

# **BENCHMARKING FORECASTING PRACTICES IN THE PHARMACEUTICAL INDUSTRY**

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## **ABSTRACT**

Since business forecasting as practiced these days is a very young function, businesses are looking for benchmarks, which can help them to determine where they are in relation to the industry norm, and if they are below it, what they have to do to get there. This paper shows the norms of pharmaceutical industry as well as the norms of 13 different industries combined. The benchmarks include forecasting process, support of upper management, forecasting models used, forecasting errors, forecasting software and systems used, salary of forecasting professionals and their background.

## **INTRODUCTION**

The forecasting is not a new discipline, but the way it is practiced now in business is new. As such, companies are trying to “Benchmark Forecasting Practices,” that is, where they are in relation to their industry norms and where they want to be. The “Benchmarks” are merely the industry norms, which are also called “Best Practices.” Companies want to know the “Best Practices” within their own industry with respect to the forecasting process; where the forecasting function resides; which forecasting software, systems and models are used; which forecasting philosophy — one-number or multiple-number forecasts — is followed; how far ahead and how often forecasts are prepared and revised; how much support is received from top management, as well as from various functions including Marketing, Sales, Finance and Production; what is the background of people who work in the area, and their salaries; and so on. The answers to these questions can serve as “Benchmarks” of forecasting. Benchmarks are based on the surveys of people who attended forecasting conferences and/or tutorials (which were five in total) run by the Institute of Business Forecasting (IBF) in the year 2001. Attendees of these conferences/tutorials are primarily from large and upper-midsize companies.

## **EXPLOSION IN THE FORECASTING FUNCTION**

Although business forecasting is quite a young function, it has grown by leaps and bounds in the last two decades or so. Prior to 1985, very few companies had dedicated forecasters. Those who

made forecasts were basically economists who were primarily concerned about the state of the economy and its impact on the overall health of a company. Also, their forecasts were more strategic (long term) and less operational (short term). The kind of growth we see today is primarily in the area of operational forecasting. The average age of the forecasting function in the pharmaceutical industry is 7.4 years, meaning that on the average companies within this industry started this function only 7.4 years ago. Furthermore, in an average company, 5.8 persons work as a dedicated forecaster in this industry.

The growth in the forecasting function has led to a multi-billion dollar industry of forecasting software and systems. The forecasting software is a stand-alone package. It generates forecasts either by a model selected by the forecaster or by a model selected by a software package. Most of the forecasting software packages have a built-in automatic system that selects the best model for each set of data based on pre-defined criteria. The forecasting system, on the other hand, does much more than preparing forecasts. Depending on the system, it can, in addition to preparing forecasts, help to generate plans for distribution, manufacturing, transportation, sales and marketing. Most of the vendors in the area started their business in 1985 or after.

The key players in the forecast software industry are SAS, John Galt, Smart Software and Business Forecasting System. Although SAS started the operation in 1976, it did not introduce the forecasting component until 1980. John Galt Solutions was founded only in 1996. Both Smart Software and Business Forecasting System started up in 1986.

The key players in the forecasting systems are SAP, Manugistics, Oracle, i2 Technology and Demand Solution. Although SAP has been in business since 1972, it introduced its forecasting system (APO) only in 1998. Manugistics opened its door for business in 1986. Oracle was founded in 1977 but it introduced its “Demand Planner” only in 2002. i2 Technology was founded in 1988. Demand Solutions was opened for business in 1985.

## **MANAGEMENT SUPPORT**

For a forecasting function to succeed, it needs the support of the upper management, because it needs resources to start it and resources to maintain it, which only the upper management can provide. Resources are needed to buy forecasting software and/or system, syndicated data, and tools to store and analyze data, as well as to communicate data/information to different stakeholders within and outside the enterprise. Data used in preparing forecasts is both internal and external. Syndicated data, which provides competitive information, is bought from outside sources, and can easily run into millions of dollars. Buying and installing a forecasting software and system also cost lot of money. Furthermore, for a forecasting function to work efficiently it needs collaboration from various stakeholders, both internal (sales, production, marketing and finance people) and external (distributors and customers).

