BARRIERS OF DEMAND PLANNING IMPLEMENTATION

Vladimira Vlckova¹, Michal Patak²

¹University of Pardubice, Czech Republic, vladimira.vlckova@upce.cz
²University of Pardubice, Czech Republic, michal.patak@upce.cz

Abstract
Demand planning represents a set of procedures and information technologies for exploitation of demand forecasting in planning process. Its implementation enables better exploitation of forecasting in planning horizon a decision making about the size of production, stocks and layout of sources capacity between particular products by this way that profits of the whole company and even of the whole supply chain are maximized. Demand planning is essential part of many modern logistic technologies (e.g. CPFR). Its importance is growing mainly with regard to increasing importance of differentiated Customer Relationship Management and Supply Chain Management. Efficient demand planning requires close cooperation of all departments within the company, but also building strong collaboration with stakeholders and using the end-consumer data (POS data). This can not be achieved without support of integrated information systems. Identified barriers of demand planning implementation which is discussed in this contribution arise primarily from ignorance or wrong understanding of demand planning principle and from difficult ensuring of above mentioned necessary conditions for its implementation in the Czech environment.

Keywords: Demand Planning, Demand Management, Supply Chain Management, Demand Forecasting, Companies of Chemical and Food Industry.

JEL Classification: D23, M21, M53.

Introduction
Current turbulent market environment forces companies to react faster on quickly varying customers’ demands. These requirements are transformed into orders, which are on the one hand hardly predictable for many companies and on the other hand they must be reliably fulfilled in all their parameters. It is indicated that manufacturing companies are usually successful in sales (orders) forecast for relatively longer time segments from the point of demanded products’ quantity, however lay-out of these demands in time and place is becoming the key problem. Accruing specific demands of individual customers and particular orders are additional important factors, which makes forecasting more complicated and deteriorates their accuracy and credibility. We can illustrate it on the diversity of cleaning agents’ packing from the point of view their odour, size, shape, and type of label on the wrapping, promotion packing of product. Very short guaranteed storage period of finished products as well as particular raw materials still more complicate situation in food-processing industry. Growing pressure on fast operative decision making mainly in distribution and production are the consequence of this. It causes as well increasing number of impacts into operational plan and with it related growing demands on high flexibility of workers, production and service facilities. Nervousness and stress of workers with all negative consequences which it bears are additional results.

Origin of these very difficult situations can be anticipated when right, accurate, accessible information about demands in required time and form are available (Fiala, 2008). These information must be than accessible not only within the whole company, but to individual links of supply chain and must be between them exchanged, shared and exploited for right decision making. That’s way most companies wish to improve demand forecasting, to understand future demand as a critical element in planning future supply and to implement demand planning.

Our investigation in companies, mainly of chemical and food industry in the Czech Republic however gave evidence that demand planning is not effectively exercised in business practice. There is the whole line of factors which complicate, eventually do not enable its implementation. The aim of this contribution is therefore primarily to specify principle, importance, role and possibilities of demand planning and especially to call concrete barriers of its implementation.

Targeted literature retrieval focused mainly on demand planning and conditions of its implementation together with a method of in-depth interview with managers in chosen companies of food and chemical industry operating on B2C markets were exploited as research methods.
Demand planning

Recent market environment is distinguished by consumer awareness and increasing competition on the customer side. It determines rapid development and changing of demand management. Companies and supply chains develop new models for forecasting and managing demand, and use the demand plan to control their supply and financial plans. Customers and suppliers collaborate to communicate demand information, and profit by collaborative planning, influencing, and managing demand. Most of treatises are focused on best practices, principles, process, and principles of demand planning, but in the literature, there is big disunity in comprehension what demand planning is and how role play in the business management.

Some authors comprehend the demand planning broadly. They imagine that demand planning includes all processes that an organization takes to anticipate customer demand and to ensure sufficient product to be available – in the right place, at the right time, to the required level of service and at the lowest possible supply chain costs. Demand planning therefore includes such activities as demand forecasting, inventory management, capacity planning, production planning and scheduling and materials requirements planning (Bolton, 1998).

