JOURNAL OF FOREST SCIENCE, *50*, 2004 (3): 142–148

Application of logistics in woodworking industry

J. ŠTŮSEK

Faculty of Economic and Management, Czech University of Agriculture, Prague, Czech Republic

ABSTRACT: The paper is focused on logistics. The importance of the logistic chain management is emphasized as it becomes a crucial competitive success factor. The total corporate costs and customer service quality are dependent on the structure and communication within this chain. Using a concrete example, several results of the establishment of the logistic approach in the woodworking industry are mentioned in the paper. It has to be emphasized that the application of the logistic principles in the industry has its own specificities arising mainly from the biological character of processes providing and manufacturing the basis resource. A solution of the supply – purchase chain is provided on the basis of an example of the company Dřevovýroba.

Keywords: logistics; value chain; logistic benchmarking and controlling

In the dynamically changing entrepreneurial environment, managements in firms have permanently been increasing consumers' demands. They strive to keep pace with the advance of new information technologies and instruments, moving the bounds of possibilities forward as much as possible but at the just not inconsiderable production costs. Managerial teams more or less successfully resist or utilise the globalisation of material, value and information flows wiping of the competitive advantages achieved on the one hand, and offering completely new opportunities on the other hand.

Classical models of the management processes in firms have gradually transformed from the solution of relatively unambiguously defined tasks (minimisation of the production costs, optimisation of the warehouse management, the achievement of suitable reactions and flexibility of consumers' demand, the management of human resources, etc.) to the target (system) approach presented in the application level of theoretical principles, mainly by logistics.

The competition by individual firms dwindles and it is gradually substituted by the competition of supply – purchase chains. The firm that does not consider the information about its customers and their demands as the common property of all participants in the value chain coming to the firm processes in a most suitable way, fails in the competition of the supply – purchase chain.

Each organisation building its strategy irrespective of its suppliers and customers has to take into account higher costs of the product supply and distribution. The firm selecting its suppliers in a conventional way (lowest price, best delivery conditions) and makes the most of the traditional relations (order – supply) quits its competitive advantages in controlling the time factor.

It is not always possible to ensure a timely reaction to the market requirements (fashionable trends or changed customer demand) without immoderate costs (higher final price). If the supplier is informed only by an order (and usually exclusively by an order) about the changed structure of his/her market or sale – changes, changes in the number of permanent customers or about the market history – the time of the cycle supplier – purchaser – consumer gets longer. The costs, operational and organisational problems of all the participants grow up – the consumer has more reasons for his dissatisfaction. As a last resort, but very often in reality, it is necessary to give up the order or to put up with a lower margin.

It is advantageous if the necessary purchaser's information is at disposal in the framework of the same informational system of the final suppliers. The real trade partnership has to be established, that means in a higher quality than in the classical trade relations. Of course, there exist possible risks (sharing a trade secret, dependence on the exclusivity of the supplier, etc.) but they can be eliminated, for example, by careful selection, common motivation in the increase of turnover, supporting the existent or economic dependence on the relation duration or strong limiting the number of suppliers in such an alliance.

One of the main principles in the establishment of trade partner relations is the preference of the value chain regardless to whom the value has been added. Therefore the suppliers should know the way of their purchaser's value creation who provides the value to his/her consumers. All the trade partners, to all intents and purposes, should preferably have at their disposal the information about the types of products or services that are considered by the consumer to be the most important. But if this actual state