Salespeople are the eyes and ears of the market. They can provide input as to what their customers are thinking and planning. Production people can provide information about how much and when they can produce, and how much lead-time they need. Marketing people can provide market intelligence. They can also provide information about the products they plan to introduce or abandon, territories they plan to go into and exit out, what type of advertising works and does not work, and how much lift each ad provides, and so on. Finance, of course, controls the budget.

All these have a bearing on the forecast. Besides these, the forecaster needs input from distributors and customers about their inventory. Without the blessing of upper management, nothing would be forthcoming. When asked how supportive is the senior management to the forecasting function, 43% said highly supportive, and 57%, somewhat supportive. At least, upper management in every company within pharmaceutical recognizes the need for this function, because no one said that they didn't feel the need for it.

## **FORECASTING PROCESS**

One way to define the forecasting process is to describe the issues it deals with, which are: What kind of data/information is needed to prepare forecasts? From where will it come? How will that data/information be transmitted? Where should the forecasting function reside? What types of forecasts are needed and how far ahead should they be

prepared? What levels of details in forecasts are needed? What should be the forecasting philosophy — one-number forecast or multiple-number forecasts? Which forecasting approach should be used — bottom up, top-down or somewhere in the middle? Who should participate in the process? Should there be a monthly consensus meeting? How often forecasts should be monitored and revised? Do we need to document forecast accuracy? Who should have the authority to override forecasts? We will describe here how most of these issues are currently dealt with in the pharmaceutical industry.

In the pharmaceutical industry, most of the companies have the forecasting function within Marketing (44%), followed by a separate Forecasting department (16%) and Strategic Planning (16%). Dr. Larry Lapide, VP and GM of Benchmarking Services, at AMR Research, says that it does not makes much difference where it is placed as long as it is not within planning. Otherwise, plans may become the forecasts.

For a forecasting function to work smoothly and efficiently, we need collaboration among different functions. Forecasts cannot be prepared in isolation. The forecaster needs input from various functions (Sales, Marketing, Production, and Finance) to prepare forecasts as well as to overlay judgment over statistically generated forecasts. When asked whether or not conflict of interest exists among different functions, 74% of them said "yes."

## **ONE-NUMBER VS. MULTI-NUMBER FORECASTS**

In principle, every one will agree with a one-number forecast philosophy, with that every business plan will be based on that number. Imagine for a minute what could happen if the production plan is based on one number, the financial plan on another number, and the marketing plan on a number different from the other two. Such a process would create nothing but chaos within an enterprise. However, political realities are different. In an organization where different functions have been all along preparing their own forecasts, it won't be easy for them to give it up.

One Forecasting Director of a multi-billion-dollar pharmaceutical company recently remarked, "In theory, we all agree with one-number philosophy, but political realities call for a compromise. In order to get cooperation from production people we agreed

to a two-number-forecast philosophy — one for production people, and another for all other functions.” In the pharmaceutical industry, a little more than half of them (52%) follow a one-number philosophy.

How far ahead to forecast (forecast horizon) depends very much on the lead-time, that is, how far ahead a decision has to be made. The more lead-time we need, the more far ahead we have to forecast. In this industry, 16% of the companies forecast one-month ahead; 22%, one-quarter ahead; 34% one-year ahead; and 28%, one-year ahead.

It is quite common to hold periodically (normally once a month) a forecasting consensus meeting. In this meeting, generally, people from different functions including Marketing, Sales, Production and Finance get together and go over the statistically generated forecasts. Where necessary, they overlay judgment over them in an effort to build a consensus. Consensus meetings are important for a number of reasons because it involves all the functions in the forecasting process. All these functions may have some information, which has a bearing on the forecast. Furthermore, the consensus meeting provides an opportunity to overlay judgment over the statistically generated forecasts. Remember, forecasting is neither a science nor an art, but a combination of both. It also brings different functions to the same page.

