TITLE

An Evaluation of the Potential of Bayesian Sales Forecasting in Improving the Long-term Marketing and Management Performance of UK Pharmaceutical Firms

ABSTRACT

Management needs to deal with increasing uncertainty of environmental changes to make critical and important decisions about the future in the present time. Sales forecasting is fundamental to management's ability to plan, budget and control. It is not a question of whether managers should forecast or not; but the main question is how they are to do so, and this fact is applicable to all organisations in all industries.

Understanding of forecasting approaches and tools is crucial to carry out managerial activities such as data acquisition, data audits, links with formal planning procedures and other management systems, maintenance of existing applications, and identification and implementation of new applications.

The latest studies indicate that defects with forecasting do not lie in technical areas but in the gap between forecasters (producers) and managers (users); which is mainly because the forecasters might not be able to understand the managers' needs, and the managers are not capable of understanding the forecasting techniques especially complicated ones. Consequently, this has led to a gap in communication that caused ill-matched forecasts and unavoidable results.

DESCRIPTION OF THE TOPIC:

"Future is an attempt to place a degree of order and structure on this uncertainty" (Baines, 1992:9). Management needs to deal with increasing uncertainty of environmental changes to make critical and important decisions about the future in the present time. Sales forecasting is fundamental to management's ability to plan, budget and control. It is not a question of whether managers should forecast or not; but the main question is how they are to do so, and this fact is applicable to all organisations in all industries. Understanding of forecasting approaches and tools is crucial to carry out managerial activities such as data acquisition, data audits, links with formal planning procedures and other management systems, maintenance of existing applications, and identification and implementation of new applications. As shown in Figure (1).

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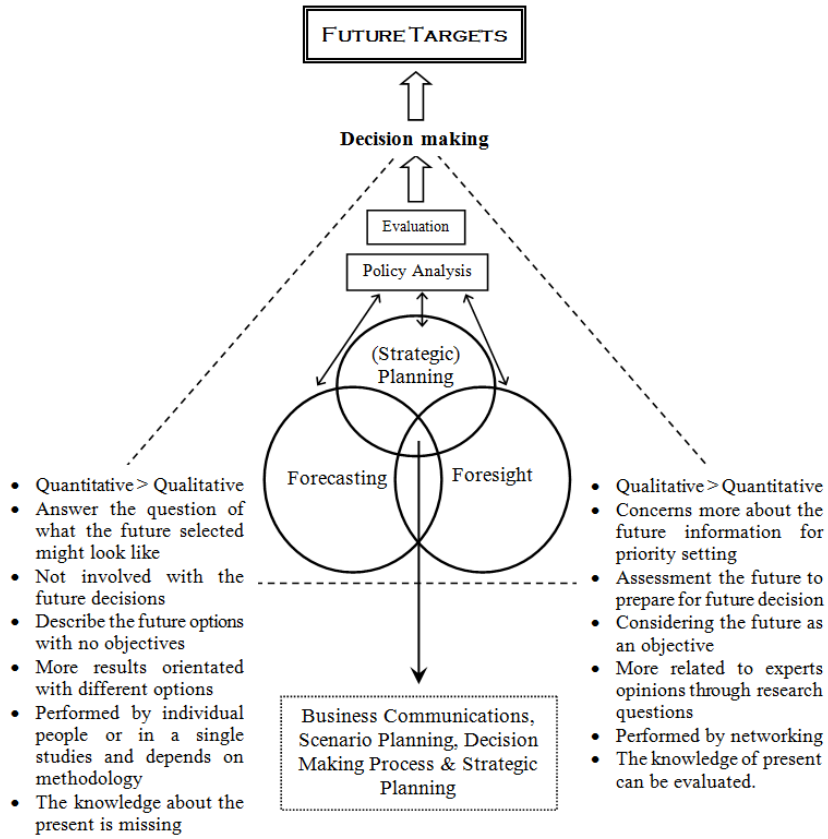

Figure (1): understanding of forecasting approaches

Such a gap is very obvious in pharmaceutical industry, where most managers in these companies come from a technical pharmacy background, and are not experts in estimating the future to make accurate forecasts, which has often led to unfortunate results. However, such an issue should not be neglected since pharmaceutical industries have a major responsibility towards medical needs in two main directions. The first direction being producing new and innovative drugs through the department of Research and Development (R&D), and the second one being maintaining the supply of existing products in order to satisfy the markets' / patients' on going demands. On the other hand, pharmaceutical industry can affect national economies, where any defects in the achievements or future expectations would ultimately affect the employment and healthcare needs, as shown in the Figure (2).