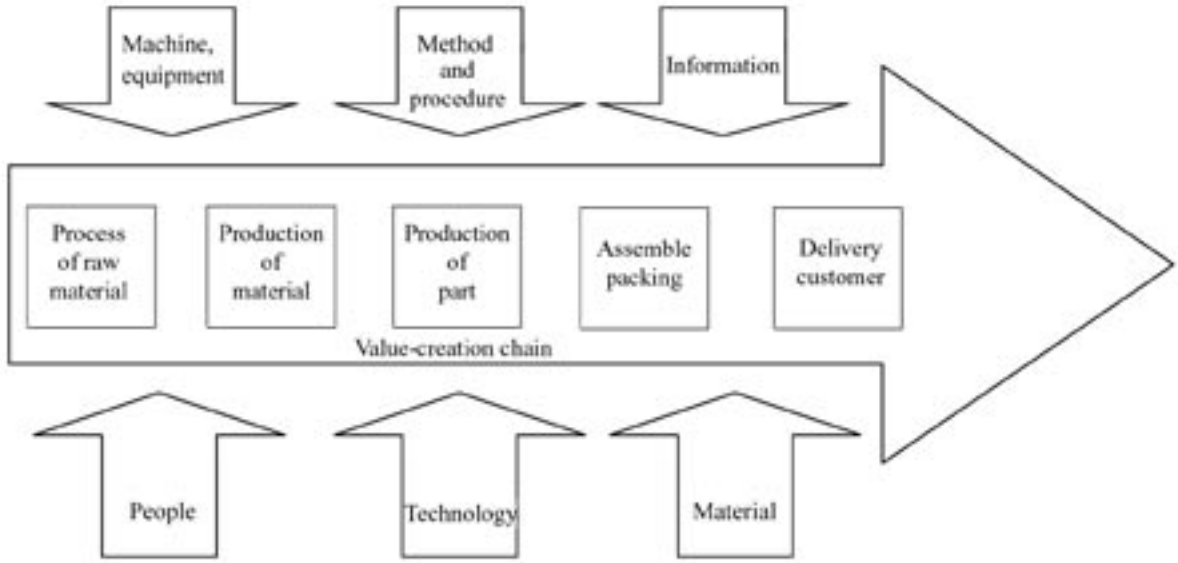

Fig. 1. Concept of value chain

of the value taken in by the consumers could be utilised without a loss of pace in the process of the value creation in relation to the price of the value, the information has to flow freely along all links of the value chain. After implementing this assumption, the logistics applied to the value chain or a combination of more chains is the most effective. The concept of the value chain is presented in Fig. 1.

The value chain as a model represents the flow of the value-added creation. The added values is created by the activities whose grouping creates the process that passes through the links of the value chain. Value-creating chain is a complex of mutually combined processes. The process can be defined as a succession of operations creating the added value. It is necessary to evaluate the productivity and quality obtained of these processes and to contemplate the time period of the process at the same time. For the improvement of the results obtained, it is necessary to optimise the individual processes mainly from the aspect of the time pressure and to ensure the expansion of production. Each process has some outputs being transformed in partial operations into the outputs of the following operations. Practically, the value-creating chain is the realisation in the form of supply-purchase chain in which each unit creating the added value is the consumer and purchaser of certain output at the same time. This conduces to the creation of the supply-purchase relations.

Management of the logistic chain becames the critical factor of the success in competition. Total costs of the enterprise and the customers service quality depends on the structure of and the communication within this chain.

AIM AND METHODS

The aim of the contribution is to show the successful application of the logistic principles selected in the branch of wood processing. At first, it is necessary to mention that the application of the logistic principles in this branch has some specific factors coming out mainly from the biological character of the processes providing the basic raw material – wood mass. It also significantly affects the function of logistic chain.

The logistic approach is based on the orientation of the consumers' demands, on the realisation of the consumers' service expressed in the form of logistic services of a higher quality that are part of the total consumers' satisfaction. This fact has to be considered as the first principle of the successful introduction of logistics into the firm. The services for customers become a crucial point in the negotiation between the customer and the supplier. The services are viewed as a process integrating the firm with the customer and supplier, the process in which the added value is created. The consumer is interested in the continuity of the service.

The second important principle in logistics is the integration of the logistic chain (system). It is possible to achieve the integrated logistic chain by different strategic steps, for example by a frontal attack, etc. More suitable and commendable way of introducing the integrated logistics is the gradual use of logistic management in individual links of entrepreneurial logistics. Implementing this approach is necessary only in the co-operation with the enterprise-wide strategy.

