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TOOLS FOR IMPROVING LOGISTICS PROCESSES

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ABSTRACT: New trends in strategic evaluation are influenced by new navigation, information & communication technologies. They permanently change the possibilities, the goals and the forms of logistics strategies. The task is to identify and fulfil a successful logistics business strategy. Thereby the logistics strategies have a strategic, structural, functional and implementation component. Today companies can hardly succeed without taking the broad range of logistics strategies into account. Logistics strategies are also used to the company's positioning in the market. The support of up- and downstream members along the complete supply chain is very important. The successful introduction of a logistics strategy in a company requires methodical approach for the selection of the appropriate solutions. Choosing the right solution requires an overview of the wide range of possible management instruments. To give the reader an overview of selected management tools and logistics tools to improve processes, some of them are presented in this paper and are explained too. The starting point is classification procedures. The combination of the Value, Rarity, Imitability and Organization (VRIO) model, the identification of technologies types and the characterization of resources allows the definition of logistics strategies, standard procedures and sets of logistics activities.

Keywords: Strategic management tools, logistics tools to improve processes, logistics resources, VRIO-analysis

1. MANAGEMENT INSTRUMENTS

Different studies identify the most important management instruments. Strategic Planning, CRM, Employee Engagement Surveys, Benchmarking, Balanced Scorecard, Core Competencies, Outsourcing, Change Management, Supply Chain Management, Mission, Vision Statements and others are important management instruments (Cp. [1]). The development of a logistics strategy has four important parts. These are the strategic, structural, functional and implementation one. Figure 1 shows them to illustrate the different sights on a logistics strategy.

The Strategic Planning is the basis of strategic management. It includes a great number of methods, instruments and tools, which support the analysis, the design, the evaluation, the implementation and the control of strategies. Figure 2 shows some of them to illustrate the huge number of possibilities to support the strategic management, also in logistics.

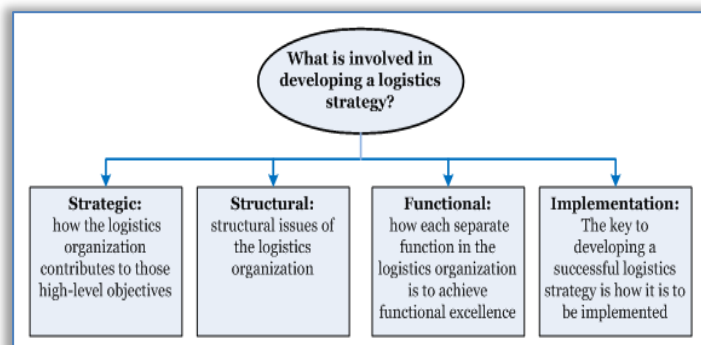


Figure 1. Parts of a logistics strategy (Cp. [2])

2. LOGISTICS TOOLS TO IMPROVE LOGISTICS PROCESSES

There are often used classification procedures in logistics. It is more comfortable to handle with groups and classes than with single items. The use of representatives elevated the clearness of logistics processes. It is more easy to use strategies, workflows and expedients as a standard by

using groups of items. In addition it simplified the evaluation of logistics objects e.g. products, suppliers, customers, offers. The classification has positive effects on the planning and controlling of logistics processes. It simplifies the use of items and increases the transparency in summary. Classification procedures were developed and published around the world. Table 1 shows a selection of typical classification procedures in logistics. They are well known and often used too.

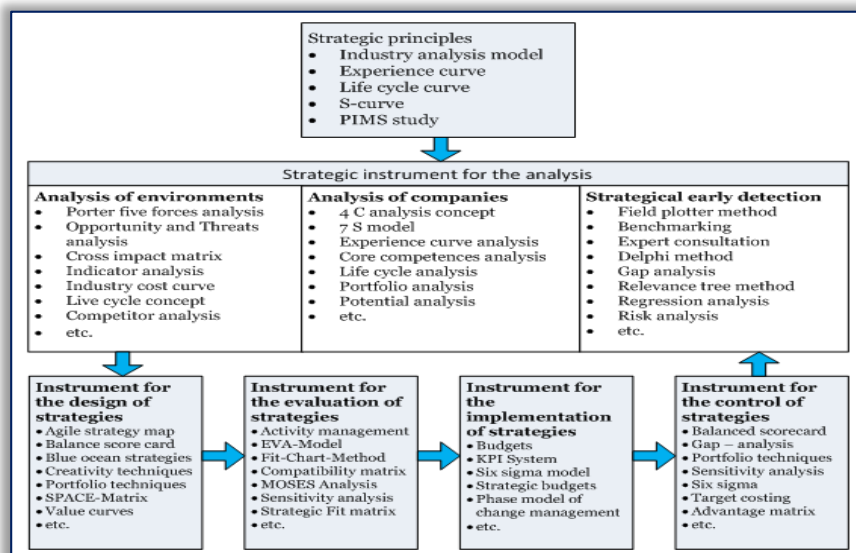


Figure 2. Classification of some strategic management instruments (Based on [3], [4], [5], [6], [7], [8], [9], [10], [11], [12], cp. [13])

