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COMPANY STRATEGY IN THE CRISIS PERIOD

Abstract: The article deals with the logistic strategies enabling an enterprise to create a strategy flexible in terms of business and marketing and stable in terms of manufacturing. In order to create a strategy model the following principles can be applied: shorter periods of capacity planning combined with flexible planning, SYNCRO – MRP principle, the application of forecasting in operative planning, creation with partners one of the cooperation form as supply chain, demand chain, lean supply chain, agile supply chain, leagile supply chain, and using the DBR, APS and SCP systems.

Keywords: Syncro-MRP, capacity planning, forecasting, supply chain, demand chain, lean supply chain, agile supply chain, leagile supply chain, DBR, APS, SCP.

1. Introduction

In the time of a crisis and uncertainty the basic philosophy of management is to prepare a strategy for a shorter period and to modify this strategy based on changes in market conditions, i.e. to prepare a flexible model – fast adapting – strategy, i.e. the strategy of a fast and dynamic change (Yonshuang *et al.* 2009).

Is this acceptable supposing that the usually strategy should be prepared for a longer period of time as it globally focuses on strategic goals significant for the company? How this dilemma can be solved?

If we do not adapt to the market and stick to some static strategy, it can lead to the loss of our market share and the loss of competitiveness. It is difficult to change technologies or to change manufacturing – this requires large-scale investments (Malindžák, Takala 2005).

More cost-effective and faster solution is to change the logistic strategy of the enterprise so that it would be based on new organization, coordination, flows and chains. The application of a "fast strategy" is influenced by the speed of changes (S), by the inertia of the system (I) and by the capacity of resources (R) (see the Fig. 1).

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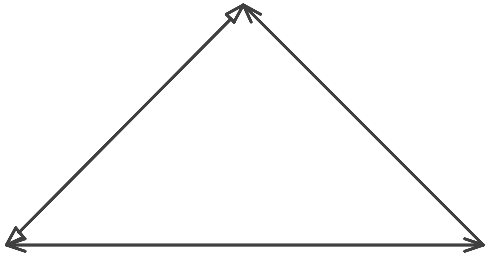

Fig. 1. *The relation of Speed, Inertia and Resources*
Source: Yonshuang et al. (2009)

The speed of changes is the matter of selected processes, on which a strategy is to be built, i.e. those processes that will bring the most extensive and the most beneficial change at the lowest costs. Comprehensiveness and costs are proportional, i.e. the more comprehensive way a change is prepared and implemented, the bigger costs are required (Liilian, Olli-Pekka 2007).

There are logistic principles and approaches to the preparation of a flexible business strategy that arise from generally applicable models applied in Slovak enterprises, described in the following article (Malindžák, Takala 2005).

2. The principles and approaches to the preparation of a flexible strategy

The antagonism between manufacturing stability and market instability i.e. business/trade flexibility is characteristic for any crisis. The market forces the enterprises to adjust the performance for the following reasons:

a) reduced volume of orders (some enterprises push down their business activities due to crises);
b) the increased number of small orders (enterprises face to orders of products in small quantities due to the uncertainty of orders they get from their customers);
c) production is bigger than demand, companies trip each other up through their prices;
d) product prices are reduced;
e) productivity falls down;
f) insolvency increases.

Reduced uncertainty, higher manufacturing stability, uniform capacity utilization, maintained employment level etc. and at the same time maintained market share, met due dates, maintained manufacturing productivity, all these are the goals of enterprises in the time of a crisis. This dilemma can be partially solved by the following logistic principles and approaches.

2.1. Syncro-MRP

This strategy was, for the first time, described in (Malindžák 2007) and applied in Toyota Motors Corporation.

It is based on the idea of dividing the manufacturing process into two parts in terms of planning (see the Fig. 2).

