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Accounting information may not be the ultimate communications medium in a business but it has certain definite advantages today. The author compares two schools of thought on the subject and suggests the advantages and drawbacks of each —

ACCOUNTING INFORMATION IN DECISION MAKING

by John W. Dickhaut

The Ohio State University

ACCOUNTING information, in addition to its role in external communication, is obviously a major factor in managerial decision making. However, accounting information is not used in all decisions of all managers.

Are there any valid generalizations about the relationship between accounting information and decisions? This article attempts to

analyze that relationship—and then to test the analysis against two well known decision making models.

Accounting information

Internal accounting information consists of balance sheets, income statements, funds statements, projections such as income budgets, and underlying data such as in-

voices, schedules, and cash budgets that lead to the compilation of these statements.

Internal accounting information also consists of reports on performance, such as variance analyses, and has recently been described as including certain non-transaction data such as probability distributions, management models, and simulation techniques.¹

in order to include most data that might come under the purview of the accountant and subsequently be used by a decision maker.

The nature of decision

As a member of an organization, the individual makes a decision from "the viewpoint of its organizational effect."² His decisions are linked to the purpose which he and other organization members are trying to accomplish, and his decisions will be integrated with other members' decisions if that purpose is to be accomplished. Integration of decision occurs when different people are willing to perform different organizational services to reach the overall organization goal.³

Chester Barnard mentions that individuals' decisions in formal organizations not only will be integrated but also will "interact"⁴ so that one individual's decision is derived from someone else's decision and will lead to yet a third decision. Barnard calls this behavior the "logical process" of the firm and says, "The ends of organization to a relatively high degree involve processes not as rationalizations after decision but as processes of decision."⁵

The environment of decision

Barnard states that there are three main elements that form the bases of the organization whose end result is a series of logical processes: communication, a willingness to serve, and a common purpose.⁶

Communication performs the critical task of relating the other two elements. By means of communication, common goals are passed from one member of the organization to other members so that cooperative effort can be attained and the willingness to serve can be directed to varying circumstances. Communication becomes a primary basis for interacting decisions within the organization. Barnard says,

"The probability of accomplishing a common purpose and the existence of persons whose desires constitute motives for contributing toward such a purpose are at opposite poles of the system of cooperative effort. The process by which these potentialities become dynamic is that of communication."⁷

Accounting as communication

Accounting information is a type of communication. It can link a common purpose and the willingness to serve. If all types of communication are related to general decision making, then accounting information is related to decision making.

The typical income statement links willingness to serve and organizational purpose by segregating the components of the total effort that contribute to the purpose. People can see from their respective vantage points in the organization what contributions their efforts make toward the purpose.

Accounting information contributes to the logical processes of the firm by promoting interactions of decisions. An income statement represents the results of many decisions and, at the same time, forms the basis for future decisions. The future decisions are not necessarily made by the same people who made the original decisions. For instance, salesmen and the sales department make the decisions that result in the sales figures, but the president of the organization, on the basis of the cumulative sales data, may make decisions that relate to the entire company.

The occurrence of decision

Herbert A. Simon has extended Barnard's concept of decision and has described what happens when a decision is made; he segregates the parts of a decision into their respective components. Simon says, "The task of decision involves these steps: (1) the listing of all alternative strategies, (2) the determina-

... there are three main elements that form the bases of the organization whose end result is a series of logical processes: communication, a willingness to serve, and a common purpose.

tion of all the consequences follow upon each of these strategies, (3) the comparative evaluation of these sets of consequences.”⁸

The listing of “all alternatives” and the “determination of all consequences” means that the decision maker possesses complete rationality. For profit-making firms, complete rationality leads to the maximization of profit. The decision maker, as commonly portrayed by the economist, maximizes profit.⁹

