

The Role of Demand Forecasting in Knowledge Society

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Abstract Demand knowledge derived from obtained data and factors knowledge which influence on it allow to company management to react more flexibly on demand change, to plan more effectively marketing operations, to increase availability of products on the market, to increase the level of customer's services and to develop thus competitive advantage. This paper therefore deals with demand forecasting and with major factors which influence it.

Keywords – Demand. Demand Forecasting. Sales Forecast. Knowledge management. Industrial enterprise. Supply chain.

I. INTRODUCTION

Important attribute of knowledge management is data storing and their transformation into information. If company is able effectively exploit this information into its profit than it means that company is able to transform them into knowledge. Data related to demand and sale forecasting is without question the basic enter data of this transformation process. Demand forecasting forms the basic keystone for strategic, tactic and operative decision making within the company. Its exploitation rate in planning can have fundamental influence on the effective management of material flow not only within company but within the whole supply chain as well. Systems managed by real demand begin to assert themselves in present very variable market environment. This paper therefore deals not only with role of demand forecasting but also with factors which influence forecast considerably. It comes out from comparison of theoretical approaches with experiences of the author obtained during research done in this sphere within companies.

II. KNOWLEDGE MANAGEMENT AND DEMAND

Knowledge management deals with knowledge control, it means with recognition of already existing knowledge, eventually with formation of new knowledge, consecutive formalization, storing, dissemination, sharing, accessing, processing, exploitation, development and evaluation of their effectivity by force of feedback. Data are during their processing transformed at first from unsorted facts into information, i.e. into sorted data according to their importance and after that into knowledge. Data themselves have no information but they contain in them potential information. They are only sequences of letters, numerals and other symbols, which are potential carrier of information.

Information then gains its value in interpretation process only. Information originates only by the way that some significance is assigned to it.

Let us introduce as an example data transformation, which observes in time disposal values of the company in natural and monetary units, through information on sales knowledge. This transformation proceeds usually with exploitation of corresponding software. However only skilled workers, who know given market, customers, products, productive process, logistic process etc. (i.e. workers of marketing, trade, sale or product managers, together with workers in production, technical control etc.) in cooperation with customers are able to process correctly data and to transform them into information. They classify and interpret on the base of their knowledge and experience data from various viewpoints, mainly according to their importance and purpose, i.e. according to their further exploitation in decision-making processes within the company. On the base of these information they then create, usually in team, in combination with other information, which are mainly of qualitative character, new and for company usable knowledge. They can then deduce for example sales forecast for next period, survey about customers' value for the company, survey of profit of individual business units and that even in the structure according to individual customers and they can deduce from them important conclusions for the company, for example strategy of From the point of view of people diversity, their education, fields, worth etc. data are not information for everybody, eventually they can have different information value. We create our knowledge everybody alone on the base of existing general as well as special knowing, skills, belief and values. So knowledge originates only at the moment when information is exploited. On the base of this knowledge we can create survey about individual problem and to make decision.

For right and effective decision making we need mainly correct knowledge derived from correct information and data. Data related with demand and sales forecast belong to basic entering data of this transformation process in the company. Their transformations into usable knowledge for managerial decision making are not however simple and they should be therefore formalized by definite way.

Already data collection alone will be strongly influenced by what demand knowledge should serve for. Therefore right definition of objects of interest and purpose are very important. The type of demand and for what will be mainly exploited should be unambiguously specified in this case. For example whether this demand should serve mainly for looking for ways of its active formation/for its rising and/or it should serve mainly for planning and management of material and information flow.

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Demand represents in general level the customer's demand modified by environment in which customer is and underlain by his purchase power [1]. But we will not manage with this definition for creation of knowledge about demand. For example we are interested from economical point of view in dependence of demanded quantity on price, e.g. we are mainly interested in monitoring of shift along demand curve or in shift of the whole curve and we study effects which invoked this movement. From economical point of view we must differentiate whether we are interested in [2]:

- Individual demand, which is given by demand of sole buyer for everything.
- Partial, respectively market demand, which is given by demand of all economical subjects for one product.
- Aggregate demand, which is given by total volume of demanded amount of goods and services.