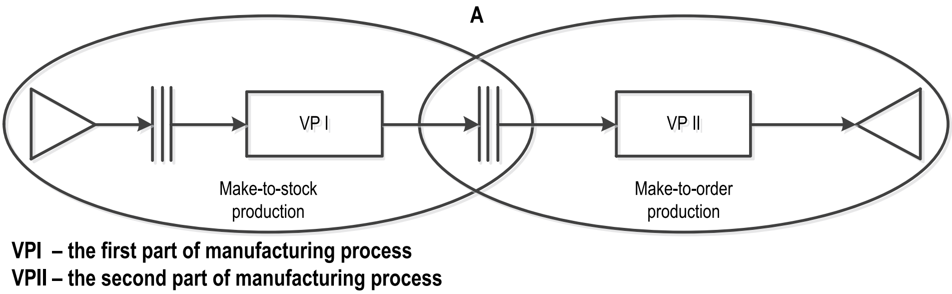

Fig. 2. *Syncro-MRP principle*

VP I – this manufacturing process is organized as make-to-stock production. It is mainly the production of universal parts and semi-finished products (e.g. clinker related to cement production), which is identical or similar for many products, i.e. planning is performed in the VP I part by PUSH system and planning is of statistic and flexible type.

VP II – is make-to-order production, i.e. flexible towards customers, and planning is performed by PULL system. The point of contact of these two logistic procedures e.g. A – is a break-even point. It arises naturally from the structure of production process, i.e. for instance VP I – is parts manufacturing and VP II – is make-to-order production, which is flexible in relation to market requirements e.g. final product assembly. Warehouse A is often in front of the bottleneck of manufacturing process.

The volume of the inter-stage inventory of Warehouse A is based on a protective buffer. This for instance, means a weekly delay, i.e. the amount released from Warehouse A in week N for VP II manufacturing process will be scheduled for VP I production for the following (N+1) week, i.e. VP I produces for the warehouse and at the same time for the orders considering the above weekly delay. This enables, at least for part A, to maintain a stable and uniform manufacturing mode at the expense of higher inter-stage inventory in warehouse A.

2.2. Supply chain

If the company does not have orders for several weeks in advance, one of the options for this situation long-term solution is to chain/link enterprises and to create a supply chain (Lambert 2008, Goldman *et al.* 1995).

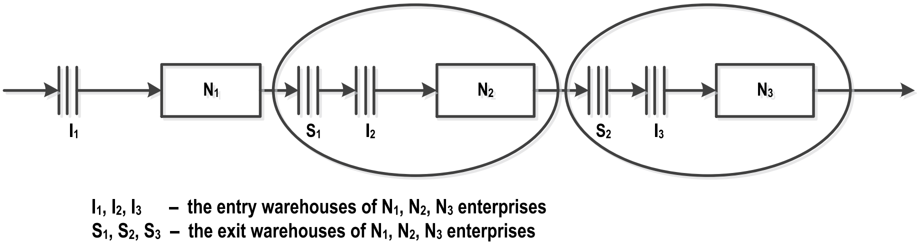

Fig. 3. *Supply chain application*

For example: enterprise N_1 receives or gains the manufacturing plan forecast of enterprise N_2 and N_2 enterprise will specify, how big the stock produced by N_1 should be e.g. in $T_1, T_2, \ldots, T_N$ period in the exit warehouse of N_1 company. The same will apply for N_3 enterprise, which will specify the volume of inventory for the same $T_1, T_2, \ldots, T_N$ period as in N_2 enterprise etc. (see the Fig. 3). This will enable to manage these enterprises in the long run and to increase the uniformity of production, to create optimum production batches, and to generate internal orders by accumulation of a larger number of orders for a longer period of time. This all, however, is just a forecast. As a part of this forecast business is carried out on the basis of particular orders. The supply chain is mostly initiated by the companies with the strongest position in the chain or based on the agreement of all companies becoming a part of this chain (Gros *et al.* 2009, Gros, Grosová 2004).

