THE ROLE OF ECONOMICS IN LONG-RANGE PLANNING FOR AN AEROSPACE COMPANY

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Preface

This report focuses on the applications of economic analysis in private sector corporations, notably those in the aerospace industry. However, it is hoped that some of the concepts and methodology can be transferred to the public sector.

In a recent article, Foreman and Mertes point out, "Some will disagree with the idea that managing the country's business may not differ greatly from managing a private business. They may rightly argue, for example, that the problems of government are many times more complex than those of business, while the stakes are immeasurably higher. But this argument falls short of the point. For the point is, rather, that despite the relative complexity of the problems or the importance of the stakes, decision making in the public and private sectors of the economy is similar, perhaps more so than popularly supposed. The degree of similarity is sufficient for one to conclude that the methods of quantitative business analysis can be successfully used to attack the decision-making problems of the government."[1]

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[1] C.W. Foreman and F.P. Mertes, "The Business Side of Defense Planning," Business Horizons, Summer 1966, p. 35.

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I. Introduction

It is fashionable in some quarters to state that business management is essentially applied economics. In this view, the manager allocates scarce resources (men, money and materials) among competing ends--R&D, new factories, advertising, management development, etc.

This paper does not contend that this view is necessarily wrong. However, in order to be useful, it will consider formal economics as a contributing factor to business management, but as something substantially less that the whole. The presentation will focus on business planning because that aspect of company activity provides such an excellent framework for surveying the various potential applications of economic theory, methodology, and statistics to the business firm.

Robert Burns may well be the patron saint of business planning because of his immortal phrase, "The best laid plans..." In this connection, it may also be recalled that a New York City writer had a daily column entitled something like "Life With Salt on the Side". In much of the subsequent discussion, it would be helpful if the reader added not a pinch, but a dose of salt. Perhaps the mobility as well as the mortality rate of corporate planners as a breed may point this up. For example, there is a rule of thumb which goes about as follows: If a business publication reports about a corporate planner who is telling how his company plans, the odds are 1 out of 2 that, within two years, he will not be in his present job, his job won't exist, or both.

It may be helpful at the outset to offer some observations on the essentials of business planning, to clear up some confusions that students of business planning as well as planners themselves may develop.

Fundamentally, business planning is not, or at least should not be, merely a collection of estimates of future sales, profits, manpower, or other statistical forecasts. To cite the obvious, Webster's new International Dictionary states that to plan is "to devise or project as a method or course of action." Here is what can be taken to be the essence of business planning: it is a process which is designed to provide a course of action for a business enterprise. The statistical data merely furnish a basis for decisions. The subsequent analysis will depend heavily on a relatively simple model of the corporate planning process. More sophisticated models exist in the literature. Nevertheless, the following one is useful, on the assumption that minimum complexity may be more advantageous than maximum erudition. However, the reader may be cautioned by Gertrude Stein's lament that the trouble with Americans is that they try to simplify complexity instead of trying to understand it.

This model of the business planning process views it as a five-step affair.[1] The first phase is external orientation, setting forth--assuming or forecasting--the external environment in which the business enterprise will be operating during the planning period.

The second phase of the planning process is targeting--establishing long-term goals and objectives for the enterprise.

Thirdly, comes internal orientation, analyzing the capability of and resources available to the enterprise.

Next, comes development, formulating the key programs and major undertakings on which the company will embark.

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[1]This model is drawn from M. L. Weidenbaum, "The Role of Economics in Business Planning," in Max D. Richards and William A. Nielander, ed., Readings in Management, Second Edition, (Cincinnati, South-Western Publishing Co., 1963,) pp. 371-382. See also M.L. Weidenbaum, "The Planning Process in Business," Business and Government Review, May-June 1965, pp. 15-22.

Finally, comes evaluation, closing the loop by checking the adequacy of the developmental programs to meet the goals and objectives in the anticipated environment. Likewise, the reasonableness of the goals and objectives are reviewed against the likely accomplishment of the enterprise, given its capability and resources.

The next several sections of this paper take up each of the five phases of the business planning process in turn, indicating the actual and possible influences of economic factors and contributions of economic analysis to each of them.

II. External Orientation

The most important management decisions necessarily concern the future. Some executives tend to make light of forecasting as mere crystal ball gazing. This view contends that no human can honestly claim to know what lies ahead. While this may be quite true, it still does not provide any basis for not making a forecast. In fact, no business management can escape from forecasting. This is because almost every major business decision rests upon some assumption as to future conditions. Not to forecast, therefore, is really to assume or forecast indefinite continuation of the status quo. To expect or forecast no change in these days of dynamic change seems very shortsighted and unrealistic.[2]

A. Long Term Forecasts

In practice, most business planning, particularly that of a long range nature, begins with or is done on the basis of some evaluation of the external environment in which the company will be operating. This is the area in which business economists often make their most important contribution. All available

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[2]Walter Hoadley, "The Economist's Contribution to Management Planning," a paper delivered at the International Management Congress, New York City, September 17, 1963.

surveys of the role of company economists indicate that such forecasting is the predominant activity which they have in common.

A survey of economic staffs of American industry conducted by the National Industrial Conference Board revealed that "periodic forecasting is reported by respondents to be the most important single activity of staff economists."[3] A similar survey, conducted by a large oil company concluded: "If there is a single activity common to all the company economists surveyed...it is forecasting long and short-term trends in the national economy and relating them to sales and profits."[4]

Company planning may utilize different types of economic forecasting. These vary from sophisticated models of the GNP to a naive assumption à la Sewell Avery that the storm cellar is the most likely symbol of the economic outlook. As is known from the frequent citation of this shopworn example, Montgomery Ward pulled in its horns after World War II while its rivals expanded to meet the burst of unsatisfied postwar consumer demand. The assumption of the Curtiss-Wright Co. after World War II that there would be little further demand for aircraft led this largest aircraft producer during the war to attempt to diversify out of the aircraft industry--adding insult to injury, it was unsuccessful in doing so.

