11-15-1923

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Stanley G. H. Fitch

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Official Publications

Vol. V November 15, 1923 No. 5

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130 WEST 42nd STREET, NEW YORK

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INDUSTRIAL ACCOUNTING STATISTICS AND THEIR INTERPRETATION[1]

The interpretation of Industrial Accounting Statistics may be considered from various angles, but all of them ultimately converge in an analysis of two fundamental financial statements, viz., the Profit and Loss account and the Balance Sheet, which record the success or failure of every industrial organization. Obviously, the Balance Sheet presents the financial condition of a business at a given date, and the changes in financial condition between two given dates can be explained by the study of the Profit and Loss account, so these primary factors govern the interpretation of all industrial accounting statistics.

Basis for Comparison of Statistics

In the study of financial statements and statistics, it is essential to review them not merely for a single year, but for a series of years; and not merely for the business under scrutiny, but in relation to other businesses of the same general character. Broad comparisons form the only suitable and reliable basis for interpretations that will lead to sound decisions and constructive action by executives, bankers and investors. As a well-known writer has recently said: "It is impossible to read the financial statement of a business for any given year and properly judge the performance of that business. It is necessary to take into consideration the conditions preceding, the probable future conditions and the external and competitive conditions influencing the business. It is true that many companies suffered heavy losses during recent years, but this was largely inevitable. It is also true that the average concern experienced profitable times during the war years, and this likewise was more or less inevitable because of larger volume of business, advancing prices and wider margins of profit. But both of these resulted from external and competitive conditions, which could not be entirely avoided, and which must be taken into consideration in reading and interpreting the financial statements of a business for any period.

"In analyzing the affairs of a business, it is therefore necessary to consider the trends of volume, prices, expenses and turnovers; the position at the time of that business or industry in its business cycle; the position of the individual concern in relation

[1] An address delivered at the eighth annual meeting of the Associated Industries of Massachusetts at Boston, October 26, 1923.

to competitive standards for its industry; and all other external or competitive conditions which might influence its present showing or affect its future progress. These are things which cannot be read out of the financial statement of a business for one year, but which may largely be noted from a study of statistics over a period of years, by comparing the trend of affairs of the individual company with the trends of its industry, and the trends of industry in general."

Financial Questions

In the minds of alert business executives, credit men, bankers and investors, the following questions are constantly recurring in relation to their respective properties:

(1) Is the concern in better financial condition than it was a year ago?
(2) If so, is that favorable condition likely to be continued during the ensuing year?
(3) If not, what is the cause and what is the remedy?
(4) Has the volume of sales shown a consistent growth?
(5) Has the aggregate net profit shown a similar growth or have the costs of selling for increased volume absorbed an undue proportion of gross profits?
(6) What was the turnover of inventory and the turnover of accounts receivable, and of total capital, and can such turnovers be increased?

It is the purpose of this paper to indicate briefly how the answers to these questions, and to many similar ones, can be obtained through the intelligent interpretation of industrial accounting statistics, and to discuss the broad aspects of this subject.

Financial and Operating Ratios

Industrial Accounting Statistics may be interpreted to show many significant business relationships which are in effect measures of business efficiency, expressed in terms of financial and operating ratios, such as:

Ratio of Net Profit to Net Worth
Ratio of Net Profit to Sales
Ratio of Operating Profit to Total Capital Used
Ratio of Operating Profit to Sales
Ratio of Gross Earnings to Sales
Ratio of Costs and Expenses to Sales
Turnover of Total Capital Used
Turnover of Inventories
Turnover of Accounts Receivable
Working Capital Ratio

There are many other ratios which influence the principal operating ratios, and which in a large measure explain favorable or unfavorable business results. These may include labor turnover, ratio of spoiled work, unit of output per operative, average wage per man, and per hour; to all of which further reference is made later in this article, along with citation of actual cases as illustrations.