Other authors see no differences between demand planning and demand forecasting (Sheldon, 2006a; Voudouris et al., 2008; Kilger & Wagner, 2010), or get view of gap in fundamental of generation forecast and plan. Forecasts are a projection into the future of expected demand, given a stated set of environmental conditions; whereas plans are managerial actions proposed by the organization to capture and supply as much of the forecasted demand as possible (Mentzer & Moon, 2005). Forecast is a statistically based initial estimate of future demand. A demand plan is an estimate of future demand derived by a consensus-driven review and approval of the forecast. In effect, a forecast is subject to several planning, and verification processes to generate the demand plan (Gattorna et al., 2003). Demand plan is especially utilized in operations management. Therefore, demand planning often represents one of several steps in sales and operations management (see e.g. Wallace, 2009; Crum & Palmatier 2003; Sheldon, 2006b) or part of advanced planning systems (Meyr et al., 2010).

Though the demand planning is variously interpreted, most of the authors agree with opinion that demand planning is part of, or whole methodology for the use of demand forecasts in the process of planning. Demand plan, as a result of demand planning, describes how the company will make sure that the company can produce and/or supply the product at the needed time at an acceptable cost. Furthermore, the demand planning function should ensure needs not only to make sure that there are enough goods to sell, but also to make sure, based on sales cycles, inventory turns, and other measurements, that demand planners are able to replenish inventories as needed (Haines, 2008). Demand plan is an essential business tool for most organizations. It is necessary source of information for the production and operations management but also for other areas like marketing, finance or human resources. An accurate demand plan will help to deliver product within customer lead times, deploy the right quantity of the right product, make sound operational decisions, and ensure financial planning reflects reality. Conversely, poor demand plans determine poor customer service, excess inventory, excessive production changes, and increased distribution costs (Gattorna et al., 2003).

Demand planning is a very dynamic process. As with many product management practices, demand planning benefits from a strong dose of cross-functional support. An effective involvement of members of the supply chain organization, manufacturing, finance, operations, sales, and marketing within demand-planning processes is usually more important than the forecasting technique or software using to demand forecasting (Haines, 2008; Gattorna et al., 2003). The more demand planners are able to synchronize their efforts with sales and market, the more closely they can influence the supporting functions or procurement, manufacturing, and distribution. If these functions are out of sync with the rest of the organization, operational inefficiencies will develop, resulting in the misuse of valuable financial and human resources (Haines, 2008). It is evident the demand planning does not present only forecasting. It can be understood as necessary part of company planning and decision making on strategic, tactic and mainly operative level by using of demand forecast.

Demand planning implementation

The implementation of the demand planning enables to determine the closest possible forecast to the planning horizon and decide the volume of production, stock and sources capacity distribution among particular products to maximize the profits of the whole company (Vlckova & Patak, 2010). Methodics of
demand planning implementation depends on the level of the evolution of demand management in the company.

Whereas demand management within most manufacturing companies was minimal at best or nonexistent in the past, today demand management continues to evolve. See the evolution of demand management according to the authors (Crum & Palmatier, 2003) in Figure 1. Target of demand planning, as a modern tool of demand management, is to get closer to consumers and tailor internal company processes to meet their needs. Once companies align their internal processes, further opportunities for improvement lie in integrating this information across all partners: contractors, co-packers and suppliers. Integration throughout the supply chain results in more assured decision making, shorter, consolidated supply chains, reduced inventory levels and more responsive customer service. But a critical first step for companies is to ensure that their own houses are in good order (Smith et al., 1998).

![Evolution of Demand Management](image)

Figure 1. Evolution of demand management (Crum, Palmatier, 2003)

Mentzer et al. (1999) conducted a benchmark study of forecasting best practices. Drawing from in-depth analyses of forecasting process throughout each of twenty companies, they identified four dimensions of forecasting practices: functional integration; approach; systems; and performance measurement. Functional integration is concerned with the role of communications, coordination, and collaboration of the sales forecasting function with the other business functional areas of marketing, sales, finance, production, and logistic. Approach is concerned with which products and services are forecasted, with forecasting techniques used, and with relationship between forecasting and planning. Systems addresses the evaluation and selection of hardware and software combinations to support the sales forecasting and demand planning functions, as well as the integration of forecasting systems with other planning and management systems in the organization. Performance measurement considers the metrics used to measure sales forecasting and demand management effectiveness and its impact on business operations (Mentzer, 2004). Among other things, the study describes strengths and weaknesses of companies in their forecasting practices. Demand planning implementation begins at the improving all dimensions mentioned.

