature [1].

Table 1 – Distribution of capital goods, use of resources [1]

Capital goods	Example	Characteristics	Specifics
Raw materials	Coal, ore, timber, oil, natural gas, agricultural products, etc.	Products of mining companies or farms. The minimum treatment technology.	Large products. The high cost of transportation, handling, storage.
Energy, semi-finished products	Plastics, cellulose, fuel, metallurgical materials, basic chemicals, metals, electricity, flour, etc.	Processed raw material for the materials. Energy suitable for the manufacture of final products.	Often commodity goods. Goods of the same quality and liability, delivered by more manufacturers.

Table 1(continue) - Distribution of capital goods, use of resources [1]

Capital goods	Example	Characteristics	Specifics
Parts, assembly groups	Motors, valves, integrated circuits, etc.	Components intended for direct mounting. Components of the mixed final products.	They do not require further processing.
Auxiliary materials, overheads	Office supplies, lubricants, filter materials, etc.	Materials and products for administration, maintenance, implementation of technological operations.	Goods widely used. Wide selection. Easy availability.
Finished products for business	Trading goods	Finished products intended for final consumption.	Goods packed in shipping or handling containers.
Equipment, capital equipment	Machines, production lines, PC, vehicle, factory, etc.	Resources deposited into the permanent activities required for manufacturing and other business activities.	Expensive. Risk purchases.

Generally appropriate commodities for joint management of commodity cluster

If we want to determine the appropriate commodity for joint management of the cluster, it is important to note that each commodity is theoretically suitable for joint management. The suitability of a common procedure is mainly dependent on the significance (consumed amount...) within the cluster. Commodities can be according to the business split into two categories.

Commodities generally used by companies. Commodities which are different from each other. Usually at least the type differences, one supplier can provide.

Commodities used in companies with same field of interests. Commodities where field of business decides about type a needs of commodity.

If we will take an overview of important commodities, they can be classified into these categories:

a) Commodities generally used in business:

Category of energy and intermediate products - energy
Category of extra costs and overheads
  - Office needs
  - Packages
  - Cleaners
Category of finished goods for business
  - Normalized parts
Category of management, capital equipment
  - PC
  - Transport and handling equipment
  - Buildings and facilities (depending on the development or recovery plans)

b) Commodities used in the same business field (business):

Category of raw materials
Category energy, semi-finished products - semi-field
Category of parts and assemblies
Category of extra costs and overheads
  - Lubricants, coolants, cutting fluids
  - Filter materials
Category finished goods for business
  - Purchased merchandise on (radio, batteries, windows, ...)
Categories of equipment, capital equipment
Machinery, production equipment, production lines

Analysis of commodity parameters

We use the identified categories and areas of basic commodities in this chapter. First of all, relevant parameters determine general commodities. Furthermore, for each category and commodity specific parameters may differ for individual members of the cluster.

Common parameters are: quality, quantity ordered, price per unit (kg, pcs, m3, ...), type of commodity (determining specific items).

The general parameter - unit number, is specified for each group separately, because it is always important to determine the unit's measurable. Overview of problem parameters for which can potentially require different requirements of individual cluster members is given below. The name of the commodities listed and the relevant parameters (in bracket).

Category of raw material - inanimate nature: chemical composition (quality), the unit volume (liter, kg, ...)

Category of raw material - live nature: unit volume (m3, pcs, kg ...), degree of ripeness, quality ("health" of raw materials, ...)

Category of raw material - special raw materials: chemical composition, dangerousness, suitability for recycling, the unit volume (liter, kg, m3, ...)

Category of energy, semi-finished products - energy: a unit of quantity (kWh, m3, ...)

Category of energy, semi-finished products – semi-finished products: unit volume (pcs, m3, ...), or chemical composition, structure, mechanical properties (strength, ductility, hardness, etc.)

Category of parts and assemblies: technical characteristics (power, power, consumption, dimensions, ...), production quality (accuracy, ...), mechanical properties (strength, ductility, hardness, etc.), the unit quantity (pcs, m3, ...)

Category of extra and overhead materials: unit volume (pcs, liter, ...), technical characteristics (dimensions, ...)

Category of finished goods for business: a unit of quantity (pcs ...), technical characteristics (dimensions, ...), brand, product quality (accuracy, ...), the scope of technical support and service (manuals, ...)

The categories of equipment investment units: unit volume (pcs, l, ...), technical characteristics (dimensions, performance, power consumption, ...), the brand, the scope of technical support and service (manuals, ...)

In addition to the above parameters there are also important parameters concerning the contractor that will be included in the criteria in the following chapter.

STARTING POINT AND SELECTION OF COMMODITIES ELIGIBLE FOR JOINT MANAGEMENT OF CLUSTERS. Definition of limiting conditions and criteria for selection of appropriate commodities

There will be established a substantial limiting conditions and criteria for selection of appropriate commodities for joint coordinated cluster approach in this subchapter. Also there will be a distribution of commodities into four groups according to their significance and availability.