Forecasting the future level of GNP, while often extremely useful and certainly popular, is more nearly a starting point. The following are some illustrative management questions or problems involving external influences which can be critical in planning and which lend themselves to economic analysis:

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[3]"Sources of Economic Intelligence", Conference Board Business Record, Sept., 1960, p. 28.

[4]C.S. Teitsworth, "Growing Role of the Company Economist", Harvard Business Review, January-February, 1959, p. 100.

1. What are the most important local, regional, or worldwide economic trends? When we disaggregate, we often find such phenomena as growth in the West during recessions in the East. What phase of the business cycle lies immediately ahead? For some industries, and not just defense and space contractors, it is becoming more nearly a case of the budget cycle than the traditional business cycle.

2. What are the demand prospects in the company's new as well as established markets? These may not be related to GNP at all, or in a sophisticated fashion--such as to the rate of increase.

3. Where are market opportunities likely to expand mort rapidly? Obviously the analyst needs to know the industry and company as well as national economic trends.

4. Will the availability and cost of credit tend to expand or depress buying? Are "tight" or "easy" credit conditions ahead? This requires understanding of the factors influencing future changes in governmental economic policy.

5. What is ahead for prices of raw materials and finished products as well as for costs of other goods and services that the company buys or sells? Changes in minimum wage laws, governmental regulation of business and the expansions and developments in government operations and planning may have significant impact on the firm.[5]

6. Is the economic strength of the competition likely to intensify or diminish?

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[5]For a detailed analysis of how government programs can affect individual companies, see M.L. Weidenbaum, "The Impact of Government Spending Programs on Private Price Formation," in U.S. Congress, Joint Economic Committee, The Relationship of Prices to Economic Stability and Growth, Government Printing Office, 1958, pp. 529-554.

Let us now turn to the methodology of preparing economic forecasts. Almost all of the long-term economic forecasts used by business firms in recent years are based, with varying degrees of sophistication, on the following simple formula:

$$G = E \times H \times P$$

G stands for the gross national product (GNP); E is the average number of persons employed during the period; H is the average hours worked per employee; and P represents the output per man-hour or productivity. This, of course, is the projection of potential supply of gross national product.

Incidently this does not mean that everything has to be related to the GNP. Some company markets, for example, have little, if any relationship to fluctuations in the national economy. It should be understood, however, that much criticism by businessmen of the very concept of GNP really relates to its uses. For example, many persons are tired of hearing that the public debt is no problem because it is a declining percentage of the GNP (which may be more of an arithmetical than a real relationship). However, when the profit squeeze is explained in terms of GNP--citing data showing corporate profits as a declining function of GNP--businessmen often then appreciate the potential value of GNP as a neutral economic tool, a concept which can be applied by political conservatives as well as liberals.

The employment estimates are generally based on Census Bureau and Labor Department projections of the population and the labor force. Given the population forecast--and the Census Bureau obligingly provides several alternatives, based primarily on different assumed fertility rates--the estimate of the labor force primarily is a question of determining participation rates among the groups of working age--that is, at each working age level what percentage of the population will be students, housewives, the sick, the retired and others not available for work.

For forecasts up to about fifteen years in the future, the relevant population distributions involve little guesswork, except for in-and-out migration and mortality rates, which are factors of lesser order of magnitude than fertility. In essence, pretty much all of the persons with which we are concerned already have been born. Assumptions are then necessary as to the portions of the labor force not involved in civilian employment: the members of the armed forces and the unemployed. A 4 percent unemployment rate still seems to be the most popular assumption. (see Figure 1)

The estimate of average hours worked per employee is generally based on the historical experience of a declining secular trend in the average work week. This is usually taken as a reduction of less than 1 percent a year, perhaps 0.8 percent per annum. This can be tricky, because the average work week tends to rise during periods of prosperity and recovery. Hence, this type of analysis focuses on long-term trends.