2.3. Demand chain

This philosophy has recently led mainly to bigger pressure from chain dominant enterprises that specify, for their sub-suppliers, the volume of products and the period ($T_1, T_2, \ldots, T_N$), in which the given volume should be either in a warehouse close to their premises or directly in entry i.e. disposition warehouses. The above-mentioned goods will be owned by the supplier up to the moment of their release from the disposition warehouse. Once released the following will take place: deal – order – invoice – payment to the sub-supplier. We would like to stress out once more that the goods in disposition warehouses are owned by sub-suppliers, which forces each enterprise in the chain to make its sub-suppliers create I_0, I_1, I_2 dispatch warehouses in its premises (see the Fig. 4).

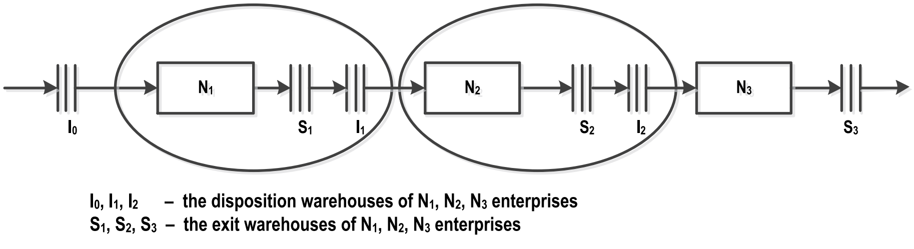

Fig. 4. *The principle of I_0, I_1 demand chain application*

Each company in the chain has to require this from its sub-suppliers. Otherwise it will pay for the given warehouses (product cost, storage cost included) at the entry and at the exit of the enterprise itself, thus having a disadvantage compared to the rest of the demand chain DCH members (Gros *et al.* 2009).

Once the dominant or final company of the chain defines its requirements (demand) related to the volume of products available in sub-supplier's disposition warehouses for several scheduling periods in advance – as a forecast of its most probable needs, this logistic strategy will enable all the members of this demand chain to achieve benefits in the following aspects:

- optimum production batches, which can be formed when accumulating forecasted sub-suppliers' requirements for a longer period of time;
- they can produce temporarily to stock, when the given product is to be delivered in some of the coming scheduling periods;
- if the manufacturing capacity is not used in a sufficient manner, production can be carried out in advance;
- thus it is more stable and uniform and results in better manufacturing productivity.

It is important to maintain discipline in a demand chain, which can be embodied in bilateral or multilateral contracts for the entire chain. The question is how much of its capacity the enterprise will devote to SCH and DSCH.

The relations and obligations within SCH and DCH are beneficial as long as the enterprises in the chain function and fulfill agreements. This strategy is suitable when cooperating mainly with strategic partners.

If, however, any of these strategic partners fall out of the chain for some reason, all its sub-suppliers i.e. previous members of the chain will face the consequences of their membership in the given chain, i.e. all of them will have insufficient coverage of their production capacities.

Therefore the enterprise should consider the extent, into which it will devote its capacities to SCH and DCH in order to leave certain capacity for its new potential customers. The optimum volume of production capacity dedicated to SCH and DCH seems to be max. 60–70%. These approaches were optimal for companies Chemosvit fólie, a.s. and SEZ Krompachy, a.s.

2.4. Application the forecasting in capacity planning

Capacity planning is based on the knowledge of particular orders for the relevant planning period e.g. for a month, decade, week or available machine and equipment capacity in the relevant planning period. What should be done if the enterprise does not have sufficient volume of orders well in advance, e.g. 3–4 days before a month starts, so as to effectively use its production capacity for the month given?

One of the solutions is to reduce the uncertainty of the coming period by the application of forecasting methods (see the Fig. 5), just like in the case of annual planning, for which we do not know all actual orders for the coming year.

This idea was successfully introduced in the project of *Capacity planning in Chemosvit fólie, a.s.* (Straka, Malindžák 2009).

A part of the capacity, for which no orders are available, shall be filled through the following:

a) an estimate; forecasting orders that should be received during T period;
b) statistics; we will fill the capacity with virtual orders for standard products regularly repeated in previous periods.

