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# Productivity Analysis: Prerequisite to Meaningful Financial Planning

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*Close year-by-year study of an industrial plant revealed one glaring oversight in its planning; by taking too long a time span for many of its calculations, the company was, in effect, masking a sharp drop in productivity —*

# PRODUCTIVITY ANALYSIS: PREREQUISITE TO MEANINGFUL FINANCIAL PLANNING

*by Granville R. Gargiulo*
*Arthur Andersen & Co.*

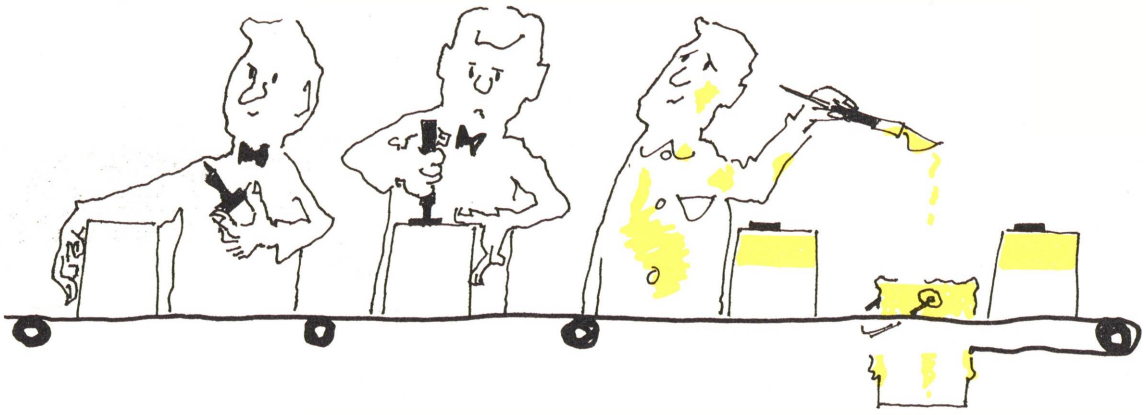
THE COMPLEX and competitive environment of most industrial organizations requires a management team that can deal effectively with change. Such a task normally requires the development of a sound financial or business plan which evolves from a planning process characterized by:

- The establishment of management objectives in a quantified measurable form together with the assumptions on which the plans are to be predicated.
- An identification of the strong and weak points of the organization and a determination of the opportunities to exploit the strengths and eliminate the weaknesses which would enhance goal achievement.
- The identification of specific alternative courses of action and the evaluation of these alternatives in terms of their impact on key criteria such as return on investment, earnings, and other performance measures related to management's objectives.

### *Factors to be weighed*

This planning process and the realistic financial projection needed to adequately assess alternatives requires consideration of many factors and interrelationships. To be meaningful as a basis for decision making, the company's planning capabilites should enable comprehension of the full effects of financial interrelationships, operating characteristics, and governing management policies. In this regard, many companies have utilized computers to provide an improved planning capability and, in particular, the development of financial planning models.

Building a financial planning model involves extensive use of historical data and past performance. The specific format or logic of the interrelationships contained in a model will more than likely be based on an evaluation of such relationships in prior years of a company's operations. The para-



Addition of workers to a raw material processing area resulted in an actual decrease in productivity . . .

meters of these relationships are generally established from correlation studies and similar statistical analyses.

