

SALES FORECASTING AS A KNOWLEDGE MANAGEMENT PROCESS

By **Kenneth B. Kahn and Marjorie E. Adams**

Business intelligence is data plus information plus knowledge ... a knowledge based management process is not complete until data, information and knowledge are exchanged among business participants... the choice of intelligence form and exchange strategy has unique implications for sales forecasting managers.

While knowledge management is growing buzzword in business, very little attention has been paid to knowledge management within the context of sales forecasting. Such attention is warranted given that sales forecasting is predicated on "company knowledge" or what we prefer to call "company intelligence," as will be discussed later. In fact, sales forecasting - from both a theoretical and practical perspective - is inherently a company intelligence management process.

By failing to equate sales forecasting to a process of intelligence management, companies inadvertently fail to capture key forecasting intelligence. Personal experience, "learning" from month-to-month business activities, sales leads, and customer-specific history (among other items), which are all key elements that could facilitate the sales forecasting effort, are often not tracked nor collected in many companies. Indeed, it is conceivable that companies' difficulties in forecasting may not result from poor techniques per se, but rather from a poor intelligence management infrastructure that would otherwise support the forecasting function.

To highlight this issue, this article discusses how companies might envision sales forecasting as a knowledge management process. We specifically present knowledge management from the perspective of managing intelligence exchange networks to support the sales forecasting function. Such networks can carry various forms of intelligence by way of two predominant forms of intelligence exchange strategies. The choice of intelligence form and exchange strategy has unique implications for sales forecasting managers.

DATA, INFORMATION, AND KNOWLEDGE

'Intelligence' is comprised of data, information, and knowledge. Each of these intelligence forms is unique, and has particular implications for the sales forecasting process:

Data: They are a collection of facts. Raw numbers corresponding to sales, invoices, returns, etc. represent data. Even if downloaded from the company computer system into an Excel spreadsheet,



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TABLE 1
INTELLIGENCE EXCHANGE NETWORK PREFERENCE

Sales Forecasting			New Product Forecasting			
	Codification	Personalization		Codification	Personalization	
Data	16	36	52%	12	23	35%
Information	9	19	28%	18	27	45%
Knowledge	6	14	20%	6	14	20%
	31%	69%		36%	64%	

unanalyzed numbers are still just data.

Information: When data are organized, summarized, and analyzed, they become information. For example, trend analysis of sales data provides information about a company's performance.

Knowledge: When information is combined with experience, context, and reflections, it provides implications, and presents strategies and tactics on which to base decisions. In the forecasting context, knowledge is created when the forecasting analyst takes the results of trend analysis, draws inferences and implications, and develops an action plan, based on intuition and experience from similar trend statistics with other product lines. In other words, trend analysis (information) is enhanced when experience and intuition are added to it.

Recognizing the distinction between data, information, and knowledge does not mean that a company has a knowledge management process in place, however. Simply generating intelligence does not complete the process. To complete it, it is necessary to exchange the data, information, and/or knowledge between individuals and departments.

STRATEGIES OF EXCHANGING INTELLIGENCE

Two strategies for exchanging intelligence (i.e., data, information, and/or knowledge) are codification and personalization. A codification strategy is a document-centered strategy, which means that data, information, and/or knowledge are put into a written form by way of memorandums, reports, faxes, and/or forms. A personalization strategy is a communication-based strategy, where data, information, and/or knowledge are exchanged verbally via telephone calls and/or face-to-face meetings. Although codification is a very efficient way of saving intelligence, it may not necessarily save slight nuances implicit within the intelligence. For example, sales history can be easily codified, but the reasoning behind the patterns in the history may not be explicit. Conversely, personalization is a very robust strategy because multiple ideas can be conveyed during a person-to-person exchange. For example, face-to-face meetings can discover factors contributing to forecast error as well as identify personnel's thoughts and opinions about which factors should be prioritized. But such a strategy can be time-consuming due to the time it takes to schedule a meeting and allow equal participation in a limited

time period.

INTELLIGENCE NETWORK TYPOLOGY

Having discussed three types of intelligence and two types of exchange strategies, it is possible to distinguish six types of intelligence networks that underlie the sales forecasting process: (1) codified data network, (2) codified information network, (3) codified knowledge network, (4) personalized data network, (5) personalized information network, (6) and personalized knowledge network.

Codified data network: Facts are exchanged in a formal, structured process. For example, the forecast analyst receives a spreadsheet including rows and columns of raw sales numbers.

Codified information network: Insights are exchanged in a formal, structured process. For example, the spreadsheet of sales numbers is accompanied by graphs and analysis.

Codified knowledge network: This represents a situation where implications are added. Here the analyst includes documented notes on why sales numbers are the way they are, and what the company should be doing in response to the given sales numbers.