However from marketing point of view demand is defined as requirements for specific products, which customer is able and ready to buy. We are therefore mainly interested in who is demanding, for what, how much, when, where, in which marketing environment and with what marketing effort [3]). We must again distinguish whether given demand is from market or company:

- Market demand for specific product represents total volume, which could be bought by certain group of customers in certain geographical region in certain periods of time in certain marketing environment with impact of certain marketing program [4]. Market demand is not thus given by some fixed number, but by function of given conditions, so-called market demand function. This function displays alternative possible quantities of demand in dependence on possible levels of marketing effort in given period [5].
- Demand of given company is share of this company on demand of the market in dependence on the size of its marketing effort. It depends in this, how customers sense products of company, services, prices, and communication etc. with regard to products of competition [6].

III. ROLE OF DEMAND AND SALES FORECAST IN KNOWLEDGE MANAGEMENT

Sales forecast relates closely with demand forecast and this relation is so close that these two terms are often in practice but also in literature (for example in [5]) identified with each other. The reason can be that present very variable market environment, strong orientation on customer and developing information technology enforced not only new view on task of demand forecast but also new methods of supply chains management. Demand planning can be understood as a gate to successful supply chain management (SCM). It means exploitation of demand forecast in planning "process with aim to accelerate rough and/or material and services flow from suppliers through transformation within the company into products up to distribution to final customer.

Companies concentrate themselves from medium term and long term viewpoint more on sale forecast than on demand

forecasting. Annual sales forecast serves mainly for financial decision making. For production and logistics planning serve month forecasts and in some branches such as electro technical, automotive, food industry rather week or even daily forecast. According to respondents in chemical company the knowledge of sales forecast for coming three months is sufficient to allow coordination individual production campaign and additional needed steps [7]. On the other hand in electro technical industry production plan is actualized and concretized still four hours before product manufacturing. Reason of forecasts on such short periods are mainly by customers required always shorter and shorter terms of their individual orders' liquidation on B-to-B markets as well as in direction to sale chains.

Knowledge of demand allows to company management to react more lively on its changes, to plan more effectively marketing operations, to increase accessibility of products on the market and to increase level of custom services. In such way significantly supports realization of modern approaches to market such as differentiate management of relations to customers – CRM. The base for such type of knowledge is information gained from well created and operating database about customers [8]. Data mining is effective tool for customer's data evaluation. In the case of right knowledge demand, i.e. correctly structured and with regard to corresponding conditions accurate and reliable, one can for example create survey about conditions on the market, about attractiveness of various market segments, about competitive strength of company and business unit within given market segments and not least about sales possibilities on individual markets, territories or to individual customers of the company [4].

Results of forecasts thus substantially influence company strategy and tactics however the influence operative management as well. Mistakes and errors in determination of demand or sales amount can be for company very unpleasant even fatal. Our research focused on demand and sales forecast showed that most frequent adverse effect of wrong forecast is rise of additional costs [7, 9,10]; however it can cause the sale loss or even customer loss. Mainly occasional or seasonal irregular swings in demand can significantly threaten company stability. Presently significant swings in sale are caused by reaction of customers on so called leaflets actions in supermarkets. Although demand behind longer horizon is not changed, its lay-out in time is very non-uniform. Companies are able to conform to them only at the cost of increased expenses, which originate for example by getting on more workers, lengthening working shifts, changes in production, urgent and therefore more expensive purchase of raw materials, by change of transport type on air carrying. These undesirable influences of demand changes can be prevented [11]:

- either traditionally through improvement of sale forecast reliability, if it is possible,
- or through increase of flexibility in manufacturing management and flexibility of all value-forming processes not according to forecasts but according to actual orders.

Implementation of logistic management not only within individual company but within all links of supply chain is condition for both approaches.