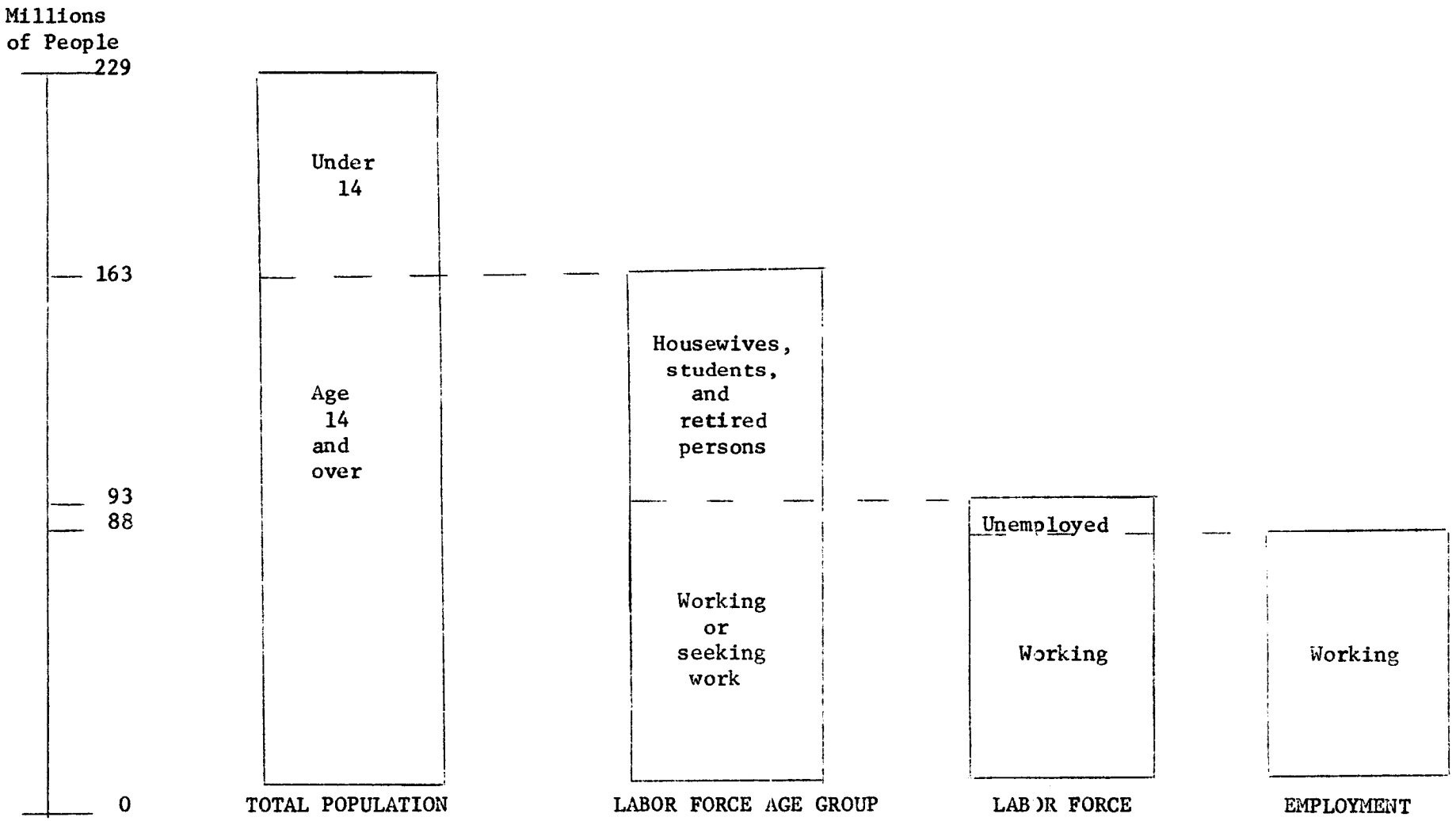
Productivity is generally estimated to increase as the result of expanded research and development, new business investment, greater education and training of the labor force, and increasing application of new technologies (see Figure 2 for an illustrative derivation of GNP).

ALTERNATE GNP PROJECTIONS FOR 1975
(in billions of 1962 dollars)

Annual Rate of Increase in Productivity	Unemployment Rate 3.5%	4.0%	4.8%
2.25%	$843	$839	$832
2.50	870	866	858
2.75	899	895	887
3.00	928	924	916

Many long-term forecasters cross-check these projections of GNP from the supply side against a more complete model of the economy. Such a model may show, on the one hand, the demand for output by consumers and others, and, on the other

Figure 1
RELATIONSHIP OF POPULATION TO EMPLOYMENT
1975



Assumptions: Approximately 71% of the population will be in the labor force age group; 57% of the latter will be in the labor force; unemployment will average 4.8% of the total labor force.

Figure 2

POTENTIAL SUPPLY OF GNP

		1956	1970	1975	Units
Line 1.	Employment	74.9	81.4	88.5	millions
Line 2.	Average hours worked per week	37.9	37.2	36.5	hours
Line 3.	Total hours worked per week (line 1 x line 2)	2839	3028	3230	millions of hours
Line 4.	Total hours worked per year (line 3 x 52)	147.6	157.5	168.0	billions of hours
Line 5.	Output per man-hour	$4.19	$4.67	$5.21	dollars
Line 6.	Total output or GNP (line 4 x line 5)	$618	$735	$875	billions of dollars

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hand, the cost of producing the output--the incomes accruing to business firms, individuals and the government. Such a model provides a useful cross-check of the internal consistency of the estimates used (see Figure 3).

In many cases, much detailed analysis of economic history and a very considerable amount of judgment and insight goes into the preparation of these forecasts. Also, the spelling out of the basic assumptions underlying the forecast serves as a description of much of the external environment in which the enterprise will be operating.[6] Typical assumptions include the following:

.The current state of international tensions--the cold war--will continue. No major war will occur during the forecast period, nor will a workable disarmament program be adopted. (This is an example of an assumption which currently is being reviewed or questioned in some quarters.)

.Scientific and technological advances will continue at the current rate or higher.

.The Federal Government will take necessary action to avoid major depressions or runaway inflations. (This may be begging the question, perhaps.)

.Prices will rise at the average rate experienced during the past decade (or, alternatively, all estimates are prepared in so-called "constant" dollars, which eliminate the effects of inflation).

B. Short-term Forecasts

The preceding discussion related to making forecasts 5, 10 or more years

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[6]For examples of some long-term forecasts of GNP, see Hans H. Landsberg, Leonard L. Fischman, and Joseph L. Fisher, Resources in America's Future: Patterns of Requirements and Availabilities, (Baltimore: John Hopkins Press, 1963).

