

OPERATION STRATEGIES FOR DELIVERY MODELS OF REGIONAL LOGISTIC NETWORKS

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Abstract: The aim of my paper is to show the operation strategies of delivery models used in regional logistic networks. To reach this aim paper gives an overview about the delivery process, the definitions and varieties of delivery models in regional logistic networks and their operation strategies. The last part shows the relations between the delivery models and the operation strategies, and describes their usability for real processes.

Keywords: supply logistics, delivery models, operation strategies, regional logistic networks

1. Supply logistic process

The tasks of the supply logistics are the design, organization, operation and control of the material- and the related information flow of the supply process. If the supply logistics is not work well, inventories can be too high, or at the other side lack of materials can be happened. Elements of supply logistics can be separated in the aspect of the tasks:

- elements contain only informative and administrative tasks:
 - ordering process of the materials,
 - registration tasks,
 - analyzing and strategically tasks, etc.
- elements contain both of materials handling and informative tasks:
 - tasks related to the delivery process,
 - tasks related to the storing process.

The above mentioned facts show that the delivery process as one of the logistic activities is a significant, separable, but not independentable part of the supply logistic process.

Delivery tasks of the supply logistic process:

- qualification of the offers,
- qualification of the suppliers,
- selection of the suppliers,
- selection of the delivery process,
- selection of the deliver companies,
- scheduling of the delivery process,
- acceptance and loading of the goods,
- loading of the goods into the store.

2. Delivery models for regional logistic networks

Delivery models have the role to describe relations between the elements of the delivery process and define the applicable varieties of the individual elements.

Delivery models can be sorted based on

- the characterization of the supplying,
- the delivery process,
- the scheduling of the delivery,
- the integration of the delivery process,
- the structure of the storing process of raw materials and elements,
- the realization of the delivery process, etc.

Based on delivery elements and strategic questions of the supply logistics delivery model varieties can be described. These models can be suited to the tasks and structure of the logistic networks and give directions for design and control of their operation.

To describe the individual delivery model varieties, at the first step, main parameters have to be defined which have effect to the elements and their relations during the operation of a logistic network. For this step, the above mentioned model elements have to be narrowed to those varieties which can be possible at delivery tasks of a logistic network.

Delivery characterizations of logistic networks:

- centralized or mixed supply process,
- indirect delivery relations between more than one supplier and user,
- using one or more outer buffer store element,
- just in time delivery process,
- integrated delivery process,
- using virtual enterprises,
- centralized storing process using
 - own stores or
 - storing service or
 - consignment storing process,
- take the delivery process as a service, etc.

Figure 1. shows the strategic questions which determine the operation of delivery processes in regional logistic networks. At the individual strategic questions only those varieties are showed which can play important role in these networks.

Based on the possibilities described in Figure 1. there can be found six model varieties which give real solution for delivery tasks of regional logistic networks:

- OSO delivery model: using one own, outer buffer store for supplying,
- OSS delivery model: using one outer buffer store for supplying as a storing service,
- OSC delivery model: using one outer buffer store for supplying in consignment storing process,
- MSO delivery model: using more than one own, outer buffer store for supplying,
- MSS delivery model: using more than one outer buffer store for supplying as a storing service,
- MSC delivery model: using more than one outer buffer store for supplying in consignment storing process,

Of course at all of the main model varieties further subvarieties can be defined but these subvarieties do not have any effect to the general models. Subvarieties give possibilities to

narrow the models for special cases which can be analyzed in details in the chapter about the operation strategies.

Characterization of the supplying	Centralized
Delivery process	Indirect, more than one user and supplier
Scheduling of the delivery	JIT delivery
Integration of the delivery process	Virtual enterprise
Structure of the storing process	Centralized
Outer buffer store	One More than one
Operation of the stores	Own Service Consignment
Realization of the delivery process	Service

Figure 1. Main elements of the delivery model varieties

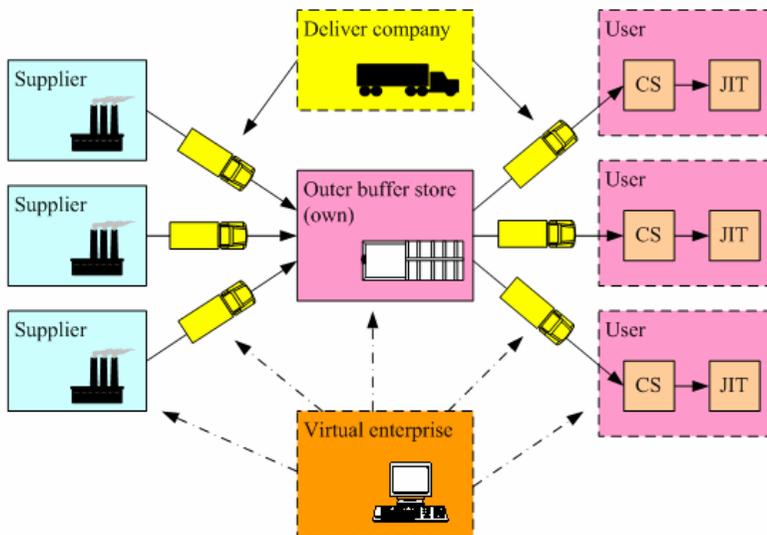


Figure 2. Example for the objects of a delivery model (OSO) and their relations
 CS – Centralized supply, JIT – Just in time delivery process