Limiting conditions of commodities on their suitability for a coordinated cluster approach are listed first. Limiting conditions:

The willingness of members to a common cluster coordinated approach: cluster members must be convinced of the benefits of joint purchasing.

Suitability for commodity cluster coordinated common procedure: Commodities for joint management of the cluster must be significant enough for members of the cluster (e.g., important inputs for the production of main product). Deliveries must be made in sufficient quantities. Profit from coordination must be higher than the cost of coordination.

Quality: There must be a supplier which is able to provide commodity required properties (e.g. supply of metallurgical materials - meet the specific properties of the material), quality requirements, certification, etc.

Delivery: The supplier must be able to accept requests for delivery dates, or can perform a variety of delivery dates for individual cluster members.

Negotiating position in the market: The common procedure to achieve better negotiating position for the cluster (to weak the position of the supplier).

Availability of commodities (geographic location of cluster members): There are two ways to supply - supply directly by the members, or the use of central storage and distribution to members of the cluster. If a supplier supplies directly to the members, supplier must be able to meet specific conditions (type of commodity, quantity, delivery date) for less than the cost savings from joint management. The second option is to deliver to common warehouse for cluster (or for a specific commodity) and the distribution to individual members of the cluster is provided.

Maintaining flexibility: Purchasing function within the cluster must be well organized. Flexibility must be maintained at a similar level as before (or lead to its improvement).

The organizational trust: There must be mutual trust between cluster members.

The possibility of a fair distribution of cost savings: All cluster members must have a discount according to significance within the cluster and the volume of purchases.

In determining whether a commodity is suitable for joint management of the cluster can be divided into several commodity groups that blend together. There are particularly two main important aspects for us. The first aspect is the importance of commodities for the cluster. The second aspect is an availability of commodities in the market. From these two perspectives we derive the following four groups of commodities (see Figure 1).

Strategic fungible commodities: *It is a commodity with relatively stable consumption and high supply in the market (they are readily available). These commodities are important for cluster, and they are suitable for joint management of the cluster. The substitutable commodities can substitute for the required substitute products, which increases the availability of what we need. It is easier to change supplier, or purchase from multiple vendors simultaneously. Using the clustering process can be coordinated to reduce inventories. You can combine purchases from multiple suppliers.*

Strategic irreplaceable commodities: These commodities are also relatively stable consumption and low supply on the market (they are less accessible). These commodities are also important for the cluster and suitable for joint management of the cluster. It is not possible to replace the replacement item.

Minor commodities: This is a commodity with a high supply in the market (they are readily available). These commodities are less relevant for the cluster. The name "insignificant" is chosen due to inappropriate management of common cluster (low consumption) and good availability of commodities.

Scarce commodities: These commodities have a limited supply in the market. Their consumption is low and irregular. They are less significant for the cluster. Joint management is not recommended, but if it is a costly investment projects within the individual cluster members.

These two aspects (importance, availability) identify two groups of criteria, which we will deal with. This includes the following groups:

The criteria for commodity cluster significance: according these criteria we make a decision about significance for the common management of the commodity (Purchasing) cluster.

Criteria for access to the market: using these criteria, we can find the availability of commodities in the market. It deals with relationship supplier/cluster.

The criteria of significance commodities:
Cost
Costs associated with the purchase (transport, ...)
Quantity Discount
Quantity of purchased commodity for cluster (corresponds to the usual quantities purchased item)
The number of cluster members, which requires a commodity (or a percentage share)
Average frequency of purchase of items purchased cluster
There are common barriers to coordination? (high storage costs, lack of storage space, ...)
Cost of storage of purchased items

Accessibility criteria:
Reliability of suppliers
Implementation of specific requirements (dates, quantity, ...)
The number of potential suppliers
Bargaining power supplier
Ability to produce the commodity on their own
Compensation for purchased items
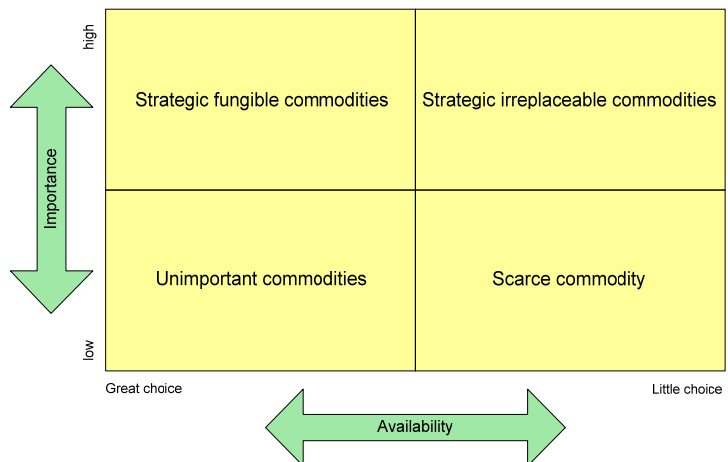Dependence on suppliers purchased commodities

Based on these criteria we composed questions which have to be answered for the evaluation of commodities under the criteria of significance and availability. Questions

Figure 1 – Commodity classification matrix

concerning the significance of commodities for the cluster, including the possible answers are listed in Table 3. Questions concerning the availability of commodities, including possible responses are listed in Table 4. Possible answers to the questions are included in the commodity group commodities - see commodity classification matrix Figure 1.