The ratio of net profit to net worth expresses the measure of earnings available to the stockholders or proprietors and is the final indicator as to business success or failure. This ratio usually varies according to the hazard, or the stability, of the industry, although there may be exceptions to that rule . However, published statistics show that for the five years from 1917 to 1921, inclusive, the ratio of net profit to net worth for a large group of industrial and trading corporations averaged 9.8%; that for the three post-war years the corresponding ratio was 6.1%, and that for the war years the ratio for the same companies was 13.9%.

The ratio of net profit to sales indicates the margin of profit on selling price. This ratio must be considered in relation to the rapidity of stock turnover, and to the capital invested in accounts receivable, in inventory and in plant. If the stock turnover is rapid, the margin of profit may be small; but if the nature of the business involves slow-moving inventories, or long-term collections, the margin must be sufficiently large to provide for an ultimate fair return to the investors. The published reports of representative groups and manufacturing industries show that for the period of five years from 1917 to 1921, inclusive, the average ratio of net profits to sales was 7.9%, the group averages ranging from 4% for leather companies to 10.5% for iron and steel companies.

The ratio of operating profit to capital used forms a ready basis for comparison of operating results of various departments of a business or of several plants under a single control, for even though products and processes may differ, it is plain that every manufacturing enterprise should earn a fair return on capital invested. The ratio of operating profits to capital used gives an executive a measure of efficiency as to the real operating ability of the head of a department or division. Operating profits are here distinguished from net profits and represent the gain from operations before deducting Federal taxes, interest on borrowed money and extraordinary losses, without including miscellaneous income not attributable to ordinary operations. The term "capital employed" commonly embraces the total investment locked up in plant, inventories, accounts receivable, cash balances, etc., regardless of the source whence such capital was derived.

The ratio of operating profit to sales expresses the basic relationship between profits and sales. This measure of comparison should be applied not only in the aggregate to the business as a whole, but also to its constituent operating units. Valuable com-

parisons become available when the operating profit ratios are expressed not only in terms of dollars, but also in units of product, such as the ton, pound, yard, or gallon. However, in judging the adequacy of profits so expressed, consideration must be given to relative price levels. Thus, in pre-war days, a profit of 10 cents per pound on a given product might have been reasonable, whereas under war conditions and to some extent even now, a profit of double that amount might represent only a fair return, having regard to the enhanced price levels for all commodities and for labor entering into manufactured products. As in the case of other operating ratios, the percentage of operating profit varies in different industries, depending upon conditions relating to competition, capital used and speed of turnover. Broadly speaking, low ratios of profits to sales follow quick turnovers, while slow turnovers involve higher ratios if an adequate return is to be obtained. For example, in the case of mill agents whose sole investment represents the capital necessary to carry short-time accounts receivable, their capital is turned 50 times per year so that low percentages of profit to sales are the rule; while in some manufacturing industries the capital employed is turned not more than once or twice per year, and in such cases relatively high ratios of profits to sales necessarily prevail.

The ratio of gross earnings to sales measures the spread between the selling price and the production cost of the goods, and therefore concerns primarily the selling organization rather than the manufacturing heads. It is to the former organization that proprietors look for effective selling results, for out of the gross margin realized must come all expenses of selling, administration, interest on loans, and other charges, before any net return on capital is realized. Like all other operating ratios, characteristic percentages can be found for representative groups of industries and from these a business executive may gauge his own relative position in the scale of efficient operation.

Costs and expenses should be expressed (a) as percentages of money values and (b) in terms of dollars per production unit. The former basis will stand the test of changing price levels and will enable the business man to determine whether, in a period of rapidly advancing prices, his costs have been relatively maintained at a level which will result in an adequate net profit, or, in other words, whether his sales prices have been advanced proportionately with advancing costs and expenses of production and distribution. The latter basis supplements the former and supplies necessary unit prices, but these unit prices, without regard to the price levels of commodities which rise and fall with the turn of the business cycle, would not adequately inform the reader of the financial statement . For example, in pre-war years iron castings used by machinery builders could be bought for five cents per pound, whereas during the war period of price inflation, the same type of castings cost more than double that amount.