Table 1. Some classification procedures of items in logistics (Compare [14])

Procedure	Short description of categorization / Example	Literature
ABC Analysis	Based on importance e.g. sales volume <ul style="list-style-type: none"> • A item – High annual consumptions/high value • B item – Medium annual consumption/medium value • C item – Low annual consumption/low value 	[21], p.131 et seq. [15], p.84 [30], p.81 et seq.
XYZ Analysis	Based on the dynamics of consumption <ul style="list-style-type: none"> • X item – Little variation • Y item – Medium variation • Z item – High variation 	[21], p.259 [27], p.248 et seq. [28], p.60 et seq.
HML Analysis	Based on the cost per unit <ul style="list-style-type: none"> • H item – High cost per unit • M item – Medium cost per unit • L item – Low cost per unit 	[17], p.35 et seq. [22], p.190 et seq.
GMK Analysis	Based on the volume of items <ul style="list-style-type: none"> • G item – Big volume (Großvolumig) • M item – Medium volume (Mittelvolumig) • K item – Small volume (Kleinvolumig) 	[20] [25] [30], p.81 et seq.
FSN Analysis	Based on the rate of consumption <ul style="list-style-type: none"> • F item – Fast-moving items • S item – Slow-moving items • N item – Non-moving items 	[17], p.35 et seq. [22], p.190 et seq.
SDE Analysis	Based on the availability of items <ul style="list-style-type: none"> • S item – Scarce available (generally imported) • D item – Difficult to obtain • E Item – Easy to obtain 	[22], p.190 et seq. [29], p.465
SQS Analysis	Based on seasonality of items <ul style="list-style-type: none"> • S item – Seasonal items • OS item – Off-seasonal items 	[22], p.197 et seq. [17], p.32
VED Analysis	Based on criticality of items and their effect on production if they are not available <ul style="list-style-type: none"> • V item – Vital items • E item – Essential items • D item – Desirable items 	[17], p.35 et seq. [19], p.76 et seq. [22], p.190 et seq.
SKFO Analysis	Based on selling characteristics <ul style="list-style-type: none"> • S item – Increasing (Steigend) • K item – Constant (Konstant) • F item – Decreasing (Fallend) • O item – No selling (Null) 	[23]
GOLF Analysis	Based on suppliers and nature of markets <ul style="list-style-type: none"> • G item – Government • O item – Ordinary market • L item – Local suppliers • F item – Foreign suppliers 	[22], p.197 et seq. [17], p.32 et seq.
ABC-XYZ Analysis	Combination of an ABC and a XYZ Analysis	[26], p.54 [16], p.26 et seq. [18], p.35 et seq.

Procedure	Short description of categorization / Example	Literature
Portfolio Method	Classification in different categories e.g. success fee or procurement risk <ul style="list-style-type: none"> • Strategic materials • Bottleneck materials • Lever materials • Uncritical materials 	[16], p.28 et seq. [18], p.35 et seq.
ABC-XYZ-GMK Analysis	Combination of an ABC-, a XYZ- and a GMK-Analysis	[24], p.64 et seq. [30], p.81 et seq.
MUSIC-3D Analysis	MUSIC=Multi Unit Selective Inventory Control Based on an ABC-, a VED- and a SDE-Analysis. Each dimension has two levels: <ul style="list-style-type: none"> • High and low consumption • Critical and non-critical • Long and short lead time 	[22], p.190 et seq. [19]

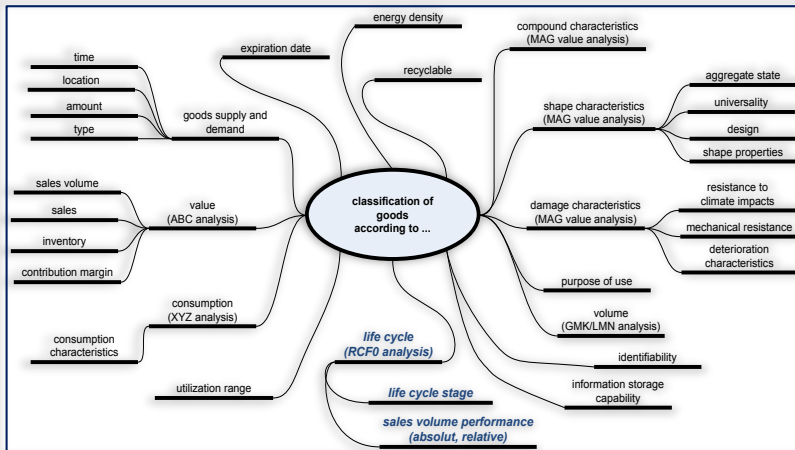


Figure 3. Important classification aspects of goods

Figure 3 shows the overview of classification aspects of logistics goods.