3. Operation strategies for the delivery model varieties

During the delivery process many situations can be appeared which have effect to the effectiveness of the process. If these situations are not analyzed before the operation many problems can be arisen in the delivery process. These kinds of problems of the operation of logistic networks can be avoided if decision tasks are defined in different operation strategies and these strategies are related to the delivery models.

Strategy questions used in delivery networks give alternative solutions for the next tasks:

- management of the ordering process,
- management of the delivery process,
- allocation of the deliver companies,
- allocation of the outer buffer stores,
- division of the logistic resources (if the objects of the network own resources, free capacities of them can be used by other objects of the network – for a given fee – managed by the virtual logistic centre).

The above mentioned possibilities in the strategies can only be appeared in certain structures of the logistic networks which determine the main operation strategies of the delivery models:

1. General integrated operation strategy
2. Mixed operation strategy
3. Operation strategy for grouped users

At the **general integrated operation strategy** (GIOS) all of the process elements are managed by the virtual logistic centre because of the general integration.

Main characterisations of the GIOS strategy:

- optimal operation of the supplying processes (in generally – except the individual orders with low quantities):
 - ordering (quantities, prices, etc.),
 - delivery (capacities, routes, costs, etc),
 - storing (inventories, costs, etc.),
- less administrative task for the objects,
- many tasks for the virtual logistic centre,
- complex and effective information system,
- higher operation costs for the network, etc.

At the **mixed operation strategy** (MOS) most of the process elements are managed by the virtual logistic centre except some special orders which are managed directly by the user, because of the amount, value, ordering frequency or other parameters.

Main characterisations of the MOS strategy:

- nearly optimal operation of the supplying processes:
 - ordering (quantities, prices, etc.),
 - delivery (capacities, routes, costs, etc),
 - storing (inventories, costs, etc.),
- better solution for the special orders,
- less administrative task for the objects,
- many tasks for the virtual logistic centre,
- complex and effective information system,
- higher operation costs for the network, etc.

At the **operation strategy for grouped users (OSGU)** general integration can not be realized because of the groups of users or suppliers however all of the process elements are managed by the virtual logistic centre. In this case the process elements of the individual groups have to be managed separately.

Main characterisations of the OSGU strategy:

- optimal operation of the supplying processes only for the individual groups:
 - ordering (quantities, prices, etc.),
 - delivery (capacities, routes, costs, etc),
 - storing (inventories, costs, etc.),
- management of certain logistic tasks can be easier within the groups,
- less administrative task for the objects,
- many tasks for the virtual logistic centre,
- complex and effective information system,
- higher operation costs for the network, etc.