Reference has already been made to the importance of capital turnover in relation to operating ratios. It is axiomatic that accelerated turnover of total capital employed directly increases the net return available to the stockholders or proprietors. Consequently, the turnover of total capital employed, considered in relation to net profit on sales and net profit to net worth, coördinates and explains those two ratios for the business as a whole. The same test may be applied to each main division of the business so as to disclose the underlying factors which are combined in the composite ratios for the entire business.

Moreover, the turnover of total capital obviously reflects the sum of the separate turnovers of segregated capital units invested in inventories and accounts receivable. Stagnant inventories, resulting possibly from rash buying in a runaway market by a panic-stricken purchasing agent, followed by a period of depression, most assuredly reduce the ratio of inventory turnover, increase the carrying charges on the stock, and result in a direct reduction in net profit. In like manner, capital locked up in overdue accounts receivable slows down the rate of turnover and results in diminished net returns from the business.

In this connection, one authority has recently said: "A slower-than-average turnover of any kind—unnecessary investments of any type—put competitive handicaps on a business which affect its return on capital, just as does failure to meet competitive conditions in merchandising or operations. The standards of efficiency in the use of capital are not as well recognized or as easily determined as standards for costs, prices, or operating efficiency, but they are none the less real. There is nothing of greater importance in the financial management of a business than the determination of what standards of turnovers and other financial relationships should be maintained if the most advantageous showing is to be made. In many industries such standards may be determined from available statistics. In others, a theoretical standard may be computed from a careful study of the business of a particular company."

For the reader of a balance sheet the working capital ratio is usually the first thought, for such ratio has been stressed by bankers and business men more than any other financial ratio. Borrowers often ask "What is the correct working capital ratio for my business?" On this point a review of data tabulated from published financial reports shows such a wide variation in ratios, not only for different industries, but for different concerns in the same industry, that no satisfactory answer to such question can be given. In general, however, it may be stated that borrowers on commercial paper are usually expected to maintain a ratio of from two dollars to four dollars of current assets per dollar of current liabilities. However, while the average ratio for nearly 250 corporations in the six years from 1916 to 1921 was approximately three to one ,the variations from this mean in both direc-

tions were quite marked. Without doubt, the maintenance of an adequate working capital ratio is essential to the enjoyment of a favorable credit reputation with discounters of commercial paper. Industries affected by a seasonal business show wide fluctuations in working capital ratios at successive seasons of the year, and the problem in those cases is to provide only such paid-in capital as is requisite to cover the low point of the year when stocks are at a minimum and collections from customers largely liquidated, and, while avoiding the accumulation of idle capital at such times, to build up such a credit standing that the peak capital requirements can be readily financed on borrowed money.

THE INDUSTRIAL BUDGET

The budget, in relation to government finances, has long been a familiar feature(although effective budgetary control of government expenditures remains to be completely establihed), but the application of the budget in relation to the finances of general business is a comparatively recent experiment. In an interesting pamphlet entitled "Budgeting for Business Control," published by the Fabricated Production Department of the Chamber of Commerce of the United States, this new aspect of budget uses is made clear, and there is cited a dictionary definition of "budget," as late as 1919, which makes no reference whatever to a budget for industrial purposes, because budgeting for manufacturers is a relatively new development.

Under modern conditions, business executives and bankers are generally in favor of some form of budgetary control for business operations, the actual application of the budget principle being tempered by the conditions surrounding each case. Very largely because of the serious financial difficulties which had to be faced in the United States in the latter part of 1920 and the early part of 1921, business men turned to the budget plan for help in establishing standards of performance, as to sales, production costs and expenses, in order to limit expenses while developing new outlets for product or while waiting for the expected return of business through the usual channels.

A budget system has been defined as an accounting and statistical organization whose function is (1) to gather information from the past; (2) to formulate on that basis plans for the future, and (3) to report subsequently how these plans have been executed. It is essential that the budget estimates be drafted on standard forms exactly in alignment with those adopted for financial and statistical statements, in order that subsequent comparisons with actual results can be readily made.