In reality, man cannot be completely rational; he is limited by the attention he can give to any one set of circumstances. In a specific situation an individual will have incomplete knowledge of the conditions that created the situation and incomplete knowledge of the possible alternatives. Lacking complete knowledge, he can, at best, reach conclusions that are satisfactory for accomplishing the purpose he has chosen.¹⁰

With his limited amount of knowledge, the decision maker will evaluate the consequences of alternatives by the criterion of efficiency. Simon says, “The criterion of efficiency is most easily understood in its application to commercial organizations that are largely guided by the profit objective. In such organizations the criterion of efficiency dictates the selection of that alternative which will yield the greatest net (money) return to the organization. This ‘balance sheet’ efficiency involves on one hand the maximization of income, if costs are considered as fixed, and on the other hand the minimization of costs, if income is considered as fixed.”¹¹



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understood by the decision maker, can supply a description of the conditions from which alternative courses of action are developed; it can relate some consequences of future action; and, because accounting information can express the consequences of future action in terms of dollar values, a criterion of efficiency can be applied.¹²

The balance sheet provides a description of conditions. The conditions are the relationships among assets, liabilities, and the residual interests of the owners. A person or organization can reason that if it duplicates the same actions (that preceded these conditions), the same result will occur. For example, assume that the balance sheet reveals an increase in cash that is considered to be satisfactory by the organization. The treasurer can reason that if he duplicates the same actions that preceded the cash balance, such as forestalling payments for merchandise, borrowing from the bank, or establishing a stronger credit policy, he can duplicate the increase in cash.

Misinterpretation of accounting information may reduce the number of alternatives that the decision maker considers and limit his rationality. For instance, Vatter suggests that a psychological block can be put between the accountant and manager by the apparent precision of variance analyses.¹³

If alternative courses of action are projected to their logical consequences, accounting information can express alternatives in terms of the alternatives’ “net money returns.” For instance, the effect of a product price change can be projected in a profit forecast and the effect of alternative price changes can be projected. The alternative that produces the greatest profit may be selected because it yields the greatest “net money return.”

Two models

While accounting information may be related to the general decision processes of the firm, account-

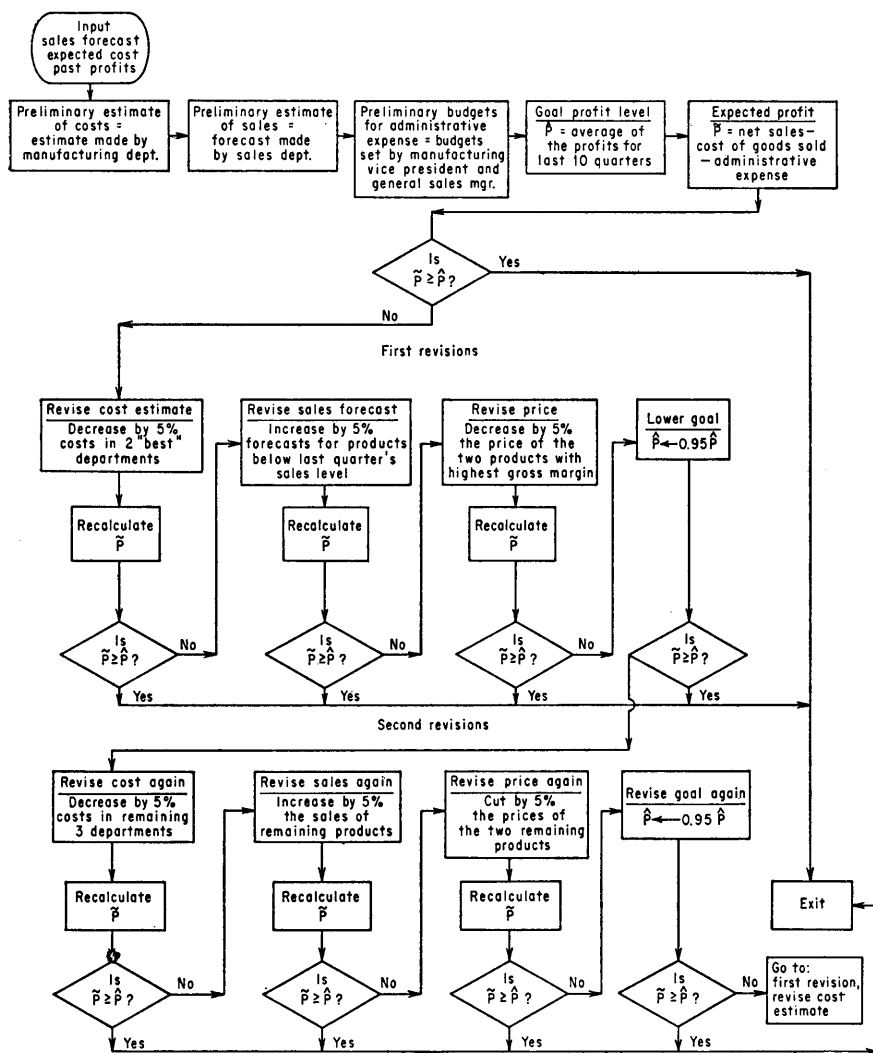
Accounting information . . . can supply a description of the conditions from which alternative courses of action are developed; it can relate some consequences of future action; and, because accounting information can express the consequences of future action in terms of dollar values, a criterion of efficiency can be applied.