Thanks to forecasting applied in capacity planning, we will reduce uncertainty and indeterminateness related to material and utilities ordering and shift schedule preparation etc.

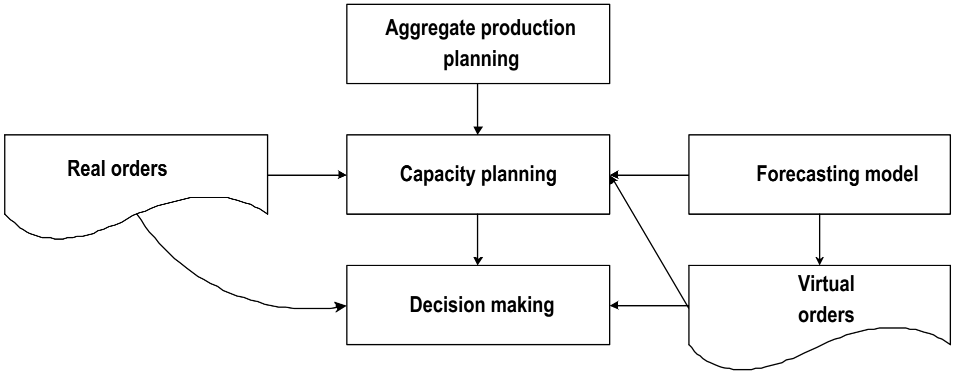

Fig. 5. *Forecasting principle introduced in capacity planning*

These above specified problems have logically lead to intensive search for new planning systems. They became known as Advanced Planning and Scheduling or Advanced Planning Systems (APS) and later as Supply Chain Planning (SCP) systems (Schutt 2004, Chopra, Meindl 2006). However, the scope of APS (SCP) systems is not limited to factory planning and scheduling, but has grown rapidly to include the full spectrum of enterprise and inter-enterprise planning and scheduling functions.

Unlike traditional ERP systems, APS systems try to find feasible, near optimal plans across the supply chain as a whole, while potential bottlenecks are considered explicitly (Stadtler, Kilger 2005). Three main characters of APS system are integral planning, true optimization and hierarchical planning system (De Kok, Graves 2003).

APICS Dictionary defines APS system as follows: "Techniques that deal with analysis and planning of logistics and manufacturing over the short, intermediate, and long-term time periods. APS describes any computer program that uses advanced mathematical algorithms of logic to perform optimization or simulation on finite capacity scheduling, sourcing, capital planning, resource planning, forecasting, demand management, and others. These techniques simultaneously consider a range of constraints and business rules to provide real-time planning and scheduling, decision support, available-to-promise, and capable-to promise capabilities. APS often generates and evaluates multiple scenarios. Management then selects one scenario to use as the official plan. The five main components of APS systems are demand planning, production planning, production scheduling, distribution planning, and transportation planning" (Blackstone, Cox 2005).

To conclude this full definition, the key success factors of APS system can be summed up (Gruat-La-Forme *et al.* 2005, Šaderová 2010):

- a real time overview along the supply chain;
- a good decision-support package;
- ability to sequence in real time, taking into account constraints in finite capacity, events or changes.

2.5. Shorter periods in capacity planning

Another solution for the situation described in Chapter 2.2., i.e. the volume of orders insufficient to fill the whole production capacity in the "T" period, has the form of shorter "T" planning periods. It is common to prepare executive planning for a year period. Standard capacity planning period is a quarter, month, week, all that based on manufacturing cycle, the duration of delivery cycle, and manufacturing process inputs. The most commonly used is a monthly period. It means that for a crisis period the period of planning should be changed from one month to one week, i.e. to the period, for which orders influencing manufacturing capacity are available in advance.

In order to maintain the advantage of the knowledge of long-term capacity planning (CP) (e.g. 1 month), capacity plan is prepared in a flexible manner for each T_N week for the period of four weeks supposing that each T_N week is definite, the second week, i.e. T_{N+1} preliminary (70–80% reliability) and T_{N+2} and T_{N+3} weeks are predictive. This enables to order materials with longer delivery cycle, prepare production etc. (see the Fig. 6).