TABLE 2
FORECASTING SATISFACTION AND INTELLIGENCE EXCHANGE NETWORK USE

	Sales Forecasting	New Product Forecasting
Codification	2.59 (s=1.77, n=6)	2.54 (s=1.21, n=11)
Personalization	2.94 (s=1.51, n=17)	2.67 (s=.77, n=18)
Equal Preference	3.17 (s=1.22, n=37)	3.20 (s=.84, n=5)
Data	3.08 (s=1.17, n=38)	2.89 (s=.96, n=18)
Information	3.00 (s=1.02, n=20)	2.81 (s=.93, n=21)
Knowledge	3.87 (s=.92, n=15)	3.22 (s=.83, n=9)

Note: 1. Satisfaction was measured on a 1 to 5 scale, where 1 = "very dissatisfied," 2 = "dissatisfied," 3 = "neither satisfied nor dissatisfied," 4 = "satisfied," and 5 = "very satisfied"
2. s = standard deviation; n = sample size

Personalized data network: This represents a situation where data are exchanged verbally, e.g., a telephone call to inform someone about what last month's sales were.

Personalized information network: This represents a situation where information is exchanged verbally. Had the previous telephone call also included an indication that last month's forecast error was 15% more than two months ago, then information would have been exchanged.

Personalized knowledge network: This represents a situation where knowledge is exchanged verbally. If during the telephone call the forecast analyst not only indicates an increase in forecast error, but also explains why the forecast is off and prescribes what can be done to ensure greater forecast accuracy next month, then knowledge has been exchanged.

EMPIRICAL ANALYSIS OF INTELLIGENCE EXCHANGE NETWORKS

Data from a survey of sales forecasting executives attending the Institute of Business Forecasting's (IBF) 2000 Tutorial meetings were analyzed to examine the prevalence of the above intelligence exchange networks and their relationships with sales forecasting. Another survey of new product professionals was undertaken and included the same questions to examine the context of new product forecasting. Questions included whether there was satisfactory data, information, and knowledge available to make sales and new product forecasts, and how such intelligence was exchanged.

Results show that companies employ multiple networks to support the forecasting

efforts - be it sales forecasting or new product forecasting. As shown in Table 1, both types of forecasting efforts reflect a strong preference for a personalization strategy, i.e., person-to-person intelligence exchange. It also shows that very few companies are relying on knowledge to support the forecasting effort; rather, data and information are the predominant forms of intelligence used to forecast sales of current and new products - 80% of the intelligence exchanged to support forecasting is through data and information.

There is a notable difference between sales forecasting and new product forecasting efforts in terms of preference for data or information, however. The majority of sales forecasters prefer the exchange of data (52% of the intelligence exchanged). In contrast, for new product forecasting, information is most preferred (45% of the intelligence exchanged). As mentioned above, for both types of forecasting, the predominant intelligence exchange strategy is a personalization strategy.

In sum, these results suggest that for forecasting sales of existing and new products, companies tend to prefer a "word-of-mouth" strategy and/or a meeting approach to exchanging data and information. This is noteworthy because a personalization strategy is not necessarily efficient when analytical techniques are used. Analytical techniques typically require data, which are documented and/or are accessible through a database. In such a situation, the use of a codification strategy would work better. Hence, it appears that the intelligence exchange networks employed by companies tend to underlie a structure that favors judgmental forecasting. From this it appears that companies can improve their forecasts by following a codification strategy as it enables one to use more statistical techniques. However, this should not be taken as a recommendation for the sole use of a codification strategy. Person-to-person contact is necessary for the forecasting effort. Use of both codification and personalization strategies are likely to offer better forecasts as well as better courses of action.

Supporting the previous paragraph are

the results of Table 2, which show that satisfaction is higher when both types of exchange strategies are equally used. Table 2 also shows that access to knowledge corresponds to a higher level of forecasting satisfaction. This latter observation lends credence to the need for greater knowledge generation and dissemination, not just data and information, to underlie sales forecasting and new product forecasting efforts. Note, however, that the results in Table 2 are directional and not statistically significant due to a limited sample size and the variability around each value. In fact, the variability around respondents' satisfaction suggests that the intelligence exchange network alone does not drive satisfaction. (See Table 2)

SUMMARY AND CONCLUSIONS

The major premise of this article is the need to characterize sales and new product forecasting as a company intelligence management process. Unfortunately, most companies see forecasting as just technique application, and do not necessarily envision the intelligence requirements so that the forecasting effort can reach its potential.

Realizing this need is a first step. The next step is recognizing that intelligence represents data, information, and knowledge - each of which has important implications for sales forecasting. While the results of this study are tentative, it appears that data are most utilized for sales forecasting, information is most utilized for new product forecasting, and knowledge is important for enhancing satisfaction in the overall forecasting endeavor. This implies that companies really need to address all three forms of intelligence.

There is a subsequent step, that is, to recognize the two strategies for intelligence exchange. As found, most companies favor a personalization strategy, which is a communications-based, person-to-person strategy. While not conclusive, analysis suggests that equal use of codification and personalization strategies corresponds to higher satisfaction in the forecasting effort. It is speculated that the codification strategy enables the company to apply analytical techniques in order to establish a proper baseline forecast, and the personalization

strategy brings in' the experience and intuition necessary to augment the forecast. Use of both strategies will most likely lead to the most reasonable, intelligence-based forecast.

Naturally, more research is needed in this area to clarify and recommend what would be the best intelligence management infrastructure and process for forecasting. The hope is that this article will place sales forecasting and new product forecasting in a new light. In particular, it is hoped that realizing the linkage between forecasting and intelligence management will highlight how forecasting should be predicated on a company-wide infrastructure and viewed

as a multiple entity, company-wide (versus a single source, department-specific) endeavor. ~

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