Methodics of the company demand planning implementation can be divided into six steps (Formánek, 2004): understand essential forecast principles; integrate systems for forecasting and planning; identify key factors influencing the demand level; identify and understand customer segments; select appropriate forecasting techniques; and build a system for performance measurement and error rate of forecasts.

Research of Smith et al. (1998) identified similar demand-plaining best practises that should act as the foundation of any demand-planning process design. These practices are: integrated forecasting, planning and execution; a cross-functional forecasting process; utilization statistical forecasting techniques; and performance monitoring a tracking. Researchers also found changes in the organization structure a critical first step in establishing excellence in demand planning. Companies should begin a maximizing the value delivered by combined supply and demand planning.

Next step in demand planning improvement is the choice of right data which is used in forecasting process. If manufacturers forecast by using historical orders data (sales to their customers but not end-consumers), they miss information about place and time of sale, and about quantity of products that is bought by end-consumers indeed. The data that is needed for supply chain planning is the actual sales to consumers at each retail outlet, which is called Point of Sale (POS) data (Andres, 2009). Utilization of information about end-consumer sales is determined by the collaboration between suppliers and customers (Jain &
Covas, 2010). Thus, it is one of principles of collaborative strategies such as Collaborative Planning, Forecasting and Replenishment (CPFR) and Vendor Managed Inventory (VMI) (Derrouiche et al., 2008). The concept of utilizing POS data to generate accurate order forecasts defines the next significant competitive advantage in demand planning and supply chain efficiency but it is still in its infancy (Gallucci & McCarthy, 2009).

All authors mentioned above correspond that best practice of efficient demand planning implementation is based on two requirements. The first is formed by several principles of demand forecasting - utilization right forecasting techniques and software to analyse right data with performance measurement. The second is communicate, coordinate, and collaborative business functions and simultaneously integration of forecasting and functional planning. However, our research in chosen companies of food and chemical industry in the Czech Republic revealed, there are barriers of demand planning implementation in companies which are mentioned in next.

**Barriers in demand forecasting**

Research was carried out in one company of food industry and in three companies of chemical industry. They cannot be disclosed due to the data sensitivity. All together 14 managers responsible for order fulfilment, such as forecasters, marketing personnel and/or salespeople were interviewed. All these companies are small or middle-size companies operating on B2C markets mainly. See in Table 1.

**Table 1. Characteristics of companies**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
<th>Main delivery method (customers)</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>food</td>
<td>foreign retail chains, retailers, cooperative stores</td>
<td>spreadsheet in Excel</td>
</tr>
<tr>
<td>B</td>
<td>chemical</td>
<td>wholesalers, retailers, foreign retail chains distributors</td>
<td>SAP, Excel</td>
</tr>
<tr>
<td>C</td>
<td>chemical</td>
<td>distributors, drop shipment</td>
<td>SAP, Excel</td>
</tr>
<tr>
<td>D</td>
<td>chemical</td>
<td>drop shipment</td>
<td>spreadsheet in Excel</td>
</tr>
</tbody>
</table>

Insufficient attention is given in all surveyed companies to statistical modelling of historical demand. Maximally data from annual time series of orders are exploited, where periodic fluctuations in sells and changes in trend are monitored. Forecasting goes out beside time series analysis also from knowledge of market and customers behaviour (Hambalková, 2009; Koubková, 2010; Patak, 2009; Rohačová, 2009). Demand planning in longer time horizon is relatively well mastered in these companies. This is result of fact that by analysing time series it has been found that values of former sales fluctuate around constant average value, which is not changed significantly from the point of view of long-term (Patak, 2009). However problems come up in the case of orders forecasting in short time in corresponding structure (for example from the point of view of taste, additives, fragrance, size of packaging, guarantied storage period, promo packaging), where only experience is not sufficient.

