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VAN WINKLE, PETER BERNARD

COMMODITY PLASTIC RESINS: A DELPHI FORECAST FOR  
PERCENTAGE MARKET SHARES FOR THE YEARS 1980, 1985, 1990, 1995,  
AND 2000

*Pace University*

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PREVIEW

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COMMODITY PLASTIC RESINS  
A DELPHI FORECAST  
FOR  
PERCENTAGE MARKET SHARES  
FOR THE YEARS  
1980, 1985, 1990, 1995, AND 2000

PETER B. VAN WINKLE

A dissertation submitted to the faculty of Pace University  
in partial fulfillment of the requirements for the degree of  
Doctor of Professional Studies in Management.

1981

ABSTRACT

OF DISSERTATION ENTITLED

COMMODITY PLASTIC RESINS

A DELPHI FORECAST

FOR

PERCENTAGE MARKET SHARES

FOR THE YEARS

1980, 1985, 1990, 1995 AND 2000

The purpose of this study was to forecast the market shares that the commodity plastic resins (e.g., low density polyethylene, high density polyethylene, polypropylene, polystyrene, and polyvinyl chloride) would have for the years 1980, 1985, 1990, 1995 and 2000. The means used to make the forecast was the Delphi method; therefore, the input information was generated by a group of plastic industry experts and represents a consensus opinion.

The need for the study arises because of the low energy requirements of production of plastic composited goods as compared to goods manufactured of other materials. This low energy demand requirement for goods made from plastic is the basis for demand forecasts that call for commodity plastic resin production in excess of 225 billion pounds by the year 2000. Actual demand from year to year and decade to decade will vary with the ups and downs of the business cycle, but it is clear that a very large investment must be made in commodity resin manufacturing facilities if the higher levels of demand are to be satisfied at reasonable material costs.

This study looks at market shares as a useful means of comparing the market relationships among the commodity resins. Shares can be converted easily to production capacity requirements both existing and needed to meet future demand.

Twenty five experts from the commodity plastic resin industry participated in making the Delphi forecast. All of these experts are employed by plastic resin manufacturing companies that belong to The Society of the Plastic Industry Inc., the major plastic industry trade organization.

The study includes 62 tables that show 1976 production capacities and those required to meet projected demand both in pounds and dollars. Also shown by the same tables are the statistical comparisons of the two intermediate Delphi forecasts that show the gathering consensus of the experts. There are also eight exhibits and six graphs that support the findings.

The result of the study is a Delphi forecast for commodity resins that covers the period of 1980, 1985, 1990, 1995 and the year 2000.

Peter Van Winkle  
Darien, Connecticut  
August 1981

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## Chapter I

### INTRODUCTION

#### PURPOSE OF THE STUDY

This study forecasts the percentage of the market that each of the commodity plastic resins will have in the years 1980, 1985, 1990, 1995 and the year 2000. The forecast has been prepared utilizing the Delphi method--the consensus opinion of experts employed in the plastic materials and synthetic resin industry.

#### THE NEED FOR THE STUDY

PIMS, a project sponsored by the Marketing Science Institute and the Harvard Business School, determined that there is a link between return on investment (ROI) and market share.

It is now widely recognized that one of the main determinants of business probability is market share. Under most circumstances enterprises that have achieved a high share of the markets they serve are considerably more profitable than their smaller share rivals. This connection between market share and profitability has been recognized by corporate executives and consultants, and it is clearly demonstrated in the results of a project undertaken by the Marketing Science Institute on the Profit Impact of Market Strategies (PIMS).<sup>1</sup>

The fact that return on investment (ROI) increases with market share is found to have special significance for the synthetic materials and

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<sup>1</sup>. Robert D. Buzzell, Bradley T. Gale, and Ralph C.M. Shulton, "Market share--a key to profitability," Harvard Business Review (January-February 1975): 97.

plastic resin industry. The industry is a growth industry that is capital intensive. A "world class" resin manufacturing facility constructed to make a specific type of plastic resin can cost three-quarters of a billion dollars in terms of 1978 construction costs,

This study shows that forecasts of demand for plastic resin through the year 2000 will require manufacturing plant additions estimated to cost in excess of 82 billions of dollars. The study also estimates the current market share percentages of total manufacturing capacity that each manufacturer of resin has for each of the commodity plastic resins.