A budget for a given period embraces careful estimates of the volume of business expected; of the expenditures necessary in manufacturing or purchasing, and in marketing the goods; and

finally of the cash requirements necessary to finance the production and sale of the goods. In preparing such a budget, the estimates must be made in detail by departments, and the department heads held accountable for any variations. The far-sighted executive, in carrying out his business campaign according to the budget, should have at his command all necessary information in relation to the past, through the medium of the accounts upon which he relies without question.

The day of the sellers' market and of easy profits is gone, perhaps never to return in our generation, and a budget is regarded as a guide for the executive. The cost accountant's help in budget building is indispensable, for a well-known writer has well said that there is perhaps no greater service the cost accountant can perform at this time for the general manager than to help him formulate a budget which will yield a reasonable profit on a normal year's business and will set a standard that if not maintained will mean less than a fair return on investment, or, if much exceeded, will involve financial risks incommensurate with the possible additional return. Such a budget should be planned so as to provide for balanced production and continuity of operation. In other words, it should allow for the fullest utilization of production facilities, but its sponsors should check and condemn any tendency to manufacture anything and everything for which there may be a possible demand, and should produce dependable cost figures that will disclose the expensiveness and wastefulness of such a practice.

It is perhaps unnecessary to emphasize the importance of organizing the work of budget preparation within the accounting department so that those department heads who are to be held accountable under the budget plan for production, sales, expenses and costs, may have no control over the reporting of the results of the operations. Such department heads, of course, should be freely supplied with all detailed information regarding their departmental operations and expenses that may be required in reviewing their achievements or failures when measured by the budget standards, but those whose output is under scrutiny should not be permitted to select the gauge by which their performance is to be measured.

The essentials of an industrial budget comprise:

1. Careful estimate of sales based upon previous years' experience, tempered by the immediate business situation.
2. Scheduling of production in keeping with sales estimates.
3. Careful gauging of material requirements.
4. Establishment of standards of labor performance.
5. Careful analysis of expenses, with limits set for auxiliary services, such as power, maintenance and delivery.
6. Provision for funds to carry through projected sales and production programs.

7. Provision for checking and revising standards by performances.
8. Predetermining of profits and losses.

The soundness of a proposed budget may be tested by constructing pro-forma statements of profit and loss and of financial condition, and by careful analysis of the indicated financial position at the close of the period to be covered by the budget. Then by comparison with the known financial position at the last balance sheet date, conclusions can be drawn as to the wisdom of attempting to operate on the budget or of revising the plan. Questions should be put relating to the pro-forma balance sheet, such as: "Is the cash position strong or does the budget indicate faulty provision for cash requirements?" "Is the working capital ratio satisfactory or has the ratio decreased, either through diversion of cash to needless additional fixed investment in plant, or through operating losses?" "Does the surplus show a reasonable increase, or a decrease arising from operating losses or from the payment of unwarranted dividends?" Answers to those questions and others of a similar nature will show whether the budget has been skilfully and wisely prepared and what should be done by way of reconstructing the estimates.

Coordination of Statistics and Accounts

Successful organization demands that at all times there must be hearty coöperation among the several departments and complete coördination of effort of the individual members of the organization, if efficiency and economy in operation are to be established. In like manner there should be effective coördination in planning the work of statistical and accounting departments. In an organization of moderate size, all accounting and statistical work may well be placed under the immediate direction and control of a single accounting officer. In large organizations, however, it becomes necessary to subdivide this work and to maintain separate departments for the several branches of accounting and statistical records. For example, separate departments are commonly maintained by large corporations for financial accounts; for cost accounts; for planning and production records; for sales analysis and for other subdivisions of accounting and statistical work. As each of such departments functions under the direction of a responsible head, its work is likely to develop characteristics peculiar to individual preferences unless a strong centralized authority directs the scope of the work of all and maintains the necessary coördination of results, so that sales analyses, production reports and cost data are finally interpreted in terms of the profit and loss account and the balance sheet.