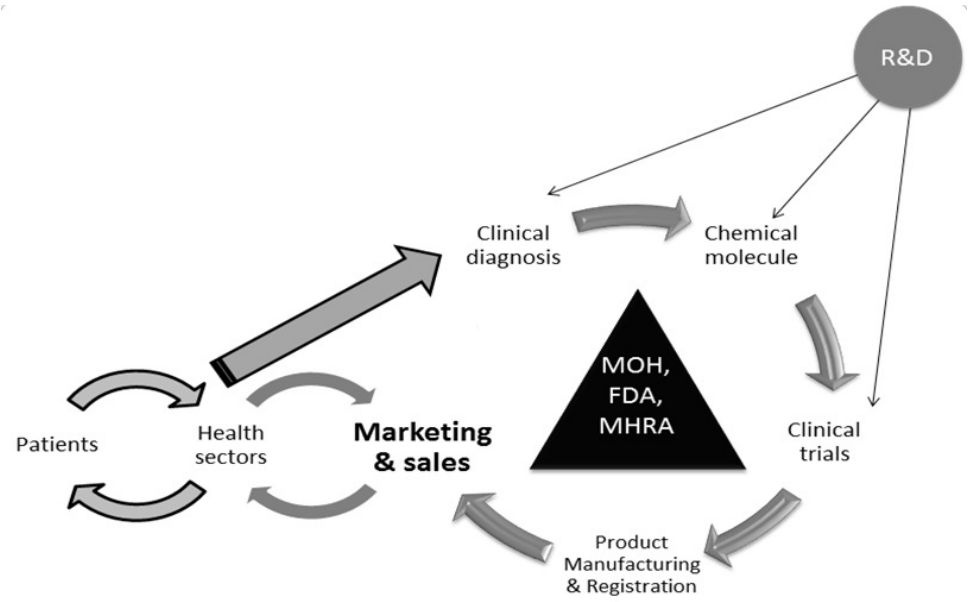

Figure (2): Overview of Pharmaceutical Industries

In most cases, forecast results are produced by forecasters separately in a process that purely investigates previous data only, without looking at the real situation in the market place which might include several influencing factors. Such data is then handed over to managers – who happen to be pharmacists in most cases – to build strategic plans. Since they did not participate in the initial forecasting process, these managers will handle the forecast results as received without understanding the underlying forecast methods, neglecting the influencing market factors again.

Accordingly, plans and decisions built upon these forecast results will be subject – at many times – to overshooting or conservative forecasts. In the first case, overshooting forecasts will involve over stocking, unnecessary capital investment, marketing costs, over employment, purchasing raw materials and wasting Research and Development (R&D) resources. Whereas in the conservative forecasts, results might involve Out Of Stock (OOS), increased manufacturing costs, lost revenues, failure to launch new items, and – in worst cases – affect patients' lives in cases of life saving medical products. As shown in Figure (3).

BAYESIAN FORECASTING:

"...in terms of forecasting ability ... a good Bayesian will beat a non-Bayesian, who will do better than a bad Bayesian" (Granger, 1986, P:16).

Bayesian forecasting is a mix between judgement and mathematical data analysis; it involves the use of a subjective view of probability and offers rationalistic beliefs in context of uncertainty that will lead to logical decision making. The concept of rationality is explored in the context of representing beliefs or choosing actions in situations of uncertainty which could be considered the basis for introducing decision theory.

The uncertainty; which is a feeling that might be shared by individuals, should be evaluated taking into considerations that we do not attempt to treat all individuals' uncertainties with the same degree of interest or seriousness. Subjective knowledge within more objective scenarios support more reflective and accurate forecasting for pharmaceutical firms.

This research aims to explore approaches to overcome such a conflict, through forecasting processes that are handled jointly between forecasters – who are experts in the statistical forecasting methods – and managers – who are experts in evaluating the various influencing market factors, which basically means a mixture of objective techniques of analysis along with subjective input without data. Framework of the research is Figure (3) is the initial framework of the research.

RESEARCH OBJECTIVES:

- Investigate who is responsible for sales forecasting in pharmaceutical companies.
- Evaluate the importance of sales forecasting in pharmaceutical industry in the decision making process.
- Evaluate the current techniques used to manage the forecasts and the forecasts errors in pharmaceutical industry.
- Developing a prescriptive model for a theoretical conceptual stage model, and understand how Bayesian theory can improve the prediction of pharmaceutical companies
- Establish the main managerial implications of implementation of such a model in pharmaceutical industry