In terms of GNP accounting, investment in new productive capacity cannot exceed savings. It has been established that the rate of savings as a percentage of income for individuals in the United States has fallen to 3.3 percent. This is extremely low.

A problem of tremendous magnitude is expressed in our national savings rate - 3.3 percent.<sup>2</sup>

This low rate of savings portends difficulties for companies should they become seekers of capital in the investment funds market because of shortages of capital that must ensue from the declining savings rate. Certainly manufacturers of plastic resin must seek funds from the investment banking community, or the public, to finance the manufacturing capacity expansion needed to meet the projected demand growth for plastic

2. Editorial, United States Bahker, May 1980, p. 6.

resins.

Investment bankers are sophisticated and understand very well the relationship between market share and ROI as confirmed by PIMS. For this reason plastic resin manufacturing companies will find that those with the largest market share at present will have the least difficulty in acquiring funds for new plant construction. Those companies with the smallest market share may find no availability of funds at any workable price; consequently, they may become losers in the ROI race which makes sale or merger as their only viable economic alternative.

Among the market share leaders competition will arise for the available funds for plant expansion purposes. Success in gaining access to the funds will depend upon the mutual understanding and confidence that the investment banking community and plastic manufacturing companies have with each other. A forecast for the market share that each of the commodity plastic resins will have in the future is then essential to the planning process in terms of market share strategy, manufacturing facility planning, and financing.

#### LIMITATIONS

Part of the information utilized in the development of this study was gathered from questionnaires returned by 25 experts in the first round, and 15 of the same experts in the second round. The sample was relatively small considering the total universe, which is a study limitation. As mentioned above only 15 of the original 25 respondents answered the second questionnaire and this too may be a limitation. The comparability of the 25 and 15 respondent surveys has been evaluated

utilizing the chi square test.

Much of the information relating to plastic resin and feedstock plant construction costs was gathered in 1978. Keeping this in mind the reader should make adjustments for the rapidly rising inflation rate that was also present in 1978 and continues today. Since the typical plastic resin facility requires five years to plan, build, and "de-bug" prior to coming on-line, it is difficult for any study to precisely ascertain what the ultimate costs of any facility will be, except to say that the costs will probably be higher than anticipated.

#### ORGANIZATION OF THE STUDY

Six chapters make up the body of this study. Each has a specific purpose as described below.

Chapter I The intention of this chapter is to outline the balance of the study. Each of the five remaining chapters is described briefly. Definitions explaining terminology peculiar to the plastic industry are provided at the end of the chapter.

Chapter II The second chapter provides background information about the size and makeup of the plastic materials and synthetic resin industry. In the development of this chapter, market-share percentages and ownership of the production facilities have been analyzed. An estimate of existing facility costs is made along with estimates of future construction costs: this is essential to the development of an understanding of the strategic implications that market share implies.

Chapter III In this chapter the origins of the Delphi method of forecasting--the forecasting technique of choice for this study--are discussed. The steps necessary to implement the study are detailed along with considerations that relate to each of these steps. Several Delphi studies are examined to determine what kinds of information have been investigated using this method and what the results have yielded.

Chapter IV The Delphi study is undertaken in this chapter. The actual steps are implemented with the reasons given for making decisions that affected the steps. The results of the returned-Delphi questionnaires also are compiled in this chapter with a chi-square test applied to determine if the results from the two sets of returned-Delphi questionnaires are significantly different.

Chapter V To broaden the understanding of the specific Delphi forecast, it is useful for our study to prepare a forecast that covers the same ground but utilizes a different method. This comparison forecast is by choice the regression analysis utilizing time series information and clearly shows how different the resulting forecasts are and what different purposes they serve.

The unique qualities of the Delphi forecast become apparent as do the unique qualities of the regression analysis forecast. Instead of the results being antagonistic as might be expected, the differences in the forecasts have a tendency to broaden the understanding of the subject investigated.

Chapter VI The final chapter of the study compares the Delphi and regression analysis forecasts. The forecast is evaluated for each of the