Only the basic methods and methodical approaches directed to the achievement of synergy effects have to be applied in the solution of logistic chains. For example, applied system methods, systematically oriented methods, optimisation methods, benchmarking methods and logistic controlling etc. In the selection of methods suitable for solving logistic problems it is necessary to consider the position of logistics in the firm, i.e. the phase of logistic concept, project, realisation or routine operation. Each phase and the extent of solution of the logistic problem asks for specific approaches and solution steps.

Logistic benchmarking and controlling is the basic approach to at the practical management of the logistic chain. This paper presents the utilisation of logistic benchmarking and controlling for the improvement on the logistic chain (directed to supply – purchase processes) in the firm with a purposeful direction to the quality standards and the establishment of the firm's position in its market segment. The method of the mass evaluation of the solution of supply relation is described in the paper. The basic criteria of the suppliers' evaluation were chosen: price, quality (composed of quality and length), quantity, services (for example conditions of payment, of transport, etc.), and the reliability of the delivery. The range of the points allocated was 1–5: 1 – lowest evaluation, 5 – highest evaluation. Together with the solution of distribution of the part of the logistic chain, the market analysis was accomplished with the use of ABC method.

RESULTS AND DISCUSSION

The use of the logistic approach in the branch of wood processing is shown on an example of the firm Dřevovýroba. The firm is specialised to the production of wooden handles for hand tools and special milling and turning semi-finished articles for the furniture-making industry and for the wholesale trade chains. The firm belongs to the medium ones by the production volume and by the number of employees but is one of the biggest ones in the Czech Republic within its branch.

The mean number of employees is 80, the annual capacity of cut wood raw material ranges from 15,000 to 20,000 m^3 of wooden mass. In structure: ash – 70%, beech – 25%, and the rest such as spruce, maple, locust tree 5%. The annual turnover is around 100 mil. CZK. The firm exports its products to EU countries and delivers them to the home market, wholesale, retail, and trade chains.

These are the basic parameters, asking for the continuance of material, information, and financial flows by a good organisation and permanent improvement of management and logistic chain organisation. Throughout the years, the firm has solved a number of logistic problems connected mainly with the production and export logistics.

The development of production and dynamic market environment caused some problems connected with the continual delivery of wooden raw material and the purchase of special machines (entrance logistics). It was also necessary to ensure the production quality required in some periods at the cost of disproportionate expenses and extraordinary effort (mainly in the temporary absence of suppliers or at the seasonal demand).

The problems of the product sale (output trade logistics) were also solved while isolated under the circumstance pressure – distribution to markets abroad but mainly to the Czech market in permanently changing wholesale net, deliveries for a non-manageable number retails including the sale to final customers. All of that had to be solved with regard to the production operation, necessary cash flow, and the connected operational problems.

For the overcoming of some obstacles and for the firm stabilisation, it was evident that the common denominator of some problems is a too great deal of the time-consuming processes, delays and roundabouts in the logistic chain. This conclusion was proved also by the internal analysis; some of the results are as follows:

The portion of technological operations in the whole logistic chain was only 32%, and only 27% of it belonged to the working operations.

Number of the working activity interruptions (related to the mean order) by systematic technological operations (drying, sorting, necessary manipulation) or unsystematic ones (waiting for a free drying room, need for free storage rooms, derangements, waiting for the purchaser's arrival or for their own transport, clearing of a preferential order for another purchaser) amounted to the frequency value 11 in many cases.

From the administrative activities necessary for the order clearing, waiting for the information transfer takes 61% of the time (including delays caused by the repeated corrections of information).

High portion of non-technological operations (storage, wrapping, drying, etc.). It is not possible to eliminate them thoroughly but they can be improved upon by a better organisation of production or by the use of outsourcing.

The main task of supply and distribution processes is not delimited from the aspect of the logistic management.

On the basis of this analysis the following priorities were determined:

To optimise (limit with the advantage of positive selection) the number and structure of trade partners, i.e. suppliers and purchasers, mainly in the home market.