Table 2 – Questions and Answers about the significance criteria category

		Questions	Possible answers			
CRITERION OF IMPORTANCE COMMODITIES	1	What is the unit cost of purchased commodities?	very low	low	high	very high
	2	What are the total costs associated with the purchase of the commodity?	very low	low	medium	high
	3	What is quantity discount?	very strong	strong	limited	any
	4	What is the quantity purchased for cluster?	low	medium	high	very high
	5	What is the number of cluster members, which requires a commodity?	all	majority	minority	sporadically
	6	What is the average frequency of purchasing of purchased items by cluster?	low and irregular consumption	variable consumption	relatively stable bound to a specific time period	high consumption
	7	Are there any barriers to common coordination?	YES, unrecoverable barriers	YES, high barriers	YES, low barriers	NO
	8	What are total costs for warehousing of purchased commodity?	low	medium	high	nelze

Table 3 - Questions and answers about the category of accessibility criteria

		Questions	Possible answers			
CRITERION OF AVAILABILITY	1	Is there any reliable supplier of commodity?	yes, many suppliers	yes, several suppliers	yes, one supplier	no
	2	Is supplier able to fill our specific requirements (deadlines, amount, location...)?	yes	rather yes	rather no	no
	3	How many potential suppliers of required items exist?	very many suppliers	sufficient number of suppliers	few suppliers	one supplier
	4	What is the bargaining power of suppliers to cluster?	very low	low	high	very high
	5	Are we able to produce purchased commodity by ourselves, and is it advantageous?	YES, cost-effective	YES, cost-ineffective	NO, cost-effective	NO, cost-ineffective
	6	Is any substitution for purchased commodity on market?	very many	many	little	no
	7	How much is cluster dependent on supplier of commodity?	independent	partially dependent	strongly dependent	entirely dependent

Selection of commodities for joint management of cluster

In the previous chapter a set of questions that were based on previously determined criteria was created and described. These questions were integrated to the form and the answers were summarized in the matrix of commodity classification. Procedure of evaluation of commodities in the matrix is following: Answering of experts to individual questions in form. Based on the answers are individual commodities automatically entered into the commodity matrix. The generated matrix advises the user whether the commodity is suitable for joint management of the cluster, or whether it is easy or difficult to access the market.
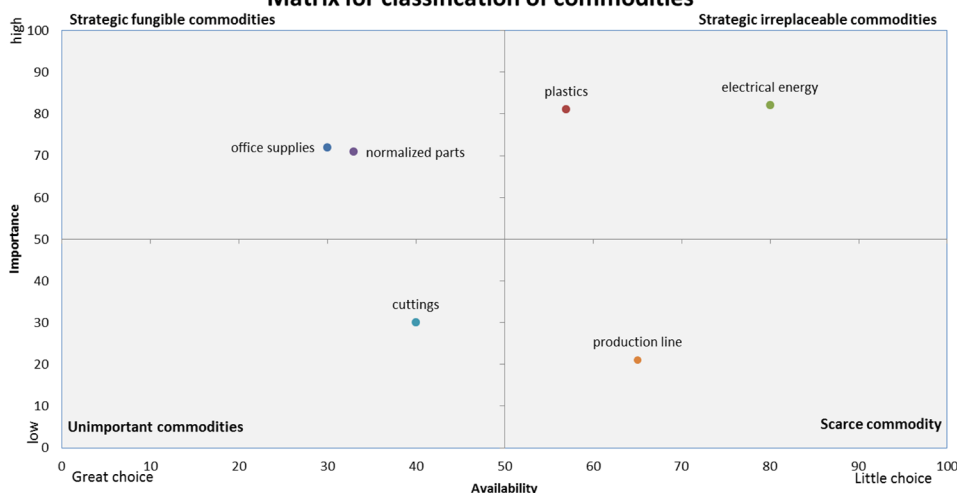

Figure 2 - Example of use of commodity classification matrix

The matrix was verified on a set of six commodities; it is the following commodities: office supplies, plastics (granules, tablets, powder, ...), electricity, standardized components (screws, nuts, bearings, ...), cuttings, production line (investment property - use of own production). The commodities were evaluated in chosen company, where team of experts answered the questions (mentioned in table 2, table 3). Example of the resulting matrix for these commodities is at Figure 2.

CONCLUSIONS

The aim of this article was to determine the methodology for evaluating commodities suitable for joint management of the cluster. This was achieved by using the proposed classification matrix of commodities. The benefit of this work is perhaps the cost reduction of the cluster using the proposed methodology. Another benefit is the analysis of commodities parameters. Then creation of the form for the matrix that lead to the suitable commodities for cluster. The main purpose of this work is cost savings of individual members of the cluster. This saving will lead to greater competitiveness of individual members.

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