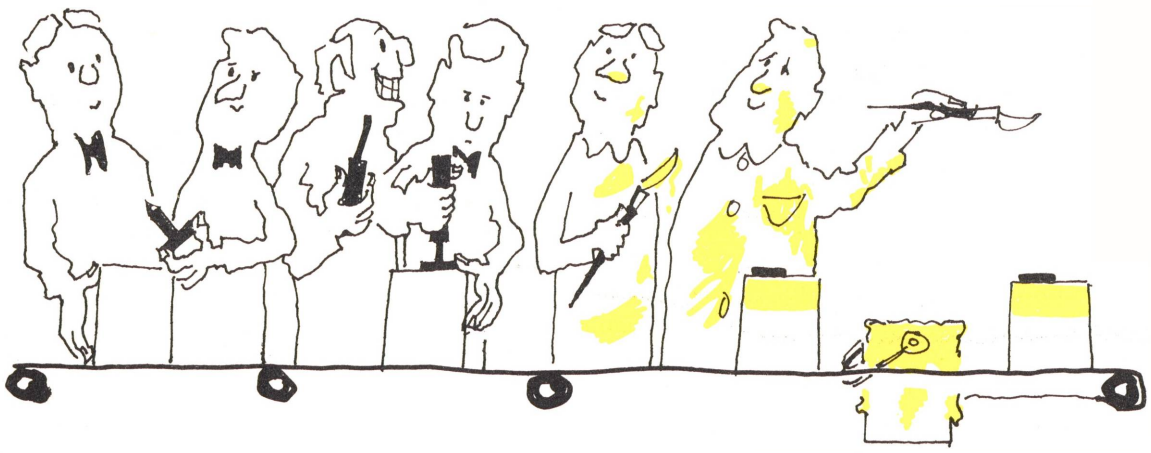
The heavy reliance on historical performance and related data as a basis for building a financial planning model and for supporting assumed effects of alternative management actions in the future, suggests the need for a clearer understanding and evaluation of what truly constitutes past performance. While the accounting and management information systems of a company may provide an identification of financial and operating problems on a relatively short-range basis, there is limited capability in most organizations to identify and isolate the trends in productivity which have a cumulative impact on profitability. Richard Gerstenberg, chairman of the Board of General Motors Corporation, stated, "I regard productivity as a measure of management's efficiency, or lack of efficiency, in employing all the necessary resources—natural, human, and financial." If this measure is not used to diagnose the gradual forces affecting performance—good or bad —then the reliance on historical information as a basis for developing a financial model poses risks of perpetuating capital and human productivity in the future which may be well out of line with maintainable levels.

Elaboration of this real danger is illustrated by the following case example.

### *A case example*

The company represented by this example produces consumer non-durable products in a continuous production process environment. The initial phase of the investigation focused on a comparison of the company's two plants to industry averages at the four-digit Standard Industrial Classification code level.* In order to take advantage of the available methodology and published data