### **FORECASTING MODELS USED**

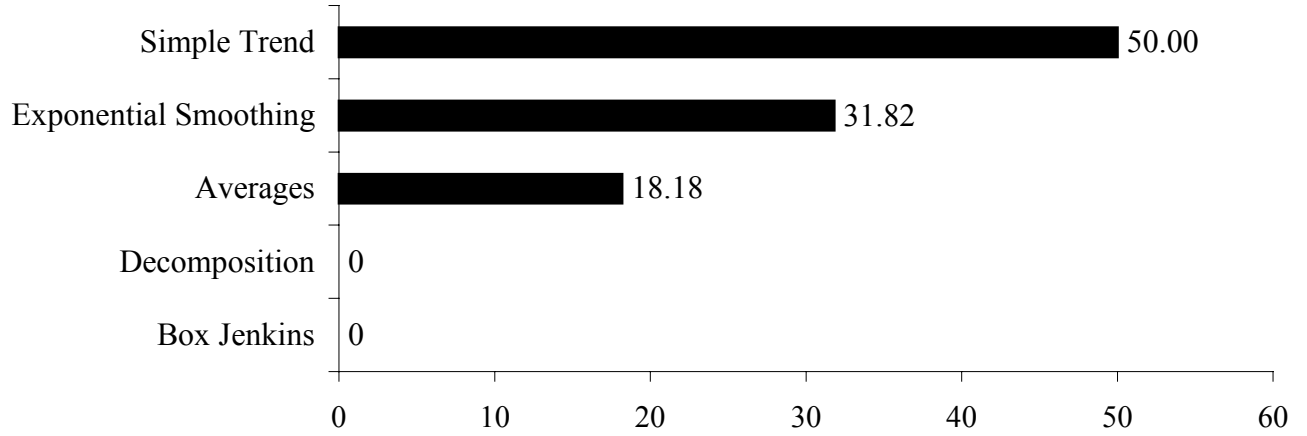
There are three types of models: (1) Time Series, (2) Cause-And-Effect and (3) Judgmental. In Time Series models, we extrapolate the data using one technique or the other. In Cause-And-Effect, there is a cause and there is an effect. We develop relationships between them by using the historical data, and then make a forecast by using those relationships. In Judgmental models, judgment is predominant. They are used particularly in the case of new product forecasting where historical data are not available.

Among all the models, Time Series models are by and large the easiest, and are most often used (52%); where as, Cause-and-Effect, 24%; and Judgmental, 19%. The remaining 5% represents homegrown models. In some cases, they use more than one type of models.

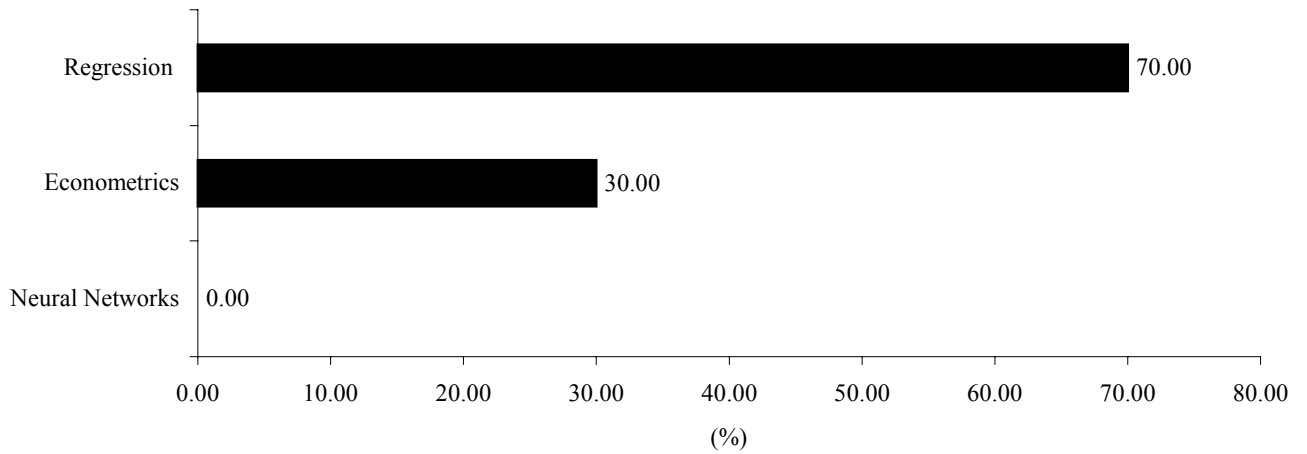
Within Time Series, the models often used are the simplest ones. Within this group of models, Simple

Trend and Averages are the easiest ones, and their uses constitute 68% of the total. (See Figure 1) Among Cause-And-Effect models, there are three models, which are: Regression, Econometrics and Neural Networks. Among them, Regression is the most popular one. (See Figure 2)