Use of accounting information may vary among firms and among periods

EXHIBIT I

REPRODUCTION OF FLOW CHART IN THE BONINI MODEL

\tilde{p} = expected profit
 \hat{p} = average of the profits of the last ten quarters



ing information is not used for all decisions of all firms. The use of accounting information may vary among firms and among periods. One firm may use accounting information for one type of decision while another firm may not use accounting information for that same type of decision. For example, some firms may use cost measurements developed by the accountant in economic order quantity models while others may ignore the EOQ model and accounting measurements entirely.¹⁴

Let us now take two specific decision models, those developed by Charles P. Bonini and William M. Morgenroth, and test the generalizations stated earlier in the article against them.

In a 1966 statement the American Accounting Association suggested the use of decision models to determine the relevance of accounting in the decision making process. In this article, however, the models are used not to determine relevant information needs but rather to see if the general relationships deduced in the earlier part of the article are valid in specific decision models as a way of testing the generalizations.

The models were chosen for examination because they reflect not just one segment of the organization but a variety of people with varying responsibilities. They deal with the same decision, pricing, but with different firms in different types of markets.

The Bonini model

In Bonini's model¹⁵ (Exhibit 1 on this page) the pricing decision is made by an executive planning committee. The committee has received a profit projection for the next quarter of operations and has a record of average profits

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for the past ten quarters of operations. The committee will make no change in the predicted sales, cost of sales, or product prices if the projected profit is greater than or equal to the past average profit. If the projected profit is less than past average profit, the committee will lower predicted costs of the two best-cost departments by five per cent. If projected profit still is less than past average profit, the committee will increase by five per cent the predicted sales of departments that have forecast sales less than their past quarters' sales. If projected profit still is less than past average profit, the price of the two products with the highest gross margin will be lowered by five per cent to increase total sales revenue. (Demand is elastic.)¹⁶

If projected profit still is less than the profit goal (past average profit), the profit goal is lowered by five per cent. If, after lowering the profit goal, projected profit still is less than that goal, a second revision of cost, sales, and prices occurs. Costs are lowered by five per cent in all cost departments not reduced before. If projected profit still is less than the profit goal, predicted sales not altered before are increased by five per cent. If projected profit still is less than the profit goal, prices of the remaining products are decreased by five per cent.

If this fails, the profit goal is decreased again by five per cent. If, after the second revision of costs, sales, prices, and profit goal, the projected profit remains less than the profit goal, the planning committee returns to the first set of revisions and again reduces costs, increases sales forecasts, lowers prices, and changes the profit goal until projected profit is greater than or equal to the profit goal.