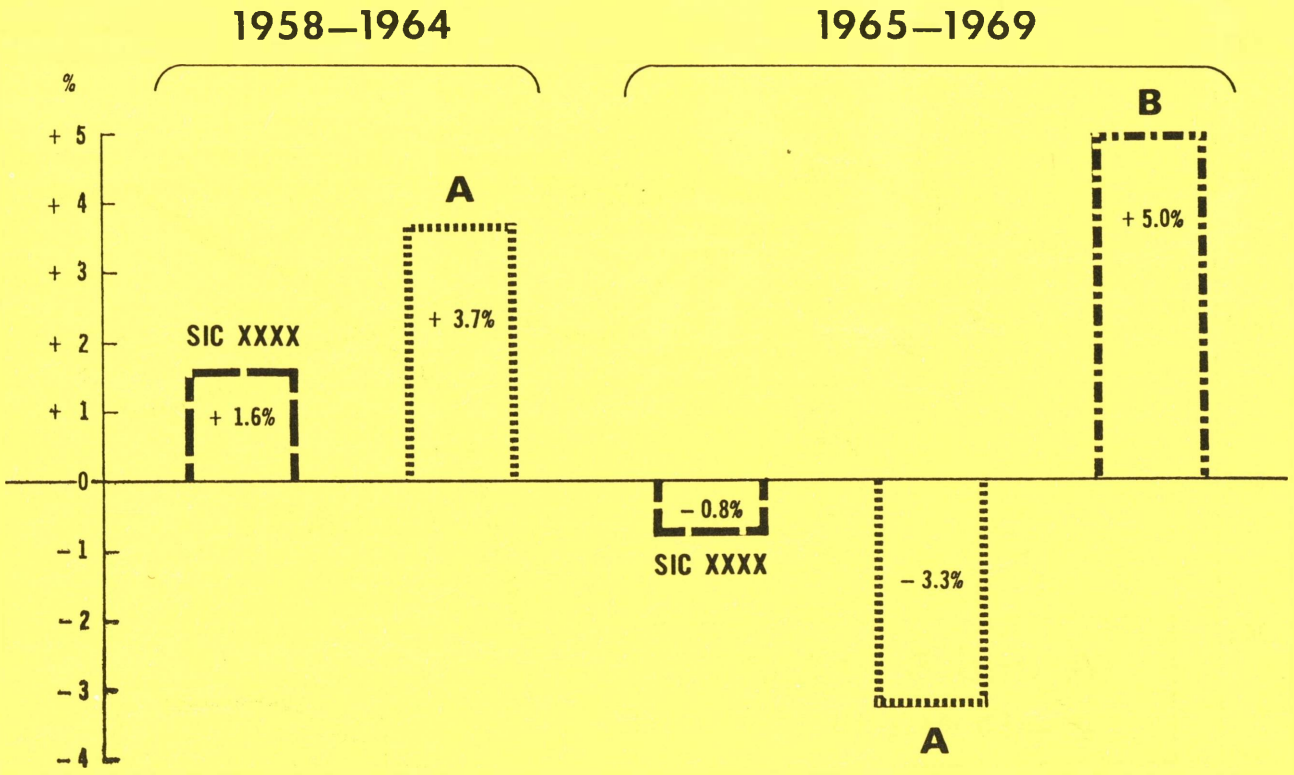
*Federal classification.



. . . since expected increased demand was not realized. Productivity per worker declined sharply.

EXHIBIT I

## PRODUCTIVITY INDEX (output per all-employee man hour)
## Comparison of 7 and 5-Year Average Annual Trends
## A and B PLANTS vs. INDUSTRY




on productivity, output per man-hour was used to compare to the industry averages published by the Bureau of Labor Statistics.

Exhibit 1, this page, graphically portrays the results of this analysis. As a basis for comparison of both Plant A and Plant B trends, productivity ratios were developed for two distinct time periods, 1958 through 1964 and 1965 through 1969, the latter time frame to take account of the startup of Plant B in 1965.

As presented, the average annual trend for this early period showed Plant A gaining at a rate of 3.7 per cent, which is substantially higher than the industry average for this period. The trend for the 1965 through 1969 period showed a markedly different rate for Plant A, namely, a decline of –3.3 per cent compared to a negative 0.8 per cent trend for the industry. Plant B, on the other hand, showed a significant positive trend of 5.0 per cent. This experience for Plant B was not surprising since the plant was constructed more recently with substantially greater emphasis on automation and improved plant layout relative to Plant A.

### *Two distinct phases*

The trends for the operation of Plant A indicate that there were, in fact, two distinct productivity averages: a period to the mid-sixties in which productivity rose at a rate substantially higher than the industry, and a second period, since the mid-sixties, in which productivity declined more rapidly than the industry. These trends were particularly surprising since, in most recent years, the company had experienced increasing levels of sales growth. Further comparisons of the company's plants-to-industry statistics showed that labor compensation had increased substantially faster than the in-