Numerous instances showing lack of coördination might be cited as illustrations of what ought not to be done. One large corporation maintained an elaborate statistical department devoted to the analysis of sales, sales expenses and commissions of sales-

men; sales were tabulated in great detail according to classification of product; according to territory, and according to individual alesmen, and the analysis of expenses and commissions followed similar lines. All of this information was used almost exclusively by the sales manager, and was compiled on the basis of a calendar year, although the corporation's accounts were closed annually on May 31. This lack of coördination between the work of the financial accounting department and that of the statistical department was strikingly revealed when upon attempting to develop a complete operating budget, it was found that the financial statements and the statistical reports did not "tie up," so that a great deal of unnecessary work was required in recasting the figures which could have been obviated if the plans had been properly coördinated.

Recently in the case of a large manufacturing corporation operating what purported to be a cost system, it was found that the monthly costs and earnings supplied to the officials during the year varied widely from the results disclosed upon closing the books at the end of the fiscal period. Investigation disclosed that the discrepancy had been largely due to a failure to take cognizance of variations in inventories of work in process at the beginning and end of the year, which in this case happened to be large. Coördination of the cost system and the general accounts would have obviated such an error which caused serious consequences through reliance on undependable cost data.

In a plant recently under investigation, two so-called cost systems were found to be in use, system A inherited from an old line manufacturers and based largely upon rule-of-thumb methods, and system B evolved by a well-trained mill man, who, however, had no opportunity to "tie up" his results with the general books. The problem was first to convince the management of the futility of perpetuating the confusion and wasted effort caused by attempting to find "costs" under two different systems; secondly, to demonstrate the soundness of the principles underlying system B, and finally to develop system B to its logical completion by effecting its coördination with the general books. In adjusting this matter the factory system was developed along the lines of standard costs for a number of diversified products, with provision for monthly comparisons between the standards and actual results. Standard costs in this case meant analytical standards, separately established and carried through the accounts for materials, for labor and for manufacturing overhead. While the monthly profit and loss account reflected the net variation between total actual costs and total standard costs, that variation was interpreted in terms of the three cost elements named for products and for processes, and the analyses showed further what proportions of the variations were due to fluctuations in output in relation to the standards adopted, and what proportions were due to fluctuations in market prices for materials and for labor. The mill referred to had been

highly profitable in former years but after suffering under modern competitive conditions it was forced to adopt a cost finding system founded on sound principles as the result of which reliable information was obtained and was intelligently interpreted and a successful continuation of a long and honorable business life was assured.

Many instances might be cited as to the interpretation of industrial statistics which apparently only indirectly relate to the financial statements but may vitally affect the proper coördination of the industrial organization, of which the following is an illustration. In a large manufacturing plant, otherwise well organized, complaints became frequent that orders failed to come through a certain department on time, thereby destroying the coördination of production throughout the plant, and that the costs in that department exceeded the estimates on which selling prices had been fixed so that profits had been seriously impaired. Thereupon an investigation was made to disclose the causes for delayed deliveries and for cost variations.

All orders handled by the department for a period of six months were tabulated with the result that 73% were found to have been delivered on time, and that the delays on 27% of the orders ranged from 1 to 10 days. Thus, notwithstanding the allegations, the investigation was at the outset narrowed in scope to only 27% of the orders handled, which was somewhat surprising to the manager. Further investigation and tabulation of the department records disclosed many of the causes for delays which included (1) the failure to commence work when scheduled; (2) work already started, crowded out by rush jobs; (3) spoiled work; (4) congestion of work; (5) delays in receiving stock; (6) accidents to machinery, and (7) illness of operatives. While it was not possible in all cases to distinguish between avoidable and unavoidable delays, it was pointed out that with better supervision and planning of work, most of the causes for delays could be eradicated.