The Morgenroth model

In the Morgenroth model¹⁷ (Exhibit 2 on page 54), prices are determined by a different methodology. The pricing decision is made at the divisional level of

the organization. Prices are determined not only in relation to profit but also in relation to what other firms in the same market are doing. Prices are not determined in advance but shift with the day-to-day activity of the immediate market. (Demand is inelastic.)¹⁸

In the Morgenroth model there are three possible decision results: (1) following the price increase of the leader in price setting, (2) following the decrease in price of the price leader, or (3) not changing the price of the product under consideration.

In the model there are twenty different decision processes that may lead to the three results. The simplest (decision rule A) says that if the wholesale price of the price leader is equal to the wholesale price of the firm making the pricing decision, the firm should continue to watch the market and not change prices.¹⁹

Decision processes that occur when the market price of the firm making the pricing decision differs from that of the price leader are more complex. A typical process is decision rule D in the Morgenroth study, which says that if the wholesale price of the price leader is greater than the wholesale price of the firm making the pricing decision; if a representative of the district sales office says not to change prices; if the price analyst at the division office believes that other major competitors will not raise their prices; and if the other major competitors do raise their prices within 24 hours, then the firm will raise its prices.²⁰

When the price leader's prices are less than those of the firm making the pricing decision, the decision processes are even more complex. A typical process is decision rule R in the Morgenroth model, which says that if the wholesale price of the price leader is less than the wholesale price of the firm making the pricing decision; if the district sales office says not to change prices downward; if the district sales office says wait 24-48 hours and if after 24-48 hours the

prices of other wholesalers drop; if the quantity of sales of the firm in the immediate market is less than the quantity of sales in the nearby market; and if it is believed that the price of the firm in the nearby market will not drop if the price in the immediate market is decreased, then the price in the immediate market will be lowered to the competitor's price.²¹

Evaluation of the models

In the Bonini model the generalized relationships between accounting information and internal decision making appear to be valid.

Accounting information in the form of projected budgets is a communication instrument within the Bonini model. The projection reflects the purpose of the organization, future profits, and the instrument reflects predicted contributions of members toward the purpose. The contributions of the sales department and the production department to future profit are identified, and the decision to lower prices is based on the effect the price change will have on profits.