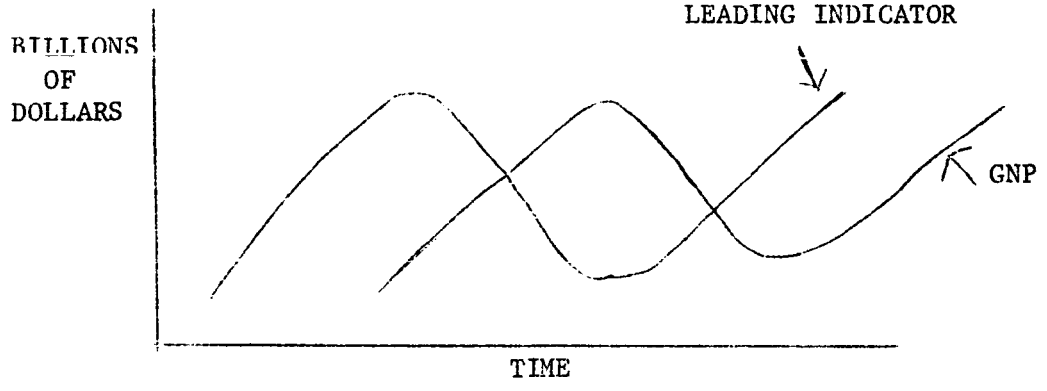
Figure 3

NATIONAL INCOME AND PRODUCT ACCOUNT, 1962
(In billions of dollars)

Cost of Producing Output		Receipts from Output	
Compensation of employees	$322.9	Personal consumption expenditures	$355.4
Proprietors' income	49.8	Gross private domestic investment	78.8
Rental income of persons	12.0	Net exports of goods and services	3.8
Corporate profits	47.0	Government purchases of goods and services	117.0
Net interest	22.0		
Subtotal, National Income	$453.7		
Capital consumption allowances	49.4		
Indirect business taxes	53.0		
Statistical discrepancy, etc.	-1.1		
Gross national product	$555.0	Gross national product	$555.0

in the future. For many lines of business, especially retail trade, developments in the coming year may be of overriding interest and importance. Here the methodology may often but not always be less formal.

Recent surveys of business forecasting show that, for short-term forecasts, analysts more frequently use the leading indicators approach developed by the National Bureau of Economic Research.[7] The leading indicators are a selection of statistical data that indicate turning points in the business cycle ahead of the over-all economy. Examples of leading indicators are new orders, housing starts, stock market prices, business failures (inverted), new incorporations, and overtime hours. The following is an idealized relationship between leading indicators and general business activity. The relationship, unfortunately, is never so simple in the real world.



A relatively poor second choice is judgment, a simple technique that many forecasters find so easy to develop that it often substitutes for actual data. A third choice is anticipations surveys--such as those reporting on the capital investment plans of business firms or consumer spending intentions.

Other methods such as GNP sector analysis, correlation analysis, and econometric models of the economy are used, as well as consulting the opinions

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[7]For a good description of the leading indicators, see National Bureau of Economic Research, Tested Knowledge of Business Cycles, Forty-Second Annual Report, June, 1962.

of colleagues in other organizations or business firms. In effect, each practioner has a special, very personal selection of ingredients that he blends with the leading indicators and possibly the anticipation surveys in preparing his short-term economic forecast.[8]

C. Applications of Forecasts

As pointed out earlier, projections of the over-all performance of the economy are in the nature of a starting point and need to be related to specific industries and geographic areas. For example, for aerospace companies the forecast of GNP is used in projecting the military and space budgets, which are the basic market research task for that industry and central to its long-range planning.

A widely used methodology for military and space market forecasts is based on a three-fold process:[9]

1. A long-term projection of GNP.
2. A projection of the total federal and the military and space budgets on the basis of the economic forecast.
3. A statistical analysis of the composition of the military and space budgets.

The simplest method is to take military and space expenditures as a constant percentage of GNP. A slightly more sophisticated approach, somewhat in line with the post-Korean experience, is to estimate the expenditure level as a declining function of the GNP.

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[8]The most up-to-date explanations of short-term business forecasting are contained in William F. Butler and Robert A. Kavesh, editors, How Business Economists Forecast, Prentice-Hall, 1966.

[9]M.L. Weidenbaum, "The Military Market in the 1960's," Business Horizons, Spring 1961, pp. 61-68.

However, as recent experience illustrates, the actual situation is more complex than that. In the post-World War II period, military and space expenditures have been a major part, but only a part, of the federal budget and certainly a much smaller proportion of GNP. Even within the constraint of a budget which is approximately in balance over the cycle, the GNP and its growth is far more of a limitation on federal revenues than on military and space spending directly.

A model of the federal budget is needed, which is built up from both the revenue side and the expenditure side, which encompasses tax and possibly debt reductions over the period and in which defense and space programs are shown in context with the various pressures for other government spending programs.[9a]

By way of summing up the external environmental aspects, it can be pointed out that, within the planning process, material on basic economic assumptions often serves a twofold purpose:

.Initially, as part of the "ground rules" which the corporate planning office provides to operating divisions and departments to guide them in the preparation of the basic planning data and estimates, and

.Subsequently, to help establish the general context for the company-wide planning results which are aggregated for presentation to, and review by, top management.

In a more fundamental way, the description of the United States which may be inferred from these planning assumptions may be of help in setting a broad enough frame of reference for the planning process itself. Estimates of variables affecting the future market potential for a company's current product line may be helpful planning data. However, in an economy characterized by rapid shifts among products, processes, and markets, such information may not be sufficient.

[9a] See M.L. Weidenbaum, Federal Budget Trends, 1965-1975, Washington University Department of Economics Working Paper 6605, Aug. 1966.

For example, a company presently primarily oriented to government business might consider--if only merely as contingency planning--the outlook for major growth areas in the commercial economy (and vice versa). Similarly, companies selling exclusively to a local or even national market might review possible developments in international market areas--and competitive pressures which may come from that source.

III. Targeting

The second phase of the business planning process mentioned earlier is the targeting of the company's long-term goals and objectives. To begin with, it should be pointed out that it is problematical whether, in this area, formal economic theory may necessarily make a practical contribution which is acceptable to management.

Economists generally have been nurtured on the doctrine of profit maximization as the rational mode of conduct for entrepreneurs. The transition is almost instinctive from the belief that profit maximization should be the desired goal of business management to the belief that it actually is. Certainly, maximum profits may be the dominant goal of a business enterprise, but that is not necessarily the situation. A large business organization may have a diversity of goals.