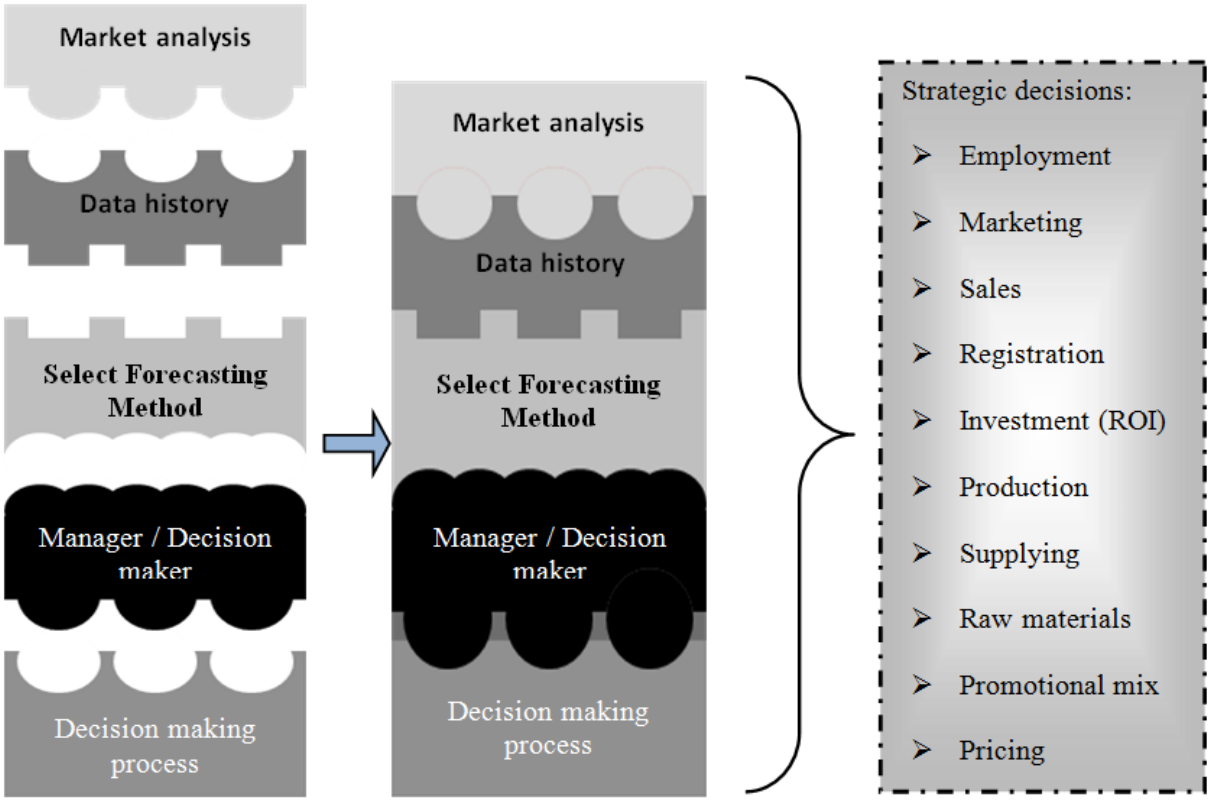

Figure (3): The framework of the research

MAIN RESEARCH QUESTIONS ADDRESSED:

Q1: Who is responsible for sales forecasting in the pharmaceutical companies?

Q2: What is the real value for achieving the sales forecasting in pharmaceutical business?

Q3: What are the main reasons for not achieving the forecasting results in pharmaceutical business?

Q4: What are the current techniques used in sales forecasting in pharmaceutical business?

Q5: Do the forecasters consult the managers before presenting the forecasts, or do they deal with the data without taking the experts' opinion / judgment (Bayesian approach)?

THE METHODOLOGY:

The sample involves the mangers and forecasters in the pharmaceutical companies in UK, basically the marketing, sales and strategic planning departments. The research type is Exploratory Research under the Postpositivistic Research through a Qualitative Data Analysis, because the area of the

research is completely new in pharmaceutical industry with too many variables involved, accompanied by high flexibility for discussion that would aim to explore a new theory.

The Qualitative theory that I will use is Grounded Theory because it is the most flexible method in Qualitative Data Analysis and would give more focus than many other methods. Also, it quickens the speed of gaining a clear focus on what is happening without scarifying the detail of enacted scenes. Grounded theory offers a sharp tool for generating, mining, and making sense of data in researches that combine insight with industry.

THE MAIN CONTRIBUTION:

From a statistical point of view, the forecaster analyses the historical data to get the results and then passes them on it to the management, where the manager may not be able to understand the forecasting method by which the forecaster got the result, leading to misleading results to the sales and marketing teams. Bayesian theory might give the solution to Pharma industry by which managers would participate in the forecasting process through providing their input and experiences.

The main contribution of this research is to fill the gap between forecasting and management in the pharmaceutical industry, where this in return will give a better output for the health business and improve the efficacy of the forecasting process, which would consequently improve pharmaceutical companies' performance and make the pharmaceutical business lead the way for other companies, taking into considerations that the implications in pharmaceutical industry could be applicable in other industries.

This research is expected to support organisation's survival and sustainability through providing managers with a model of a theoretical conceptual stage that would help them to improve their forecasting, and at the same time address the issues that should be considered to bring this output into reality, taking into consideration that better foresight and insight by companies is one of the key issues for handling future risks and addressing possible threats especially in today's changing environment.