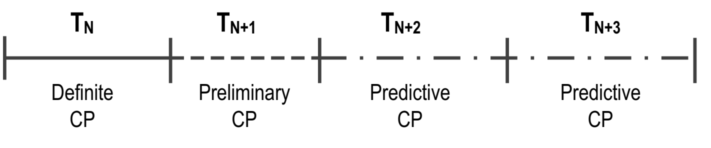

Fig. 6. *Planning periods – Flexible planning*

3. The application of "fast strategy" in the conditions of Chemosvit fólie, a.s.

Chemosvit fólie, a.s. Svit is an enterprise producing polyethylene and polypropylene packages. In 2008–2009, the principles described in the Chapter 2 were applied as a part of logistic activity reengineering project based on the task of applied research in

Chemosvit fólie, a.s. Svit. This was one of the factors of successful overcoming of the financial and economic crisis. The above applications in this enterprise are described in detail in Chapter 3.1.

3.1. The syncro MRP application

Chemosvit fólie, a.s. is an enterprise producing a wide range of hygienic packages using the technology of gravure and flexographic printing. In order to withstand market pressure and to maintain the enterprise's market position, the flexible solution of strategy changes in various areas was required.

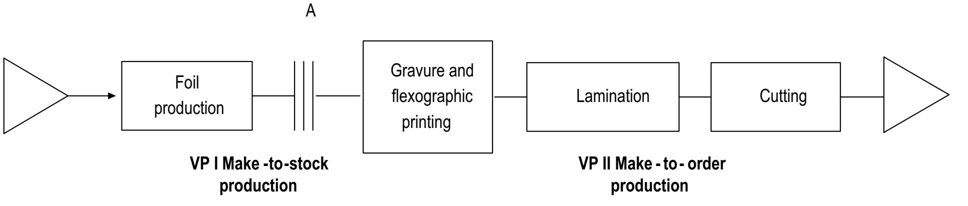

Fig. 7. *The simplified material flow of package production*

Those changes are mainly dealt with in the field of logistics due to their promptness and investment intensity. The implementation of orders for the segment of hygienic products consists of several consecutive manufacturing operations (see the Fig. 7). First of all, it is basic foil manufacturing usually followed by foil printing. If required, lamination and film-coating can also be applied. The last operation is cutting. If we want to increase the flexibility of production and deliveries it is suitable to focus on specifications of individual manufacturing operations. Unlike the first operation, where basic foil, which can be similar for several customers due to its size and specifications, is manufactured, the second operation, i.e. print is the operation producing actual products for particular customers. Especially if a frame purchase contract has been signed for a longer period of time with one or several customers it is suitable to apply statistic make-to-stock production of basic foil. Even more precise planning of statistic production batches of basic foil can be carried out if the prediction of production batches of the customer is available through the Supply Chain Management system for a longer period of time.

Such basic foil stock produced in advance can ensure shorter periods of order preparation and generally more flexible responses to customer's requirements. The original manufacturing process can be, in this case, divided into two parts – VP I make-to-intermediary stock production and VP II make-to-order production. Thus one operation of order preparation is eliminated from customer's point of view. As regards the effectiveness of production the use of this system enables to increase the volume of extrusion equipment production batches related to foil manufacturing, and machine availability and to reduce waste. A break-even point is a foil intermediary warehouse.

3.2. A change in the approach to capacity planning – forecast application

In the time of reduced or floating order capacity, statistic orders are added to the portfolio of orders entering the process of production planning. Under statistic orders the following is understood: orders, which at the moment of their creation are not covered by any particular customer order. However, due to regular demands from some customers it is highly probable that such orders will be received in a short period of time. A long-term established database of business cases, good knowledge of market and of customer behaviour are required for the preparation of a statistic order, where based on such data the forecast of future potential orders is prepared (Kačmáry, Malindžák 2010).