Professor William Baumol is the rare example of an outstanding economic theorist with a substantial amount of business consulting experience. He has concluded:

> Most oligopolistic firms [in modern day America, that covers most large corporations] aim to maximize not profits, but sales volume. So long as profits remain at a satisfactory rate, management will devote further effort to increasing its sales rather than its profits.[10]

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[10]William Baumol, "Price Behavior, Stability, and Growth," The Relationship of Prices to Economic Stability and Growth, Compendium of Papers, Joint Economic Committee, (Washington: Government Printing Office, 1958), pp. 54-55.

A somewhat similar conclusion is reached by A.A. Berle, but on the basis of a different line of reasoning. Berle contends that with the growing separation of ownership from management, a wholly different set of motives and incentives enters the picture compared to the day of the owner-manager. As Berle puts it, the personal motive of the professional manager is to earn salaries and fringe benefits and also to enhance personal power and prestige by maximizing the power and prestige of his company.

This is not determined merely by the annual profit and loss statement, important though that certainly continues to be. More importantly, in Berle's view, it is measured by the strength and success with which a company fulfills the function which it has assumed in the economy and by its capacity for continued growth.[11]

A similar conclusion is reached by Harbrecht:

> "The corporation's first concern is with itself. The modern corporation has developed to a point where the annual profit record is not its principal goal; rather are the profits necessary means to something far more important, the continued healthy existence of the corporation."[12]

It should be pointed out that agreeing with the findings of these two gentlemen does not necessarily require sharing their philosophical outlook toward the role of business in American society.

In practice, there are many forms which the goals and objectives of an enterprise may take. Management may wish to maintain--or increase--the historical growth in sales or earnings or share of the market. It may wish to attain a given percentage rate of return on stockholders investment or on total

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[11]A.A. Berle, Jr., "Introduction and Commentary", in Toward the Paraproprietal Society, New York, Twentieth Century Fund, 1960, pp. 1-14.

[12]Paul P. Harbrecht, Toward the Paraproprietal Society, New York, Twentieth Century, 1960, p. 21.

capital--often at least equal to some blue ribbon panel of corporations. A certain diversification of the product line or market served may be desired. For example, a number of government contractors from time to time set out to raise the commercial percentage of their profits and/or sales.

Some or all of these objectives may be aimed at by an individual company. In fact, these objectives may be interrelated. Many of them may be derivatives of an explicit or implicit profit maximization goal. Economic Analysis and information may aid both in selecting the type of goal to be followed and in providing statistical measuring sticks for gauging attainment. To these managements who quantify their goals, the economist can point out the historical, and projected rates of growth in the economy as a while, in the industry or industries in which the company is operating, and for other companies of comparable size or market position.

Similarly, for profit goals, management needs to be aware of the historical and projected profit rates in the over-all economy, in pertinent industries, and for comparable companies.

Sales objectives can be set in such statistical forms as maintaining or improving market shares. Here, knowledge of the historical trend of the pertinent industries and markets, as well as usable general economic forecasts can play an important role. In some cases, the identification and measurement of the market or industry may be no simple task.

To cite one important example, the electronics industry still has not come into its own in the Standard Industrial Classification which underlies the data of the Census Bureau and many other governmental agencies. Bits and pieces of electronics production are continued in a dozen or more SIC codes.

It should be noted that some companies do not attempt to quantify their objectives. Figure 4 is a hypothetical statement of company objectives for an

Figure 4

STATEMENT OF COMPANY OBJECTIVES

1. To be outstanding in the design, development, and production of aircraft, missile, and space systems which will aid the Nation in maintaining scientific and military superiority.

2. To be outstanding in the design, development, and production of aircraft for commercial airlines.

3. To be outstanding in all research, both technical and managerial.

4. To enter such other lines of business as may be required to perform the above roles and to attain our growth objectives.

5. To achieve a rate of growth and a product structure which, on a long term basis, will maximize profit on the investment of our stockholders.

aerospace company, based on several actual declarations by major defense and space contractors. Such a statement may have great negative value. It deludes a company into believing that it actually has thought through the problem of setting long term targets and goals. Hence, sometimes the company economist best serves the interests of his management by being the wet blanket at the planning party.

IV. Internal Orientation

The third step of the business planning process is internally oriented, to analyze the capability of and resources available to the enterprise. The analyst trained to some degree in economics can make a useful contribution to the analysis of an enterprise's resources and capabilities during the planning period by stressing the element of futurity.

For example, financial and engineering personnel may be in a good position to estimate the basic costs of future asset acquisitions, such as factories, laboratories, and other facilities. Yet, they may (or may not) need to be reminded that price levels may change, and possible at different rates than those that have been experienced in the recent past. Moreover, the underlying factors influencing such price changes may only emerge from a careful analysis of the national economy.

The future capabilities of the firm may need to be related to the likely capabilities of potential competitors. Productive capacity may or may not be a strength of the company, depending on the shortage or excess of capacity in the relevant industry. This is illustrative of a general function of corporate economic analysis, to relate the activities of the individual company to broader trends in the national and increasingly the international economy.

Another example of this function may be found in the labor field. Personnel management likely performs the basic projections of company manpower

requirements. It may be helpful to them to understand the future trends in national or regional labor force availability. In this connection, the U.S. Department of Labor's studies of the future composition of national employment can be extremely useful to management in relating the problems that a company may consider peculiar to its operations to fundamental developments in the national economy.[13] The anticipated shift from relatively unskilled workers to professional and technical personnel is striking. In a way, the Labor Department data provide a profile for the broad contours of a corporate recruiting program. Certainly, the transition still needs to be made to the individual industry and company.