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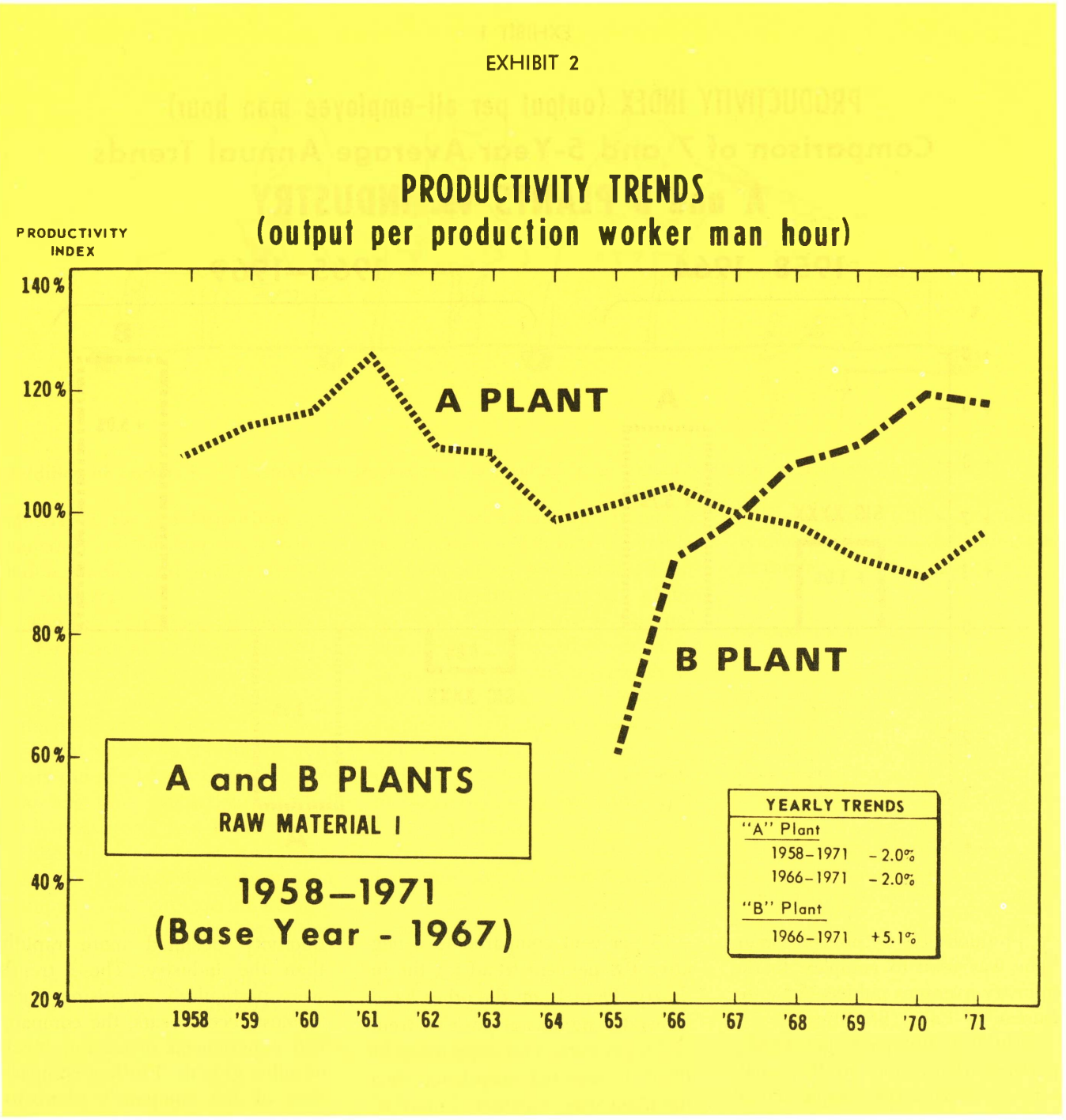
EXHIBIT 2




dustry average with a resulting increase for the company in unit labor costs relative to competition.

The unfavorable productivity trend at Plant A led to a detailed cost center analysis in a raw material processing operation and the Finishing & Packaging Department of both Plants A and B in an attempt to isolate the causal factors contributing to the significant differences in performance. The productivity trends for the Raw Material I processing areas at Plants A and B are illustrated in Exhibit 2, above, for the period of analysis, 1958 through 1971. As shown, the productivity index for Plant A reached a high point in 1961 and output per man-hour declined steadily ever since. On the average, for the entire period, the trend had been a 2.0 per cent decline. Plant B, on the other hand, had an annual improvement of 5.1 per cent for the period 1966 through 1971. Plant A's trend for this more recent period was 2.0 per cent, the same as for the entire period 1958 through 1971.