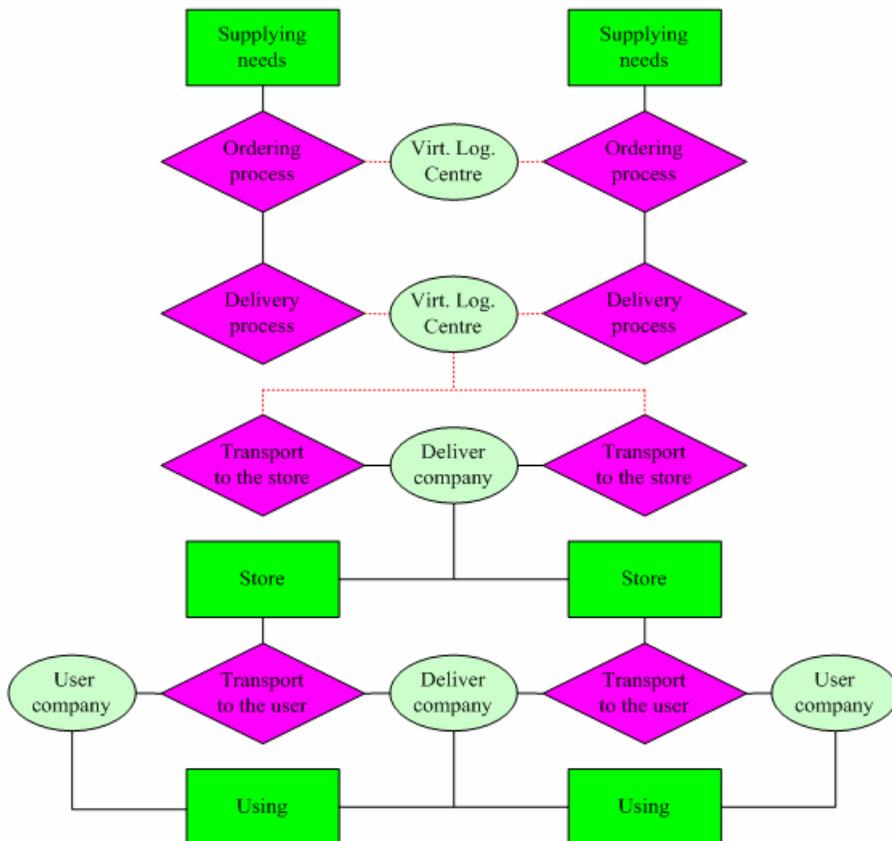


Figure 3. Example for the operation strategy (OSGU) of a delivery model (MSO)

4. Applicable operation strategies for the delivery models

Management of delivery processes in logistic networks is not a simple task because of the high number of the objects (suppliers, users, stores, deliver companies, etc.) and the delivery

tasks. To solve the tasks of such a complex system, suitable models (describe the objects and their relations) and strategies (give directions for the delivery processes and allocate functions to the objects) are required.

Of course the same strategy can not be applied for all of the models because the condition systems of the models are not the same. Relations between the models and the operation strategies described in the previous chapters are shown in Table 1.

Table 1. Applicability of the strategies for the delivery models of logistic networks

Delivery models			Operation strategies		
No.	Code	Description	GIOS	MOS	OSGU
1.	OSO	Using one own, outer buffer store for supplying	√	√	∅
2.	OSS	Using one outer buffer store for supplying as a storing service	√	√	∅
3.	OSC	Using one outer buffer store for supplying in consignment storing process	√	√	∅
4.	MSO	Using more than one own, outer buffer store for supplying	∅	∅	√
5.	MSS	Using more than one outer buffer store for supplying as a storing service	√	√	√
6.	MSC	Using more than one outer buffer store for supplying in consignment storing process	∅	∅	√

GIOS – General integrated operation strategy, MOS – Mixed operation strategy, OSGU – Operation strategy for grouped users

By the help of Table 1. it can be said that the OSGU strategy is not applicable for the first three models (OSO, OSS, OSC) because of the structure of the network (creation of groups has no advantages). On the other hand MSO and MSC delivery models are analysable only by the OSGU strategy, because at these models can not be built without grouping. The most general model is the MSS which can be applied in the most cases and can be operated and analysed by all of the strategies.

Important element of the models is the allocation of the management tasks of the delivery process to the objects. It shows which object can manage the delivery, where there are three possibilities:

- delivery is managed by the virtual logistic centre,
- delivery is managed by the users,
- delivery is managed by the suppliers.

To determine the allocation possibilities in the aspect of managing the delivery the roles of the objects have to be described at the different strategies (Table 2.).

Based on Tables 1. and 2. management tasks can be allocated to the individual objects for all of the delivery models of logistic networks which are shown in Table 3.

Table 2. The roles of the objects at the different operation strategies

Operation strategies			Management tasks		
No.	Code	Description	VLC	U	S
1.	GIOS	General integrated operation strategy	√	∅	∅
2.	MOS	Mixed operation strategy	√	√	√
3.	OSGU	Operation strategy for grouped users	√	∅	∅

VLC – Virtual logistic centre, U – User, S - Supplier

Table 3. The roles of the objects at the different delivery models

Delivery models			Management tasks		
No.	Code	Description	VLC	U	S
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3.	OSC	Using one outer buffer store for supplying in consignment storing process	√	√	√
4.	MSO	Using more than one own, outer buffer store for supplying	√	∅	∅
5.	MSS	Using more than one outer buffer store for supplying as a storing service	√	√	√
6.	MSC	Using more than one outer buffer store for supplying in consignment storing process	√	∅	∅

VLC – Virtual logistic centre, U – User, S - Supplier

Table 3. shows that there are two delivery models between the varieties where the special orders can be hardly realized (MSO, MSC). It means that there is possible to manage special orders but the integration of them into the general process managed by the virtual enterprise is not solvable (in many cases there has no advantage to integrate it).

At the other models this kind of integration is easy and does not increase the complexity of the management of delivery processes of logistic networks.

5. Summary

Summarise the above mentioned facts we can say that the described delivery models well cover the requirements of production and service companies in the regional logistic

networks, it means that all of the varieties of the models can fit to the needs of a special user or supplier group.

For all of the delivery models one or more production or service field can be defined where the advantages of the models can be used to reach the maximal effectivity.

In generally the elements, which are the components of the models, have got certain characterisations which have effects to their applicability. Of course these characterisations are given to the models where these elements are used, but the relations of the elements can increase or decrease this effects.

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