In present practice within one productive company is usually combined management on the base of sales forecast (push system) with management according to orders (pull system). The aim of logistic solution is to move the boundary of both management ranges, so-called decoupling point deeper in direction into core of fabrication, it means as far as possible in direction against direction of material flow and thus to strengthen pull system. Application of production management only according to orders is however in many companies impossible. Campaign type of production, which is used in chemical industry, can serve as example. In such cases the knowledge as accurate and reliable demand and sales forecast as possible is very important for effective management. But such judgment is for majority of products and services difficult. The more unsteady demand the more cautious must be process of forecasting and thus this process is more work-intensive too. The far the company is involved in supply chain from the customer, the less information and as well less reliable information obtains from him. This situation is relatively typical for companies in chemical industry, whose products are supplied to other compilers.

IV. FACTORS WHICH INFLUENCE DEMAND AND IMPACTS ON MANAGEMENT

Demand and sale are influenced by many factors. These factors must be identified, taken into account, negative influences must be anticipated and their eventual impact must be minimized or fully eliminated. The aim of coordination of all factors, which influence demand and sales forecast are customer's satisfaction, exploitation of manufacturing capacities and also prevention of rise above mentioned forced costs. Macroeconomic factors, interests of customers, manufacturing and technological influences and influences from suppliers are factors which mainly influence demand and sales forecast. For judgment when to develop sales forecast for well-timed ordering and raw materials supply, for production of goods and its transport to customer is essential knowledge of the whole situation. Choice of suitable method for forecast is influenced mainly by time horizon of the forecast, stability of macroeconomic and marketing environment, by life cycle of given product and its position on the market, required accuracy of the forecast.

A lot of producers do not have direct contact with market and with their customers. Thus they are not able to get necessary information for accurate demand forecast and effective logistic management. Therefore also support of mutual communication, cooperation, creation of friendly not competitive environment for knowledge dissemination, removal of barrier, motivation, production of learning cycles, engagement of people into team and networks etc are parts of knowledge management.

This is why companies implement SCM and develop information systems, which would cover informative requests by reliable and needed data. Supradepartmental integrated logistic chains are originated in which companies integrate

their logistic systems with systems of suppliers and customers and they interlink their information system [12]. Companies gain new type of view on demand, which is approaching to the view in real time thanks to easier accessibility and speed of information. They are able quickly respond, to link closely with markets and to adapt their offer to demand.

Crucial requirement for effective company management is therefore sharing of the same forecast. It happens that subdivisions are building up their prognoses individually and therefore they go out in their planning from different numbers [9]. „Bullwhip“effect can happen in this case.

Other important problem is that compliance of financial plan within the company does have priority sometime although this plan does not correspond with results of actual forecast. Once company made decision to go out from forecasts then this fact must be observed even in the case that company is not able to keep planned results and to do it simply therefore that situation was changed.

Companies need to have skills in the field of partners' relation management if they want to achieve peak efficiency as significant shift goes on in competitive environment – from competition between producers to competition of networks formed by cooperative subjects [6]. Integration of informative systems requires considerable trust between individual partners. On these principles is based for example conception of CPFR method (Collaborative Planning Forecasting and Replenishment), which is built on the creation of integrated and sharable demand forecast within supply chain. Mainly misgiving and unwillingness to share data and information with their suppliers and customers is barrier for its broader excercitation [13].

Price, crosswise, pensionable and marketing elasticity are significant properties of demand. These are non-dimensional measures which show how sensitively responds demanded amount of substance on the change of its price or price of other substance (subagent or complements), on the change of customer's rent or marketing efforts [2], [4], [5]). Demand elasticity belongs also to important factors, which should be reflected into demand forecast. Statistical methods such as for example regression analysis or cluster and factor analysis could play here important role.

Various forms of sale promotions have significant influence on swings in demand [14]. In the case of consumer goods are for example so called leaflet actions reason of multiple higher sales in very short period on which suppliers (producers) must be able quickly and flexibly react. Consequently this demand short period forecast is extremely difficult or even impossible.