The relationship between changes in total output and labor hours is illustrated in Exhibit 3, page 27. The high point in productivity trend in 1961 relates directly to the data for that year in terms of hours and output. More specifically, the area between the "labor hours" line and "pounds produced" line was at its smallest in that year. The subsequent increase in the area between these lines in later years re-

flects the steady decline in productivity. This expansion resulted from the addition, between 1961 and 1964, of the equivalent of 12 people in various departments comprising the Raw Material I processing area of Plant A.

Attempts were made by the company to identify the causes of this increase in personnel. However, neither operating management nor accounting records could identify a change in operating requirements, cleanup, etc., which might account for this drastic change in the area's basic labor complement. While there were a few minor changes in the operation, the associated increases or decreases in labor seem to cancel themselves out and could not account for the increase of 12 people. The phenomenon is even more interesting since, once the expansion in work force had taken place, the relationship between hours and output remained fairly constant, i.e., the labor line moves relatively parallel to the output line.

In general, it appeared that additional labor was added to the area in the early sixties in anticipation of increased demand. While demand for intermediate raw material dropped significantly in later years as a result of reductions in raw material content of the finished goods, no review of the operating requirements of the area was made

EXHIBIT 3

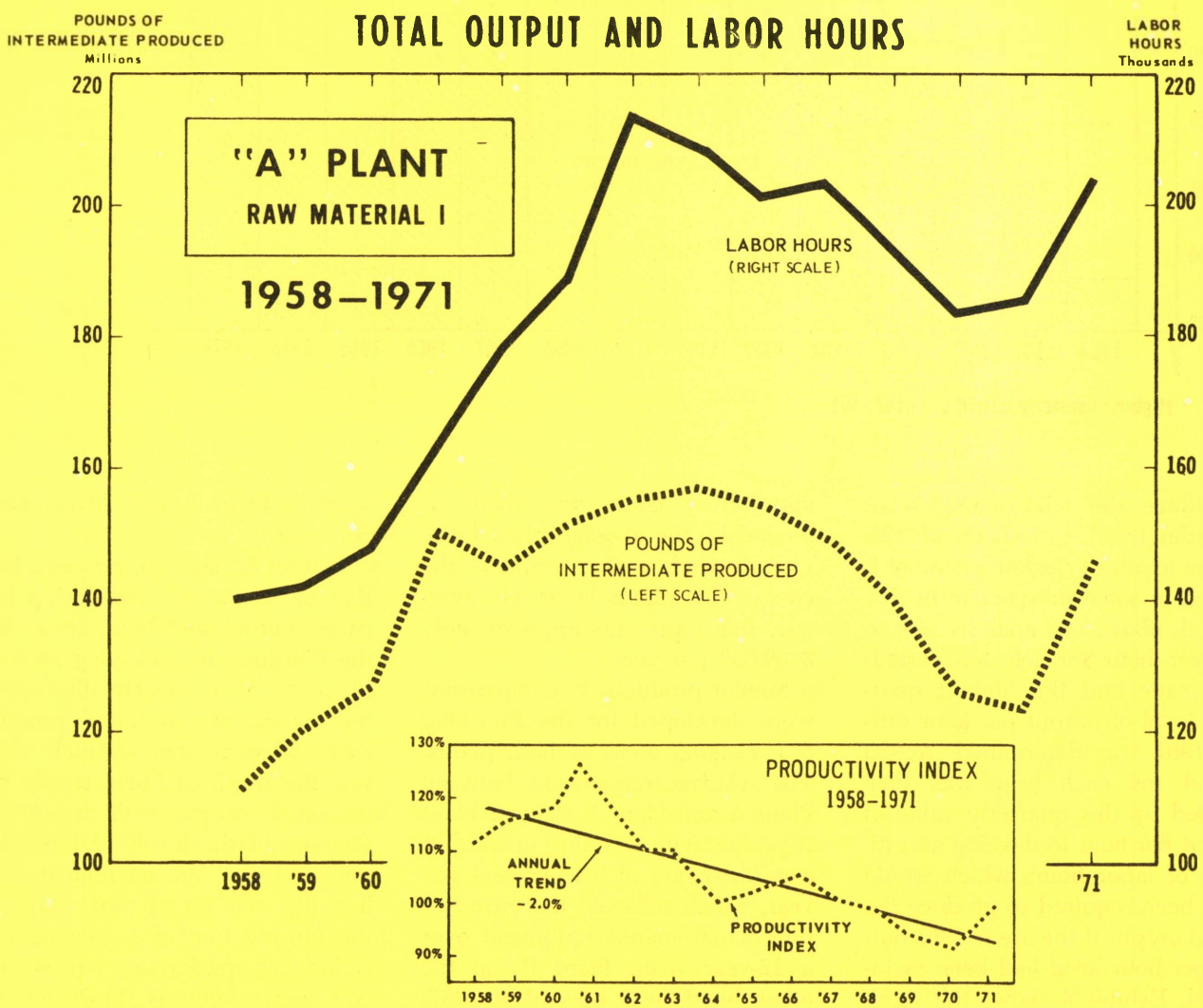
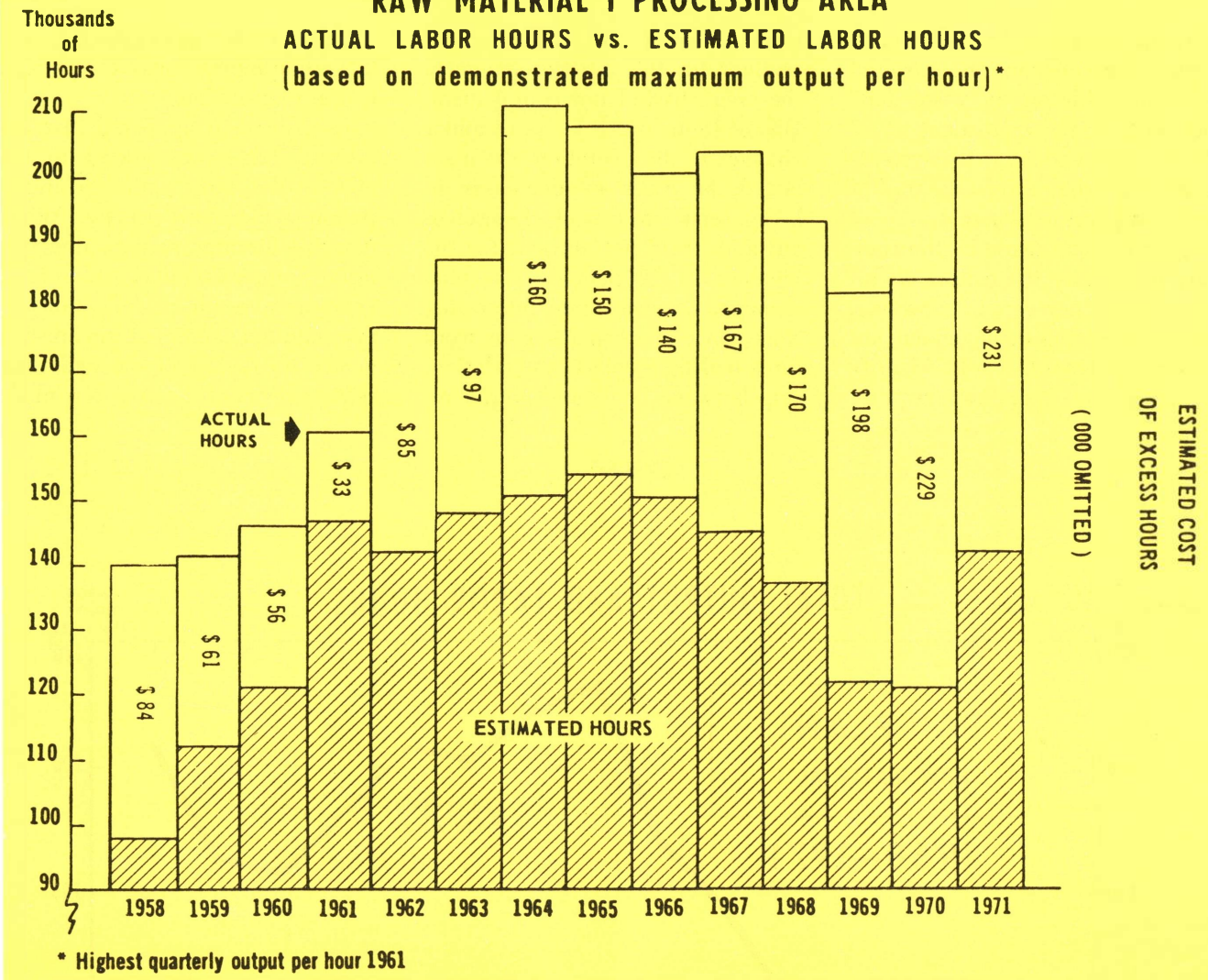