A further analysis and tabulation of the orders in respect to cost variations showed that of the orders which exceeded estimated costs, three-quarters were within 20% of the estimates, leaving approximately only 25% of the orders (which were under criticism) subject to serious complaint in this respect, a much smaller proportion than had been alleged. In general, it developed that the causes of delays in completing orders also tended to increase the cost of the work. Other causes for over-costs were (1) errors in estimates; (2) overtime work at increased rates, and (3) reduction of estimates to meet competition. This case has been cited as an example of the value to an executive of the analysis of existing data (differing from that underlying operating ratios), and the interpretation of classified information, thereby establishing the basis for remedial action, and dispelling exaggerated fears as to the difficulties involved.

Trade Association Statistics

Various trade associations have tabulated financial statistics obtained from questionnaires filed by their members. Interesting and valuable deductions have been drawn from the data so tabulated, furnishing food for thought and basis for action by the individual members with a view to eradicating evils inherent in their respective trades, and in placing their business on a firmer footing.

Statistics compiled by a trade association were recently submitted for review, and while all the requisite information was not available, some interesting conclusions were drawn from the statistics presented and were submitted to the members. Four classes of merchandise were represented, in respect to which there were tabulated average ratios of sales to total sales, gross profit to total sales, departmental gross profit to departmental gross sales, gross profit to total gross profit, inventory to total inventory, and inventory turnover. Without showing in this article the actual tabulations, the outstanding facts were substantially as follows:

Merchandise A, with 17% of total sales, and 21½% of total gross profit, carried 38% of the total inventory which was turned 1¼ times.

Merchandise B, with 27% of total sales, and 10% of total gross profit, carried 11% of the total inventory which was turned 9 times.

Merchandise C, with 36% of total sales, and 44% of total gross profit, carried 35% of the total inventory which was turned 2½ times.

Merchandise D, with 20% of total sales, and 25% of total gross profit, carried 16% of the total inventory, which was turned 3 times.

Unfortunately the departmental expense ratios were not ascertainable from the expense analyses submitted, so that no ratios could be developed for departmental net profits. Nevertheless the disparities between the respective ratios for the four classes of merchandise, especially with respect to proportion of inventory carried and annual turnover, evoked lively discussion at the annual convention where the figures were discussed, with the result that the members returned to their offices with renewed determination to maintain more complete and more intelligible statistics as an essential factor in the conduct of their business.

One important factor affecting the net profit disclosed by the analysis of the data referred to above, was that of quantity discounts, which in general are offered to certain customers whose annual purchases reach a stipulated amount. It is true that quantity discounts on large orders in staple lines may be offset by savings in shipping and other expenses, but that offsetting factor seemed not to materialize in the case of the merchandise classifications under discussion. The merchandise sold to larger concerns,

subject to quantity discounts, actually showed such a disproportionate decrease in gross profit as to indicate the futility of quantity discounts as a builder of profitable trade. The investigation disclosed that a large part of the expense attaching to sales subject to volume discounts is in the same ratio to goods sold as the expense attaching to no-discount sales. Inasmuch as a customer uses the merchandise in accordance with the requirements of his business and not in accordance with quantity bought, it would seem that a logical result of vigorous prosecution of quantity discount sales under the existing contract arrangement would be to overstock an increasing proportion of customers, and to shrink the dealer's no-discount business correspondingly. Consequently, both manufacturer and dealer would ultimately find their positions untenable. Obviously, the quantity discount should benefit all concerned, if it is to benefit the manufacturer. While the foregoing conclusions do not apply to all lines of trade, similar investigations by other associations might be illuminating and beneficial to the members in enabling them to arrive at a sound basis for business development.

Another common ground for the interpretation of trade association statistics is found in the relation between taxpaying corporations and the Federal government. It is well known that the Revenue Acts of 1917 and 1918 contain so-called relief sections under which corporations may apply for assessment on the basis of other representative corporations in the same line of business. With this fact in mind a number of trade associations have distributed to their members questionnaires, and have tabulated results reported in respect to ratios of taxes paid to profits, to sales and to invested capital, as well as other pertinent ratios. Thus it is possible for each member (without knowing the identity of the corporations reporting) to compare his own ratios with the average for the trade, and to determine therefrom the probability of obtaining relief, under the appropriate sections of the Revenue Laws, from any taxes overpaid.

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