New orders, which are being prepared in cooperation with customers and for which no order was issued yet, due to some unclear data (which might not relate to the first part of manufacturing process), are also included in forecasted orders. In this case, the shorter period of launching new packaging material on the market, e.g. as a part of comprehensive marketing campaigns, is often of common interest.

3.3. Shorter periods of operative planning

In order to increase the quality of capacity planning and production scheduling, Chemosvit Fólie, a.s. introduced a new concept of production planning in 2008 (Straka, Malindžák 2009). Since the above project was carried out prior to the global economic crisis, the considered planning period was 7 days, which corresponded with both, the actual order capacity and frame purchase contracts signed by customers. At the end of 2008 the reduced activities on global markets showed that this suggested duration of the period did not suit new conditions. With smaller average orders the pressure on delivery flexibility increased. Due to the reasons stated above it was necessary to shorten the duration of such period to 3.5 days (two periods thus form the whole week).

Capacity plan was prepared in a flexible manner, i.e. each 3.5 days for 4 periods i.e. 14 days for a customer order, material ordering, graphics preparation etc. This enabled to react on changed conditions in a flexible manner since customer requirements related to delivery due dates were much more demanding in the time of crisis than the originally signed frame purchase contracts. The possibility to change the duration of the planning period thus becomes a big advantage of new, integrated SW for production planning, which enables the company to adequately react on the situation on the market or on customer requirements/demands (Straka, Malindžák 2009).

3.4. Supply chain, demand chain, supplier managed inventory

The effort to reduce costs, increase continuity and reliability of the supply chain also in packaging industry has resulted in the optimization of processes between suppliers and customers.

Chemosvit Fólie, a.s. currently carries out several forms of cooperation, the goal of which is to reduce administration on the customer's side, to optimize production on the supplier's side and last but not least, to increase the flexibility and reliability of goods deliveries. As regards Chemosvit Fólie, a.s. its customers are mainly international companies.

In the first case it is a fully comprehensive system based on customer requirements/demands delivered in the form of long-term manufacturing plans. In order to achieve the above stated Chemosvit Fólie, a.s. decided to develop a SW application, which will, apart from customer data import, also calculate and display the data given for the needs of an order logistics employee. Following consultation with a sales person, the logistics employee is held responsible for the specification of an optimum production batch and for the creation of goods call off proposal, which has to be delivered to the customer.

The conditions of this system functioning are agreed in an SCM contract, in which production and delivery windows are defined amongst other things. Once the proposal of production batches and customer call offs is approved the batches are included in the manufacturing plan. Of the stated predictions of customer production it is also possible to define the need of basic foils for these orders, which can be produced or purchased in advance.

Other forms of cooperation are basically derivations of Supply or Demand Chain systems, e.g. SMI, which deals with the preparation and implementation of goods call offs, while the orders for production are still issued by the customer. It can be said though that SMI is basically an intermediary step leading to the full supplier and customer relation control that includes the management of both, production and dispatch.

Many customers combine the implementation of the above-stated systems and of electronic data exchange based on EDI protocol. This, in principle, enables direct interconnection of information systems leading to reduced elaborateness, lower error rate and overall increase of work productivity. Generally speaking, the systems managing supplier and customer relations can be regarded as a new generation of cross-enterprise collaboration, which is beneficial for both sides (or for all the companies forming the given chain).

4. Conclusion

The approaches described in Chapters 2.1–2.5 are logistic approaches to the creation of flexible production and business strategy, which must be feasibly selected and combined. Their application mainly depends on the position of the company in the market, on the capacity used and on the position of the company in chains.

These approaches enable to create a company strategy flexible in terms of business and relatively stable in terms of production, which is one of the possible ways to success in dynamically changing conditions, i.e. also in the time of financial and economic crises. Their application in the conditions of Chemosvit Fólie, a.s. described in Chapter 3 enabled the company to get successfully through 2009, 2010, i.e. through the years of the crisis.

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