EXHIBIT 4




to reduce the labor complement accordingly. The impact of this failure to adjust the labor content is placed in some perspective by Exhibit 4, above. An analysis of output per hour for selected periods was made and the highest quarterly level of output per hour during 1961 was determined. Actual output for each year was then divided by this quarterly value of output per hour to develop an estimate of labor hours which would have been required to produce the actual output if the area's 1961 output per hour level had been maintained. Exhibit 4 shows the significant differences between actual hours and the estimated hours at 1961's demonstrated efficiency levels. The differences in estimated and actual hours was then extended by the average plant labor rates in each year to estimate the cost of this excess labor. On average, this represents approximately $150,000 per year.

Similar productivity comparisons were developed for the Finishing & Packaging areas at both plants. The relative comparisons between Plant A and Plant B showed Plant A productivity trending upward at a gradual rate of 3.5 per cent per year, which reflected the introduction of automated equipment over a 12-year span. Plant B, on the other hand, was opened in 1965 and its Finishing & Packaging operation fully automated within several years thereafter. Consequently, the productivity improvement at Plant B was 20 per cent per year.

Exhibit 5, page 29, provides further detail on the relationship between output and labor hours for the Finishing & Packaging area at Plant A. As is clearly illustrated, the record of continued productivity improvement through 1971 was the result of fairly steady increases in output with drastic reductions in the levels of labor input required. As mentioned earlier, this was largely the result of the introduction of automatic finishing and packaging equipment. Not surprisingly, as shown on the insert graph, particularly high levels of productivity were achieved in those years which corresponded to the periods in which various

automated lines became operational, specifically 1958-59, 1963-65, and 1969-70. It is also of some interest to note that the impact on productivity resulting from these installations moved in a lag of about one year from the actual introduction of the new equipment, reflecting the natural learning curve, and the startup problems associated with new equipment.

### *What can we conclude?*

This case study described provides ample evidence that one particular element of a company's historical performance which has a more gradual impact on profitability is productivity. If so much of the value of financial planning and the effectiveness of financial models to facilitate planning is based on a proper reflection and understanding of historical interrelationships, then management must have considerably greater insight into the factors contributing to productivity performance. The methodology of productivity measurement and comparison at the company or plant level provides initial insight into the factors at work which affect profitability, both past and in the future. Detailed productivity analysis of major or key operations of a business reveals how specific decisions in the past impact productivity and profitability and, thus, pave the way for judging the reasonableness of building such impacts into the logic of a planning model and/or assumptions about the future. Without productivity analysis, the validity of the model, and even perhaps the planning process, may be suspect.

EXHIBIT 5