However mainly very difficult and time – consuming collection and storage of needed data in required structure from sufficiently long period obstruct to implementation of statistical models into standard practice. Thus missing data for analysis and their inappropriate structure, missing data storage, inadequate technical and software equipment for secure transfer of this information, which is often shared on-line, are barriers. Also innocence, inexperience and mainly disbelief of people in company into forecasting techniques and principles were found as significant barrier in demand forecasting. Disbelief of people is caused (among others) by the absence of POS data, difficult foresee ability of high variance of orders in time due to bullwhip effect and mainly by frequent promo actions in the case of supply their products into foreign retail chains. For increase of confidence in demand planning people need to understand the importance of demand forecasting, goals and procedures of the overall forecasting process, to know what their forecasting system is able to do, what it takes to get the most benefit from the system’s capabilities, and to have adjusted performance measurement process (Moon, 2006). Significant barrier for gaining needed data, mainly POS data is also no confidence between individual links of supply chain and others stakeholders. The companies A, B, C supply their products into foreign retail chains, in which is from many reasons no willingness to cooperate in the field of information sharing about demands and sales (Vlckova, 2007).
Nevertheless utilization of forecasting without POS data may represent usable source for planning. Therefore we dealt more in detail in two companies (company A and B) with possibility to exploit two basic techniques used in time series, namely Simple Moving Average and Exponential Smoothing (Patak, 2009; Roháčová, 2009). Already these simple forecast methods produced possibility to increase significantly forecast accuracy. For example, utilization of exponential smoothing has reduced forecast error from 19.5 % on 12.1 % (Patak & Vlckova, 2010).

**Barriers in integration of forecasting and functional planning**

Forecast is not exploited in all surveyed companies as key source for operations planning. Financial goals are often preferred to sales forecasting process. People in various positions do and use their own forecasts from different sources of data. Members of the supply chain organization are not effectively involved within demand-planning processes, although it can be usually more important than the forecasting technique or software used for demand forecasting, as was mentioned above. It means, that basic assumption for demand planning isn’t fulfilled, namely the relationship and integration between the forecasting system and other upstream and downstream systems within the organization.

If the created forecast is to be exploited in all the company processes, the sequence of these processes on forecasting must be assured in such a way that the forecast is the essential initial information for other company planning. As well the feedback of company processes to the forecasting itself must be assured (Vlckova & Patak, 2010). It requires support of integrated in-company information systems. Companies however do not want and/or cannot to invest into new information systems and they rely rather on long-time experience of workers responsible for managing operations processes. This variant is cheaper for small or middle-size companies from short-period viewpoint. Thus demand planning is based mainly on one person (companies A and D). This solution is not systemic and it is unsustainable on a long-term basis. In two companies (B, C) system SAP is implemented as in-house information system, however spreadsheets in Excel are, similarly as in others surveyed companies, used for demand planning. These conditions however do not allow effective integration of forecasting and functional planning.

**Conclusions**

Demand planning and its role in the business management are comprehended variously in the literature. Demand planning is part of, or whole methodology for the use of demand forecasts in the process of planning. It is a very dynamic process, which includes activities as demand forecasting, inventory management, capacity planning, production planning and scheduling and materials requirements planning. Today demand planning is modern tool of demand management which evolves to demand collaboration with supply chain partners. Best practice of efficient demand planning implementation is based on two requirements – effective demand forecasting and integration of forecasting and functional planning.

Our research in chosen companies of food and chemical industry in the Czech Republic revealed the barriers of demand planning implementation in these companies. As significant barriers in demand forecasting were found: missing data for analysis, mainly the absence of POS data, or their inappropriate structure; missing data storage; inadequate technical and software equipment; innocence, inexperience and mainly disbelief of people in company into forecasting techniques and principles; no confidence between individual links of supply chain and their no willingness to cooperate in the field of information sharing about demands and sales.

As barriers in integration of forecasting and functional planning were identified: forecast is not exploited as key source for operations planning; financial goals are preferred to sales forecasting process; people in various positions do and use their own forecasts from different sources of data; members of the supply chain are not effectively involved within demand-planning processes; there is no effective relationship and integration between the forecasting system and other upstream and downstream systems within the organization; there is not sufficient support of integrated in-company information systems and companies do not want and/or cannot to invest into these systems. In some cases the demand planning is based mainly on one person. Companies lack a performance measurement process which would allow monitoring quality of forecasting and assessment of people responsible for forecasting and planning.
References