In the short run, the analyses of the external business environment also may be useful in determining the potential availability of a critically important corporate resource--cash. Over-all business and monetary conditions are important considerations to the Treasurer's office of many companies in estimating the cost and availability of corporate funds and the preferences among stock issues, bonded indebtedness, and bank debt. Clearly, the impact of the cost and availability of funds of a "tight" rather than an "easy" money policy by the Federal Reserve is not a hypothetical or improbable factor.

In a more fundamental way, whether a characteristic of a company is a strength or resource instead of a weakness in good measure is a function of the operating climate and the types of businesses being considered. For example, the advanced technology of a typical defense and space contractor is a vital asset in the market for weapon or space systems. In contrast, it mainly results in an uncompetitive cost structure when the same firm tries to enter commercial markets where it contends against companies oriented to low cost volume

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[13] U.S. Department of Labor, Manpower - Challenge of the 1960's, Washington, Government Printing Office, 1960.

production of fairly standard items. Certainly, the types of economic data and guidance required in developing the resource aspects of business planning vary with the size, markets, and other characteristics of the individual firm.

Figure 5 is a condensation of such a resource profile for a major aerospace company which specializes in the military and space markets.

V. Development

Let us now turn to the fourth phase of the business planning process--the formulation of the key programs and major undertakings on which the company will embark during the planning period. The development of specific programs to utilize the enterprise's resources in meeting established goals is generally a function of line management. The role of economic analysis here is usually that of advice or review in selecting from among the various alternative programs presented to Headquarters by the operating divisions. Increasingly, a return on investment concept is being used to rank proposed programs and projects.

An important utilization of economic analysis during program development is in connection with sales forecasting. Forecasts of the sales of specific products need to be checked against appraisals of the market potential. Hopefully, the sales estimates were prepared on the basis of a comprehensive market research job in the first place, which included use of the analyses and forecasts of the national economy and of the specific industries in which the firm is operating.

For example, the President of Deere and Company, the agricultural equipment firm, recently stated that "The most important single factor in farm equipment sales forecasting is the expected level of cash farm income--that is,

Figure 5

AEROSPACE RESOURCES

MARKETING -	Limited Primarily to Sales of Complex Systems to Government Agencies or Small Numbers of High Value Items to Few Customers. Very Limited Industrial or Consumer Sales, Distribution, or Promotion Capability.
PRODUCTION -	Limited to Small Quantities of High Quality, High Value Items Incorporating Advanced Engineering and Scientific Design. Very Limited Capability to Meet Stringent Price Competition.
ENGINEERING -	Strong Capability to Perform State of the Art Research as Well as Complex Engineering Design. Limited Capability to Design Commercial Products for Mass Production.
MANAGEMENT -	Unique Capability to Manage Integration of Large Complex Systems and Large Scale R & D Organizations.
FINANCE -	Limited Financial Resources, Low Capitalization, Low Profit on Sales but High Return on Investment.

cash receipts from farm marketings plus government payments."[14] This also illustrates the importance to many companies of keeping abreast of government planning. It is obvious that companies selling to farm markets--either industrial or consumer--must closely monitor government policies and programs in the field of agriculture.

For many other industries, of course, the role of the government is less direct than in agriculture. However, whether we like it or not, government planning has an important direct effect on the planning of a great many industries both in this country and abroad. To a number of industries, of course, the government may be an important customer and the Federal budget becomes a basic tool of market research.

Also, continuing analysis of the various segments of the economy may yield selected growth markets which the enterprise might wish to penetrate with new products or adaptations of existing products. Conversely, information on differential growth and profit rates can be useful in selecting among the various possibilities for products to be developed or marketed. This leads to an examination of diversification efforts, an area in which economic analysis often plays a key role.

A. Diversification Planning

Technical definitions of diversification vary by author, company, and otherwise. For the present purposes, it may suffice to consider diversification as the act of getting a company into product and/or market areas which are significantly new to it. A new type of paint developed by a paint company would not qualify as diversification, but a new paint would if it were developed and marketed by a petroleum company. This newness is precisely the

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[14] Remarks by William A. Hewitt, President of Deere and Company before the New York Society of Security Analysts, November 22, 1963, p. 11.

characterisitc that requires a significant input from economic analysis.

In many ways, diversification decisions present unique problems to a company's management. Much more than other growth alternatives, such as increased penetration of current product and market areas, diversification often requires a break with past patterns and traditions of a company and an entry onto new and uncharted paths.[15] Hence, much of management's vast experience within its own industry is not particularly relevant. In striking contrast, knowledge of other industries and markets, and of the similarities and differences among them, becomes of far greater experience. Again, an awareness of economic factors and economic analysis can be an obvious advantage.

Certainly, there is no single, universally accepted method for diversification planning. The one that is presented here is a distillate or composite of the method followed by a number of aerospace companies in recent years.

First, diversification planning starts when a preliminary analysis of the likely future results of the current product-market line usually indicates that the company's goals and objectives will not be reached during the planning period. It should be realized that diversification into unknown areas may be extremely risky and management quite properly may be wary of considering such moves unless clearly necessary. On the average, the odds are less than one out of two that a new diversification program (either merger or internal development) will result in profits even equal to those of the company's traditional product lines.[16]

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[15]H. Igor Ansoff, "Strategies for Diversification," Harvard Business Review, Sept. - Oct. 1957, p. 113.

[16]Ronald R. Larson, Keys to Success in Diversification, A Presentation to the Stanford Research Institute, Long Range Planning Service Client Conference, Palo Alto, California, September 25, 1963.

The second step is an analysis of the company's various strengths and weaknesses in order to determine the kind of new activity for which it may have some important capability. Such an evaluation for an aerospace company already has been examined. Let us discuss the case of this anonymous large aerospace company which finds that defense-space markets in the coming decade will not yield sufficient business potential to enable it to meet its growth objectives (In this case, the objective may be to minimize the negative growth rate).