Knowledge management and its system within the company can not have static form. It must be all the time complemented, information inscribed or registered into it according to the development in given company and its outer environment. Dynamic style of knowledge management is typical by its expenses on IS, on frequent training of its staff and by careful choice of these employees. This style tries to focus on tacit knowledge and also on scalable knowledge. Tacit knowledge is subjective and composed from personal employee's experiences, their intuition to solve problems connected with company operation. Because they are subjective, they must not be omitted during the knowledge

management development. This knowledge must be underpinned and accessible to all who need them for their decision making.

IV. CONCLUSION

Knowledge management can be understood as practical skilled activity focused on exploitation of knowledge in decision making and managing processes with support of information and communication technologies. Systemic knowledge management has positive impact in all fields of company management. Knowledge about demand and sales and from here derived inventory control are critical for effective efficient logistic system, which will show itself in customers' demands filling, i.e. in form of perfect delivery. Therefore it is at most efficient to develop system for their detection, updating, storing, dissemination, sharing, choice, processing, exploitation, development and assessment. For this purpose teams formed by many workers (specialists) from different fields of management are created within companies. They take care the insight on information transformed from systematically taken data about sales, demand, customers and their behavior, market environment etc. to be as much various as possible. Only that way this information can be exploited in all their relationships for relevant managerial decision making in individual links of supply chain. Involvement of all users into process development of system knowledge about demand than increases measure of confidence to this process and can in its final effect significantly streamline not only company business but mainly whole integrated supply chain or network.

REFERENCE

- [1] Horáková, H. and Kubát, J., Inventory Management, (in Czech), Profess Consulting, Prague, 1998, ISBN 80-85235-55-2.
- [2] Tuleja, P., Nezval, P., Majerová, I. Grounding of Microeconomics, Brno: CP Books, 2005, ISBN 80-251-0603-9.
- [3] Lehman, D., R., Winer, R. S., Analysis for Marketing Planning, McGraw-Hill/Irwin, New York, 2005, ISBN 0-07-286596-2.
- [4] Lošťáková, H., B-to-B marketing: Strategic Marketing Analysis for Market Opportunities Creation, (in Czech), Professional Publishing, Prague, 2005, ISBN 80-86419-94-0.
- [5] Kotler, P., Marketing management - Analysis, Planning, Implementation, and Control, c Grada Publishing, Prague, 1998, ISBN 80-7169-600-5.
- [6] Kotler, P., Jain, D. C., Maesincee, S., Marketing Moves. A New Approach to Profits, Growth, and Renewal. (in Czech), Management Press, 2007, ISBN 978-80-7261-161-4.
- [7] Hambálková, P., Diploma work: Process of demand and sales forecasting in chemical industry company, (in Czech), University of Pardubice, Czech Republic, 2009.
- [8] Vlčková V., Pecinová, Z., Branská, L., 'Customer Database – Content and Possibilities of its Usage for Needs Differentiated CRM'. Publication of the Knowledge Society Institute – 1st International Scientific Conference, Vol. 3, pp.62-65, Sozopol, September, 2008, ISSN 1313-4787
- [9] Paták, M., Diploma work: Analysis of Demand Planning in Chosen Company, (in Czech), University of Pardubice, Czech Republic, 2009.
- [10] Roháčová, J., Diploma work: Demand and Sales Forecasting in Chosen Company, (in Czech), University of Pardubice, Czech Republic, 2009.
- [11] PERNICA, P., Logistics (SCM) for 21st. century, (in Czech), Radix, Prague, 2005, ISBN 80-86031-13-6.
- [12] Kotler, P. and Armstrong, G. Marketing, Grada Publishing, Prague, 2006, ISBN 80-247-0513-3.
- [13] Vlčková, V., Demand Forecasting in CPFR, Proceedings from 13th International Scientific Conference Economics and Management – 2008, pp. 336-342, Kaunas University of Technology, Lithuania, April, 2008, CD, ISSN 1822-6515.
- [14] Tellis, G. J., Advertising and Sales Promotion, (in Czech), Grada Publishing, Prague, 2000, ISBN 80-7169-997-7.