To shorten or eliminate the course of all activities not increasing the value perceived by customers – realise the principle of time "oppression".

To realise, the system of quality management.

In the paper the main priority is given to points 1 and connected 2 which at present are considered as realised in some aspects.

On the basic of the individual criteria and the weights of the individual criteria, the evaluation and selection of the so called strategically significant suppliers completed by a necessary number of occasional and reserve suppliers was made. The aim of the selection of strategic suppliers was the simplification of the raw material purchasing process. The survey of criteria and final point evaluation are presented in Table 1.

In Table 1 only 3 firms are presented. Forms 1 and 2 are of the Czech origin and firm 3 represents a supplier from abroad. Seven firm subjects were evaluated in total. Out of them, two subjects were not able to ensure the quantity required. These two suppliers were selected as so called "reserve". The other suppliers were not able to ensure either the quantity or the price relations. The selection of these suppliers favourably affected the price area (price stability) as well as the quantitative stability.

Table 1. Result of suppliers evaluation

Criterion	Significance of criterion	Points range	Evaluation			Achieve value		
			Firm 1	Firm 2	Firm 3	Firm 1	Firm 2	Firm 3
Price	0.30	1–5	3	4	2	0.9	1.2	0.6
Quality	0.25	1–5				0.45	0.5	0.5
– diameter	0.20		2	2	2	0.4	0.4	0.4
– length	0.05		1	2	2	0.05	0.1	0.1
Quantity	0.25	1–5	3	4	2	0.75	1.0	0.5
Service	0.10	1–5	4	4	2	0.4	0.4	0.2
Reliability	0.10	1–5	4	4	2	0.4	0.4	0.2
Total	1.00					2.9	3.5	1.5

The evaluation of this point was compared with the value evaluation at the same time. Its concrete realisation is the firms know-how and therefore it was not possible to present it here. Nevertheless, the approach to the factor evaluation sharing the increase in the value added (which is taken by the customer as a desirable one) in the whole logistic chain was mainly intriquing. So in the check up of parameters of firm 1 (the ability may only act as a buying agent and supplier of wood mass but also its support and co-ordination of long-term relations with all the partners towards the decrease of costs and risk evaluation and a higher grade of delivery standardisation and the ability to undertake costs, problems, and risks connected with wood mass storage) of the financial characters, the final evaluation was expressed by the null costs of storage with 99% delivery certainty (at the non-comparable delivery elasticity when the limitation of the market deviation depended practically on the parameters of the firm technology and its potential work capacity – constant price index of the input raw material to the delivery term). The price increase was practically independent on the shortening of delivery terms.

The system of the purchase with strategic suppliers was changed according to this basis. It is now in advance used for the transfer of sale prognoses on the basic of obligatory and preliminary orders respecting the situation in the branch. It enables better organisation of the delivery preparation and in case of economic suitability, to undertake a part of the storage time. Besides that a preliminary quality check was established of the input raw material already with the supplier who enables a pre-selection in the corrected price conditions and is interested in the homogeneous deliveries (in length and thickness).

The cost for the raw material sorting and, moreover, the portion of the storage space decreased in the wood production. The space was previously used for the storage of the input raw material and now it is used for the storage of saw wood and for technological operations.

The decrease in the productional-operational steps occurred at the same time by means of shortening the material and information flows (transfer of competencies). Time reserve increased in this way, after completing each order, for the direct production can be started earlier. The compressing of time occurred without any influence on the value perceived by the customer (price, delivery, term, unchanged quantity) in the following characters:

Better distribution of the raw material purchase in time and in this way also the decrease in the input raw materials – by 3 months an average, i.e. the shorting by 40–50% in comparison with the earlier time consumation. Parallels of the deliveries among suppliers are coordinated in a more