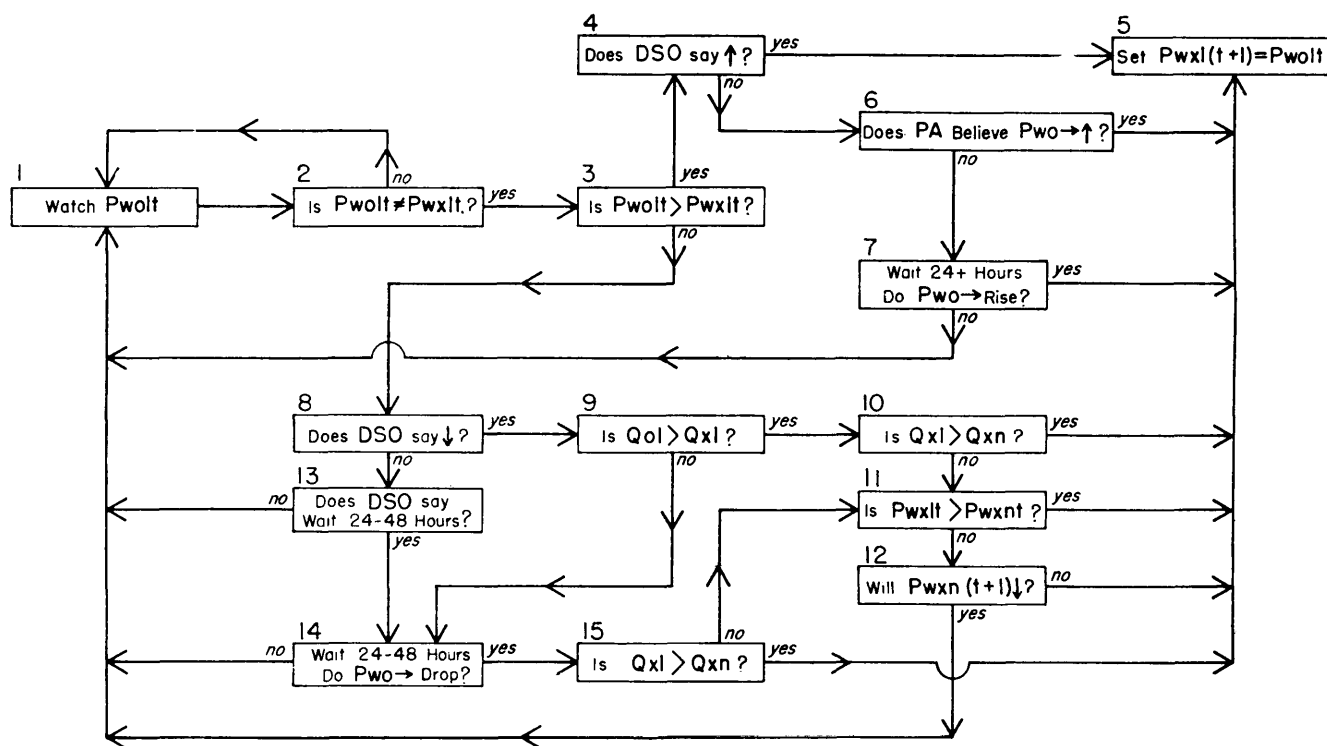
Since there is no accounting information in the Morgenroth model, the generalized relationships do not exist.

The information necessary for the pricing decision includes the price of the leading competitor in the immediate market, the price of the pricing firm in the immediate market, the opinion of the district sales office as to whether prices will be changed, the opinion of the price analyst at the divisional sales office as to whether prices of other major competitors will be changed in the wholesale market, the volume of sales of the pricing firm in the immediate market, the volume of sales of the pricing firm in the nearby market, and the effect of price change in the immediate market on the price in the nearby market.²²

It is possible to identify three major reasons why accounting information is lacking in the Morgenroth model:

EXHIBIT 2

REPRODUCTION OF THE MORGENROTH MODEL



SYMBOLS

- | | | |
|---|--|--|
| P - Price | t - Time, at present | PA - Price Analyst |
| r - Retail | (t+1) - Time, subsequent to considering price change. | = - Is equal to |
| w - Wholesale | Q - Quantity | ≠ - Is not equal to; or, is different from |
| x - Our company | l - Local market, wherein price change is being considered | > - Is greater than |
| o → - Other major competitors in local market | n - Nearby market with funnel influences | ↑ - Raise Price |
| o - Other major competitor initiator | DSO - District Sales Office (District Sales Manager) | ↓ - Drop Price |

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(1) In the Morgenroth model decisions are made within 48 hours after the price change of the price leader. Most accounting information is not prepared this soon.

Nature of demand

(2) In the Morgenroth model demand is inelastic. As Morgenroth says, "The market setting chosen for the study is one both real and painful: where there is a handful of competitors and where demand is inelastic. A drop in price causes competitors to retaliate so that no one gets more revenue or market share. A raise in price may not be followed by competitors, permitting the price leader to lose both revenue and market share."²³

If all competitors always followed an increase or decrease in the price leader's market price, accounting information would be unnecessary. It is important to note that in the Morgenroth model an increase or decrease in the market leader's price does not necessarily mean that the marketer will follow the price increase or decrease.

Goal perception

(3) The fact that demand is inelastic is ancillary to the fact that different levels of the organization perceive different goals for the organization.