The earlier examination of the company's strengths and weaknesses reveals that it possesses some unique technological capability which it hopes or believes may be applicable to important commercial fields. However, it lacks a commercial marketing capability as well as knowledge of how to design and produce for the cost-conscious commercial market. As a result, it tentatively concludes that a merger might be advisable with a smaller, but not tiny, company in another industry where the application of its unique technology may open up new markets.

Our aerospace company then goes about setting forth some criteria for evaluating alternative diversification opportunities through merger. Such criteria might include the following, a company with: (1) annual sales volume of $250-500 million over the last few years, (2) no known major financial or management problems, (3) a related technology, such as electronics, chemical propulsion, scientific instruments, etc., (4) an established commercial marketing capability, (5) a market which is likely to grow in excess of the GNP in the coming decade, and (6) in an industry with some barriers to entry, so that it can be anticipated that profits will not be driven down to unacceptable levels by a flood of new entrants into the industry. These, of course, are illustrative criteria, and imagination can undoubtedly supply others.

Given the criteria, the next step is to find the potential opportunities. Here, a knowledge of industry and company economic and financial data is essential. Without being exhaustive, it may be pointed out Census data on an SIC code basis can be most helpful in identifying growth industries and various corporate directories in identifying and supplying financial data on the firms in these industries.

The detailed analysis of the individual diversification or merger possibilities may take several forms. Areas where economic factors may be most relevant include the structure of the industry, the nature, composition, and trend of the market, pertinent governmental programs of economic regulation, price trends, and international aspects.

The actual decision to enter merger negotiation is, of course, a function of management. However, the various staff analyses of these and other matters constitute a necessary input to the decision-making process.

B. Growth Industry Study

Diversification planning may be illustrated by examining a study of growth industries made for a major aerospace company. The purpose of the study was to identify promising areas for possible diversification, either by merger or internal product development.

The work was performed in five steps:

1. For each of the 354 four-digit manufacturing industries in the American economy, consistent historical data were developed on sales, employment, capital expenditures, facilities, and growth rates. All of this information was obtained from the various Censuses and Annual Surveys of Manufactures taken during the period 1947 to 1958.

2. The average annual growth in sales of all manufacturing industries combined for the period--six percent a year--was used as a benchmark for

selecting growth industries. Individual industries growing more rapidly than six percent during the period were identified as growth industries. This provided an initial, statistical measure of growth industries.

It may be interesting to note that 40 of the 354 industries showed absolute declines in sales during the period. These included such well-known industries as men's and boy's suits and coats, pumps, vacuum cleaners, watches and clocks, pens and mechanical pencils, work shirts, motorcycles and bicycles, and cigar boxes. In some cases, foreign competition may have been the cause of the decline, while in other technological competition from substitute products may have been more important.

Also, 35 of the 354 industries had growth in sales barely enough to offset the effect of inflation. Examples of these industries which, hence, had no "real" growth in sales during the postwar period were fireworks, umbrellas and parasols, margarine, matches, buttons, chewing gum, and storage batteries. Clearly, it is not enough to serve a broad national consumer need to qualify as a growth industry in the United States.

3. The third step in the growth industry study was to eliminate from the list of growth industries those which were relatively unrelated to the aerospace company's capabilities. The screening or exclusion criteria used were designed only to eliminate fairly obvious groups of unrelated industries. Borderline cases were left in. The following were the exclusion criteria used for this aerospace company:

a. Standard consumer items, such as food, tobacco, clothing, toys, and sporting goods.

b. Standard commercial items, such as paper bags, glue, envelopes, and other office supplies.

c. Items of extremely low unit value, such as greeting cards, books, light bulbs, tin cans, and nuts and bolts.

d. Processing of raw materials, such as blast furnaces, petroleum refining, lumber, rubber, cement, and stone.

e. Arbitrary exclusions were limited to drugs, pipe, and aircraft (this illustrates the role of judgment).

4. As a result of omitting (a) the above five categories of industries and (b) those which were not growing more rapidly than the average, the original list of 354 manufacturing industries was reduced to the 29 shown in Figure 6. This was now a manageable group of industries which could be studied more intensively.

Figure 6

SELECTED GROWTH PRODUCT AREAS

Fabricating, Structural, and Machined Products

1. Blowers and fans
2. Boat building and repairing
3. Boiler shop products
4. Conveyers and cranes
5. General industrial machinery and equipment
6. Metal office and professional furniture
7. Pumps and compressors
8. Prefabricated metal buildings and fabricated structures
9. Safes and vaults
10. Scientific instruments
11. Sheet metal work
12. Shipbuilding and repairing
13. Special purpose machinery
14. Steam engines and turbines
15. Surgical and medical instruments
16. Truck and automotive trailers

Electrical and Electronic Products

17. Electrical qelding equipment
18. Automatic merchandizing machines
19. Computing machines and cash registers
20. Electrical control apparatus
21. Electrical measuring instruments
22. Electrical transmission and distribution equipment
23. Inter-com equipment
24. Power distribution transformers

Other Product Areas Related to Company Capability

25. Industrial furnaces and ovens
26. Industrial process instruments
27. Optical instruments and lenses
28. Photographic equipment
29. Wiring devices

5. The final step of the growth industry study was to analyze some of the more promising of the 29 product areas. This required identifying the major companies involved, studying their financial as well as competitive positions, and the future outlook for the industry.

For example, the electrical welding equipment did not look too attractive after more detailed analysis. For one thing, it was found that, although it grew rapidly over the postwar period as a whole, for individual years very sharp cyclical patterns with many years of declining sales were observed. Also, a relatively small number of firms dominated the industry. Seven firms each with $5 million or more sales a year accounted for most of the output.

In contrast, the scientific instruments industry was seen to be just entering a period of rapid growth. The sales trend curve indicated that much potential was still ahead. Also, there was no entrenched dominant group of firms to face a potential new entrant. In addition, there were 15 firms with sales of $5 million or more a year who were, thus far, the leaders in the field.