VÖLKER and NEU [31], p. 31 identify eleven collaborative logistics concepts. These are JIT, Quick Response, Continuous Replenishment, VMI, Cross Docking, ECR, Collaborative Planning, Forecasting and Replenishment, Electronic Market, Tracking and Tracing, SCM and CSCM. However, a great number of other concepts (e.g. 3PL to 5PL, Sourcing strategies, Keiretsu, Kanban, cp.

[31]) is also be used in the logistics area but is not among the so-called logistics concepts. New strategies as “Green logistics” and “sustainability” are not be discussed in this publication. In summarize there are not many publications, which deal with logistics tools and instruments in a strategic mind. The majority of publications describe individual selected tools and their usage for specific questions and scopes. That is why some general overviews of classic tools in logistics were developed.

Figure 4 shows the overview of logistics tools to improve logistics processes. These are application oriented instruments and tools. The tools were be assigned into the following groups: analysis, evaluation, design, implementation, controlling and interpretation according to their application possibilities.

3. STRATEGY AND ANALYSIS FOR LOGISTICS RESOURCES

The VRIO framework (Cp. [36]) is neither often applied nor well known in the logistics area. The VRIO framework is the core piece of a resource based companies view. (Cp. [37], [38], [39]) The considered criteria are value, rarity, imitability and

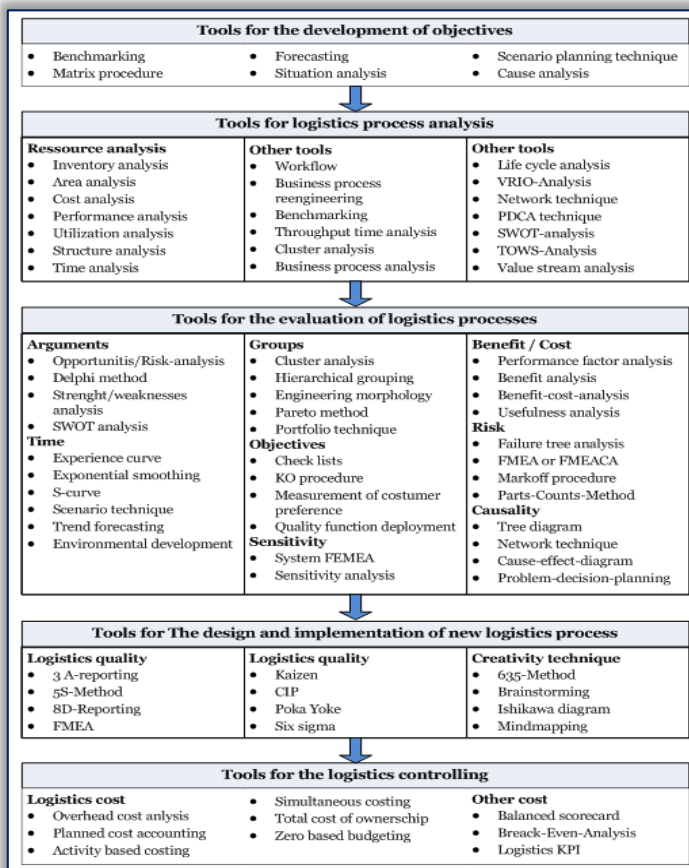


Figure 4. Some important logistics tools to improve processes (Based on [32], [33], [34], [35], cp. [13])

organization. VRIO is the acronym for a valuable, rare, inimitable and organized resource. The VRIO model is the foundation of a specific internal analysis. Table 2 presents an overview on the method. It is possible to compare company resources with those of competitors by using the VRIO model. This gives hints for the development of a competitive strategy and eliminate relative weaknesses.

What is a resource according to VRIO? It is anything that the company owns or does that creates value for customers. Resources are e.g. equipment, technologies, money, area, energy, human resources and time.

The procedure to apply the VRIO model has the following steps.

- » List of all resources and prioritization.
- » Comparison of the company resources with those of competitors and Definition of the four criteria value, rarity, inimitability and organization.
- » Definition of the competitive implications.
- » Definition, realization and controlling of activities to improve and maximize the competitive advantage.

The VRIO idea can also be used to compare, contrast and evaluate logistics concepts (e.g. Kanban, Just in Time, Just in Sequence, Vendor Managed Inventory).