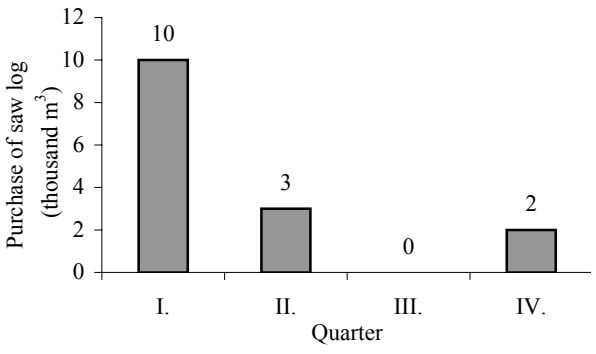

Fig. 2. Partition of purchased saw log before launching the system before year 1999 (thousand m^3)

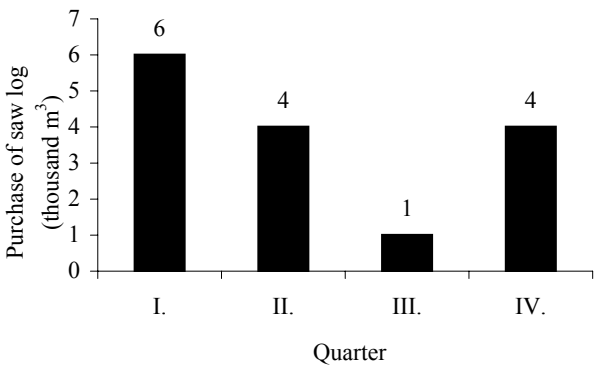

Fig. 3. Partition of purchased saw log after launching system after 2000 (thousand m^3)

suitable way. The distribution of deliveries throughout the year is given in Figs. 2 and 3.

Unnecessary manipulations with the wooden mass in storage and in production were reduced. The round wood was been sorted and cut according to the type of manufactured products. This caused an increase in the efficiency by 10% and at the same time shortening of the order production cycle.

The information flow was shortened (fastened) by the change of the ordering system.

The aim of the supplier's relationship is the creation of partnership which should be taken "as a special trade relationship" based on mutual confidence, openness, risk and profit sharing that bring some advantages to the engaged parties and result in a higher entrepreneurial output in comparison with the individual outputs of the participating firm. Strategic decisions of the firm caused a reality closer to the ideal state and also contributed to the permanent (and higher) sale of wooden mass, together with, a higher wood evaluation as compared with the export of raw material (i.e. corporate contribution).

In the distribution of products made strategic decisions were taken by both parties – export and home market. This contribution deals mainly about with the home market. The strategic aim was to obtain 30–40% of the market segment share in produced products. Therefore it was necessary to step to the management customer's relations – the management of the distribution link of the logistic chain. The basic decision in the management of the strategic character were directed to these areas:

– Management of the relationship with customers.
– Management of customer's service.
– Delivery of orders.
– Goods delivery.

The effective and flexible solution of these problems asked for the reinforcement of the computer technique in the whole logistic chain to obtain the real data for the management. The first step in the management of the relationship with the consumer was the necessity of the identification of the key customers or customer group and adapting the distribution channels. It was evident from the analyses that the final key customers interested in the products produced are among others:

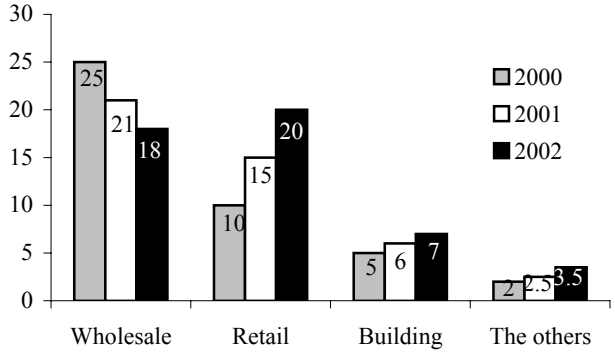

Fig. 4. Survey sales 2000–2002 – home market (mill. CZK)

– Building firms.
– Industrial and cleaning firms.
– Gardening firms and agricultural enterprises.
– Minor – individual consumers.