The growth industry study showed how, with a relatively small budget, a company economics staff could go a rather respectable distance in identifying and screening possible new fields of interest.

VI. Evaluation

The last and often a critical aspect of the business planning process is the evaluation of the adequacy of the long-term business plan. Staff planners may provide useful materials, economic and otherwise, to help in making such evaluations by management. Pertinent data can include quantifications of the performance of the larger group of which the enterprise is a part: the industry or the economy as a whole. The goals and objectives described earlier can play a vital part in performance evaluation. Here we close the loop. The

reasonableness of the goals and targets set earlier are checked against the likely accomplishments of the enterprise in view of its resources and capabilities in the expected environment. Necessary modifications may then be made in the goals and targets as well as in the programs to accomplish them.

It should be emphasized that the evaluation can involve very hard decisions. A company which is both short of cash and finds that its stock is selling below book value (two not unrelated situations) may be hardpressed to even consider the growth and diversification needed to maintain its position in its industry. This not uncommon situation may, of course, be explained as the result of inadequate prior planning.

VII. Role of the Business Economist

In general, a company economist can perform two types of functions: (1) relate current and future changes in the external economic environment to the company, advising as to the nature of the firm's responses to these changes, and (2) applying the tools of economic analysis to company planning and operations. The specific tasks undertaken depend on the interests and capability of the economist, on the one hand, and the needs of the company, on the other, to the extent that these needs are not adequately met by other staffs.

The following are some of the potential contributions of a company economist; the work is not limited to planning.

1. To appraise the position of the company in its industry and markets. On the basis of available or original materials, the economist can develop analyses of the historical, current, and projected trends of the pertinent industry and markets. He can then relate the company's performance to these developments, deriving measures of market penetration, market shares, and comparative growth rates. These measures may be useful both for short-term sales planning as well as long-term business planning.

2. To develop or to participate in the long-range planning process. This activity involves setting goals and objectives, providing planning guidelines to the line and staff managers participating in the planning process, reviewing these plans in some form, and consolidating them into a companywide picture. Possibly a more basic contribution is to convince management that the planning process is not an exercise in statistical forecasting, but the preparation of and choice between alternative courses of action.

3. To participate in diversification activities. As a result of the planning data, management may -- or it may not -- believe that a diversification program is necessary. The economist may identify growth industries related to the company's interest, sketch out their prospects, and indicate the various firms and products in these industries. Economic and related financial analysis can be prepared of alternative methods of entering these industries and markets.

4. To participate in public relations in a broad or fundamental sense. Through writing, speaking, and serving on advisory committees, the economist can act as a link with educational, civic, professional general business, and government groups. By participating in such endeavors as regional economic development, he may enable the company to render a real public service, in addition to achieving a direct corporate benefit.

5. To promote economic education and understanding. To a significant extent, much of the work described above contributes to improving the level of economic understanding on the part of company management. General economic information may also help to improve employee and public understanding of the company and its industry. The economist here may be able to provide inputs to such corporate organizations as management development, public relations, community affairs, etc.

It would not be likely any single economist or economic staff would fully develop the potentials in all of the areas listed above, nor would their efforts necessarily be limited to these five categories. Investment analysis, pricing, and labor relations are examples of other areas where economic staffs have specialized successfully.

The typical pattern of the successful corporate economics activity, if there is one, starts off with an evaluation of the over-all business environment and of the industry or industries in which the firm competes. Developing from this base, the economist and his management, either by design or by accident, then determine one or more specific areas in which major, continuing work is required by the company.

These comments are not intended to be a blueprint, mainly because the belief that flexibility and judgment and time are all important, yet hardly predetermined, variables.

What about the kind of person to be selected as a company economist? No standard pattern as yet exists. Some are former university economics professors, others former government economists, and some experienced men in the company in such areas as sales management or production planning or scheduling which resulted simultaneously in broadening their comprehension of economic problems. In addition, companies may have as assistant economists individuals with business school degrees or merely undergraduate economics majors, and they may rise to the post of chief economist without any formal graduate training in economics.

The kind of economist most business executives would look for is able to work on the problems of their company and who would use an approach that is both scholarly and practical--a man who can help the company when it has to decide how to handle an antitrust law suit, whether it should adopt LIFO accounting methods, what attitudes it should adopt in union contract negotiations, or whether or not it should enter a new field of business.

Most, but not all business economists, report directly to a senior executive in the company. This of course provides the opportunity for participating in a wide variety of company activities. It is not a simple task, because the business economist must simultaneously maintain a detailed comprehension of the external environment and develop a company orientation so that he can relate this information to the company with which he is affiliated.

The role of the economist, or of any staff specialist, is not to identify the most intellectually stimulating problems to work on or necessarily to use the most advanced and sophisticated techniques. His function is to make, on the

basis of his special training and capability, the most useful contribution to his management. He must be guided by the special problems being faced by the company, its particular history and outlook, and the needs of its management.

The economist's contribution certainly is not to talk down to management or to put some intellectual window dressing on the most fashionable current opinion--that is not recommended for his own long-term planning. This contribution consists of bringing to bear on business problems the tools of economic analysis, the results of economic research, the findings from economic statistics and in a generalized way, the value of professional objectivity. The role of the business economist has been described as furnishing a window through which the firm can see aspects of the outer world it may otherwise ignore or not fully comprehend.

The London Economist a few years back posed the question, "Are Economists Human?"

It pointed out that, "There is no body of men whose professional labors are more conscientiously, or consciously, directed to promoting the wealth and welfare of mankind." Nevertheless, the London Economist concluded that the answer to its question would be as follows: "By overwhelming majority vote, the answer would undoubtedly be NO."