Table 2. Example of VRIO analysis and impact on performance

Resources are ...				Impact on ...	
Valuable?	Rare?	Difficult to imitate?	Supported by organization?	Competitive Implications	Performance
No	-	-	-	Competitive Disadvantage	Below Normal
Yes	No	-	-	Competitive Parity	Normal
Yes	Yes	No	-	Temporary Competitive Advantage	Temporary Above Normal
Yes	Yes	Yes	No	Unused Competitive Advantage	Above Normal
Yes	Yes	Yes	Yes	Sustained Competitive Advantage	Sustainable Above Normal

Value: New resources should be developed and current resources should be improved to offer a high value to the customers.

Rarity: Resources should be unique in comparison to other competitors.

Inimitability: Resources should be difficult to imitate by other competitors.

Organization: All valuable, rare and inimitable resources should be effectively used to generate the most profit out of them.

New technologies are an important resource in this mind. All major industrial nations are searching, based on the same activities, for new key-technologies to get a long-time competitive advantage. The evaluation of technologies should be done in short time cycles to process the decision for investment in research and development as early as possible but also not too early. Therefore, the part of own development, the part of co-operation with others or the buying rate has to be defined. Decisions on the role as a pioneer as an early follower or as a later follower should be made.

Therefore the following evaluation procedure is recommended:

- ≡ Evaluation of the potential and benefit of a new technique / technology.
- ≡ Evaluation of the level of maturity of a new technique / technology.
- ≡ Evaluation of the expenses (costs) for research and development in the next months or years for this technology.
- ≡ Evaluation of the time span for the use of a new technique / technology.
- ≡ Evaluation of the prospective durability of use.

Table 3. Some examples of logistics relevant technologies for the information flow [40]

	Type of technology	Examples
A	Future technology - Very hard to obtain - Market value may not be quantified	Recording the microscopic surface by using laser diffused light
B	Key technology - Hard to obtain - Basis of competitive advantages	RFID Holograms special security characteristics electronic tendering AR (Augmented Reality)
C	Basic technology - Simple to obtain - Necessary basis of logistics	Barcode, Data Matrix Code, OCR

Table 3 shows some technologies that are relevant for the information flow. Well-known as well as new strategic procedures and software-tools are used to evaluate the tasks to be completed. The SWOT-/TOWS-Matrix and the S-curve are such well-known methods. New procedures evaluate especially the energy efficiency.

Some examples are in context with RFID- technologies and quality control:

- ≡ Creation of shipping units and transportation units
- ≡ Control of the distribution processes
- ≡ Access control, e.g. in special areas of warehousing
- ≡ Identification of boxes e.g. returnable containers
- ≡ Traceability of products and documentation
- ≡ Documentary evidence of origin and protection against imitation

The technologies of information logistics are combined with technologies of the quality control of processes.

The characterization of resources according to logistics objectives is an important step to improve their effective use. Typical criteria are area, volume, capacity, cost, energy, environment, quality, reliability, robustness, staff, technological level and time. Figure 5 gives an example of characterization of operating resources.

Single value, matrix and cluster analyses can be used to design groups of resources with homogeneous features. These groups with specific, homogeneous resources can be handled by specific logistics strategies, standard procedures and sets of activities.

The combination of the VRIO model, the identification of technologies types and the characterization of resources gives the possibility to holistic design and optimize resources in logistics.

4. CONCLUSION

Some selected management tools and logistics tools to improve processes are presented. The starting point are classification procedures. The classification has positive effects on the planning and controlling of logistics processes. It simplifies the use of items and increases the transparency in summary. The combination of the Value, Rarity, Imitability and Organization (VRIO) model, the identification of technologies types and the characterization of resources allows the definition of logistics strategies, standard procedures and sets of logistics activities.

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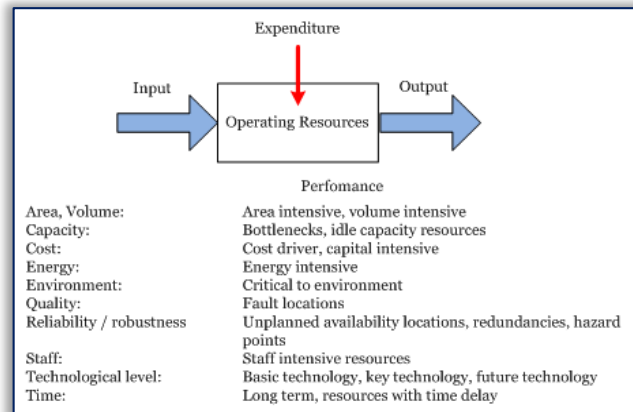


Figure 5. Characterization of operating resources

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