On the basic of the analysis, the consumer market was divided into the marked segments presented below:

– Market of minor consumers – represented by individual customers shopping in retail shops (hardware stores, gardening tools, baumarkets, etc.).
– Market of medium-size customers – represented by industrial and trade customers shopping in wholesale shops (Makro, hardware wholesale, etc.).
– Market of building operations – represented by building firms (Metrostav, Skanska, etc.).
– Other markets – represented by agricultural enterprises (ZNZ Agricultural needs, Agricultural farms, etc.).

On the basic of the evaluation of the contemporary purchasers (70% wholesale and 30% retail or final customers) this ratio had to be changed. The reason was that the wholesale managers represent strong partners and thus prolong the invoice maturity or do not pay at all and look for the most advantageous price offers, etc. This approach follows the increase in the market share at the same time. For a better meeting of the consumers' demands the assortment of marketable products was enlarged (spades, showels, mattocks, etc.). These products started in an assemblage and a wide offer of the assortment was created. It was accepted by trade chains and retail shops.

The market research was conducted for this purpose together with a massive concentrated offer of products both in the trade chains and in retail. Corresponding means of conveyance were purchased and a storehouse was constructed for the Czech area. All the customers (purchasers) obtained the precise demands from the aspect of consumer service (i.e. product quality, assortment, and the quantity of the products taken, delivery reliability, and so on). The individual customers are now in individual attendance and this affects positively the level of their contentment. In the system of order submitting in the classical way such as by fax, phone or electronically a new system of target communication between the customer and the purchaser is being introduced. These changes caused a shorter delivery cycle from the original 14 days to 2–7 days at present and in some cases to 24 hours period. The significance of these decisions is proved by the increase of earnings both in the traditionally made handles and in hardware as well (Fig. 4).

SUMMARY

The selection of a suitable supplier is one of the optimisation instrument in the whole logistic chain. In however it is influenced by the idea of strengthening the trade partnership for the increase of the value added – perceived by customers. It can be the key instrument in a certain phase. On the one hand it enables to decrease the costs or to increase the turnover, on the other hand it eliminates a number of production problems and contributes to the

quantity of production and the increase of the labour productivity.

It often contributes to a faster detection of new basic problems hidden under the cover of everyday production supply – purchase difficulties – but it has to be understood as an occasion for obtaining new competitive advantages.

Each strategic decision – as in this contribution – has its own methodical and practical content. Besides the indispensable theory and experience, this is underling by the necessity of the maximum possible quantification of the decision influence concerning the changes of the trade partner on the change of the value perceived by the customer. Preferential are the techniques which are simple, realistic, and financially interpretable. As a rule, similarly to the case described, the precisely formulated problem can lead to correct decisions even in the use of relatively simple paces of activities.

The firm management did not find an easy solution immediately. The concentration on consumers needs and the right evaluation of its own position in the logistic chain and towards the trade partners directed its strategic decision in the right direction. The aged experience and well manageable theoretical logistic principles are together with the implemented methods and techniques the firm's know-how and security for the future.

Received for publication July 1, 2003
Accepted after corrections December 30, 2003

Zavádění logistiky v dřevozpracujícím průmyslu

J. ŠTŮSEK

Provozně ekonomická fakulta, Česká zemědělská univerzita v Praze, Praha, Česká republika

ABSTRAKT: Článek je zaměřen na problematiku logistiky. Je zde zdůrazněn význam řízení logistického řetězce, jenž se stává kritickým faktorem úspěchu v konkurenci. Na struktuře tohoto řetězce a na komunikaci v jeho rámci závisejí celkové náklady podniku i kvalita služeb zákazníkům. V článku jsou na konkrétním příkladě uvedeny některé výsledky při zavádění logistického přístupu v dřevozpracujícím průmyslu. Je nutné zdůraznit, že aplikace zásad logistiky v tomto odvětví má některá specifika, vyplývající především z biologického charakteru procesů při poskytování, ale rovněž zpracování základní suroviny – dřevní hmoty. Na příkladu podniku Dřevovýroba je uvedeno řešení dodavatelsko-odběratelského řetězce.