At the district sales office the interest is to maintain a proportionate market share or possibly increase sales in the market with little reference to the effect on profit. Profit can be sacrificed to maintain the proper share of the market.²⁴

The conflict between market share and the profit purpose is also a conflict between the district sales office and the divisional office. The price analyst at the divisional office, with the profit purpose in mind, may overrule a district sales office decision that was based on proportionate sales goals rather than on profit goals.

The final decisions that are made represent a compromise between

two conflicting purposes. At times a decision is made based on the opinion of the district sales office and on proportionate market share. The decision will exclude consideration of profits. At other times a decision is made on the overruling opinion of the price analyst, who may show little consideration for proportionate market share because of his emphasis on profits.

Even if accounting information were prepared within the necessary time for making the decision, it is unlikely that the information would influence the ultimate decision because the decision does not necessarily seek a clearly defined purpose.

If the firm were interested solely in profit, cost accounting data would be relevant, because the division office could compare profit in alternative situations. The division could compare profit from following a price increase or decrease with profit when prices were not changed. The division merely would predict sales under the two alternatives and subtract product costs.

If the firm were interested solely in proportionate market share, projected accounting information would be more relevant. Sales of

competitors and sales of the firm could be projected and compared in alternative circumstances.

Prices are changed in the Bonini model solely on the basis of the profit purpose. Price is never changed unless it is believed that projected profits will be increased as a result of the decision. Accounting information in the form of projections aids the decision process by relating effects and purpose.

Neither study contradicts the way accounting information can be used in the decision process. Accounting information can: (1) focus on purpose, (2) delineate contributions to purpose, (3) describe conditions from which alternatives can be derived, (4) provide some alternatives, and (5) measure the efficiency of alternative decisions.

The Bonini decision model, in which organizational purpose is clearly defined, provides an excellent example of how purpose can be met by using accounting information in the decision process.

But the Morgenroth decision model adds to an understanding of a principal factor that must be present for accounting information to be used most effectively. That factor is a clear definition of the purpose to be met by a decision.

¹ *A Statement of Basic Accounting Theory*, American Accounting Association, 1966, p. 38.

² Chester I. Bernard, *The Functions of the Executive*, Harvard University Press, 1938, p. 188.

³ The individual, of course, will have personal goals which presumably do not conflict with the organizational goals. For a discussion, see *The Use of Accounting Data in Decision Making*, edited by Thomas J. Burns, College of Commerce and Administration, The Ohio State University, 1967, p. 163.

⁴ *Op. cit.*, p. 187.

⁵ *Ibid.*, p. 185-186.

⁶ *Ibid.*, p. 82.

⁷ *Ibid.*, p. 89.

⁸ Herbert A. Simon, *Administrative Behavior*, (second edition), The MacMillan Company, New York, 1957, p. 67.

⁹ *Ibid.*, p. 68.

¹⁰ *Ibid.*

¹¹ *Ibid.*

¹² This is not to suggest that accounting information will necessarily employ the

best criterion of efficiency or will reveal all alternatives but rather that accounting information can lead to certain alternatives and require an application of some criteria even if those alternatives and those criteria are not the optimal ones.

¹³ *The Use of Accounting Data in Decision Making*, *Op. Cit.*, p. 138.

¹⁴ *Ibid.*, pp., 193, 234, 240.

¹⁵ Charles P. Bonini, *Simulation of Information and Decision Systems in the Firm*, Markham Publishing Company, Chicago, 1968, p. 43.

¹⁶ *Ibid.*, p. 39.

¹⁷ William M. Morgenroth, "A Method for Understanding Price Determinants," *Journal of Marketing Research*, Volume 1, No. 3 (August, 1964), American Marketing Association, Chicago, Illinois, p. 19.

¹⁸ *Ibid.*, p. 17.

¹⁹ *Ibid.*, p. 23.

²⁰ *Ibid.*, p. 23.

²¹ *Ibid.*, p. 24.

²² *Ibid.*, p. 19.

²³ *Ibid.*, p. 17.

²⁴ *Ibid.*, p. 20.