**FIGURE 1**  
**TIME SERIES MODELS USED IN THE PHARMACEUTICAL INDUSTRY**  
**(In percent)**



**FIGURE 2**  
**CAUSE AND EFFECT MODELS USED IN THE PHARMACEUTICAL INDUSTRY**  
**(In percent)**



## FORECASTING ERROR

Generally speaking, among all the three levels – aggregate (company as a whole), category and SKU (Stock Keeping Unit or item) – error at an aggregate level is the lowest. This happens because in aggregation some of the under-forecasts are offset by the over-forecasts, or the other way around.

Between category and SKU level forecast errors, it is generally lower at a category level than at a SKU level. Furthermore, forecast error generally increases as we forecast further into the future. In other words, we can forecast the sales of next month or next quarter much more accurately than those of next 5 or 10 years. Also, all products are not equally forecastable, some are easier to forecast than others. The products that are difficult to forecast have large errors. Generally speaking, forecasts of non-matured products have larger errors than matured ones; forecasts of promoted products have larger errors than non-promoted ones; and forecasts of new products have larger errors than existing ones.

At a category level, the forecast error is 21% for a one-month ahead forecast, and 15%, and for one-year ahead forecast. At an aggregate level, forecast error is 5% for a one-month ahead forecast and 7% for a one-year ahead forecast.

## FORECASTING SOFTWARE AND SYSTEM

Looking at the survey results, it appears that there are a large number of players in the forecasting software market, but no one has a dominating position. SAS is the leader with a market share of 25%, followed by SPSS and Automatic Forecasting each with a market share of 12%.

The same is true with the forecasting system, that is, no one has a dominating position in the market. Here Oracle has the largest share (38%), followed by Logility (18%).

## SALARY IN THE FORECASTING PROFESSION

Among the thirteen industries studied, the salary of forecasting professionals in the pharmaceutical industry is higher in every rank except of Vice President of Forecasting. The industries studied were (1) Automotive, (2) Computer/Tech, (3) Consumer Products, (4) Food/Beverages, (5) Gas/Electric, (6) Healthcare, (7) Industrial Products, (8) Pharmaceuticals, (9) Oil/Petroleum, (10) Retail, (11) Service, (12) Telecommunications, and (13) Transportation. The median salary of forecasting professionals in the pharmaceutical industry is as follows:

Rank	Median Salary
Forecast Analyst	\$54,000
Sr. Forecast Analyst	\$63,000
Forecast Manager	\$78,000
Dir. Of Forecasting	\$119,000
VP of Forecasting	\$135,000

Over the last ten years or so, forecasting positions have been substantially upgraded. About ten years ago, very few companies have a position of Director of Forecasting. The forecasting positions often ended with the rank of a Manager of Forecasting. About five years ago, very few companies have a position of Vice President of Forecasting, which is not uncommon now. In our survey, 8 people gave the salary of Vice President of Forecasting, meaning that at least that many companies have such a position.

## BACKGROUND OF FORECASTERS

To succeed in the forecasting function one needs a fairly good background of statistics, knowledge of computer, communication skill, knowledge of forecasting software and systems, good salesmanship, and product/market knowledge. In our survey, 27% of them have Product/Market knowledge, followed by Accounting/Finance (23%), and Market Research 14%. Statistics/Mathematics is very important in forecasting, but only 12 % of them have such a background, which may improve with the time.

## CONCLUSIONS

The forecasting function as practiced in business today is growing by leaps and bounds, but it still has a long way to go. The support of the upper management, which is the key to the success of this function, is still lacking. Only less than half of the pharmaceutical companies give a full support to this function. Also, a little over half of the companies follow a one number forecast philosophy, that is, every plan including production, financial, marketing and sales is based on the same forecast numbers. The forecasting models most often used are time series models, which are by and large easier to work with. But with the time, it will change. The more and more companies will start using regression-based models. The salary in the forecasting profession is by and large the highest in the pharmaceutical industry in comparison with other industries. The quantitative background is important to succeed in the forecasting function, but

is lacking among many practicing forecasters.  
Hopefully, with the time, it will change.

## **CONTACT INFORMATION**

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