Klíčová slova: logistika; hodnotový řetězec; logistický benchmarking a controlling

Článek se zabývá logistikou. Zdůrazňuje význam řízení logistického řetězce, jenž se stává kritickým faktorem úspěchu v konkurenci. Na jeho struktuře a na komunikaci v jeho rámci závisejí celkové náklady podniku i kvalita služeb zákazníkům. Ne v každém odvětví je možné aplikovat principy logistiky automaticky. To platí i pro odvětví zpracování dřeva.

Je třeba zdůraznit, že aplikace zásad logistiky v tomto odvětví má určitá specifika, vyplývající především z biologického charakteru procesů nejen při poskytování, ale i při zpracování základní suroviny – dřevní hmoty. Na konkrétním příkladě autor uvádí některé výsledky při zavádění logistického přístupu v dřevozpracujícím průmyslu. Příkladem k řešení daného problému byly poznatky z řešení dodavatelsko-odběratelského řetězce v podniku Dřevovýroba.

Cílem příspěvku je ukázat na úspěšnou aplikaci vybraných logistických principů v odvětví zpracování dřeva. Při řešení logistického řetězce byly využity základní metody a metodické přístupy, jež směřují k dosažení synergetického efektu.

Výsledek řešení logistického řetězce je uveden na příkladu podniku Dřevovýroba, jenž se zabývá výrobou dřevěných násad k ručnímu nářadí. Na základě analýzy logistického řetězce byly zjištěny nedostatky v řízení dodavatelsko-odběratelských vztahů. Proto bylo řešení logistického řetězce zaměřeno na řízení vztahů s dodavateli a odběrateli. Na základě bodového a váhového ohodnocení zvolených kritérií byly vybrány tři firmy pro dodávky dřevní hmoty.

Výběr vhodného dodavatele je jen jedním z nástrojů optimalizace celého logistického řetězce. Přesto však – je-li veden myšlenkou na upevnění obchodního partnerství za účelem zvýšení přidané hodnoty vnímané zákazníkem – může být v určité fázi nástrojem klíčovým. Na jedné straně umožní snížit náklady či zvýšit obrat, na straně druhé odstraní řadu provozních problémů a přispívá tak ke kvalitě produkce a ke zvýšení produktivity práce.

Často sice přispěje k rychlejšímu odkrytí nových, zásadních problémů skrytých pod nánosem každodenních provozních dodavatelsko-odběratelských těžkostí, to je ale nutné chápat jako příležitost získat nové konkurenční výhody.

Na straně řízení vztahů s odběrateli bylo učiněno strategické rozhodnutí, jež směřovalo k získání většího tržního podílu v dodávkách do maloobchodní sítě.

Každé strategické rozhodnutí má svůj metodický a praktický obsah. Ten je kromě nezbytné teorie a zkušeností podtržen nutností maximálně možné kvantifikace vlivu rozhodnutí o změně obchodního partnera na změny hodnoty vnímané zákazníkem. Přednost mají mít techniky jednoduché, výstižné a finančně interpretovatelné. Správně formulovaný problém však zpravidla – tak jako v uvedeném případě – vede i při použití relativně jednoduchých postupů ke správným rozhodnutím.

Vedení firmy nenalézalo řešení snadno a ihned. Soustředění na potřeby zákazníka a správné pochopení vlastní pozice v logistickém řetězci i vůči obchodním partnerům však vedlo jeho strategická rozhodnutí správným směrem. Mnohaleté zkušenosti a dobře zvládnuté teoretické principy logistiky jsou spolu se zavedenými postupy a technikami firemním know-how a jistotou do budoucna.

Corresponding author:

Ing. JAROMÍR ŠTŮSEK, CSc., Česká zemědělská univerzita v Praze, Provozně ekonomická fakulta, katedra řízení,
165 21 Praha 6-Suchdol, Česká republika
tel.: + 420 224 382 256, fax: + 420 224 381 855, e-mail: stusek@pef.czu.cz