Int. Studies of Mgt. & Org., Vol. 22, No. 4, pp. 6–20
M.E. Sharpe, Inc., 1992

HENK A. AKKERMANS AND JOHAN E. VAN AKEN

Process-Related Problems in Operations Strategy

Achieving competitive edge seems today, more than ever, critically dependent on the effectiveness of the management of the primary processes in organizations, that is, of those activities that are directly related to the flow of goods (Andrews and Johnson, 1982; Cohen and Zysman, 1987; Sharman, 1984). Despite the strategic importance of these primary processes, they have long been missing in strategic planning. From the late 1960s on, there has been a persistent appeal to incorporate "operations," "manufacturing," or "logistics" in the strategic planning process (Heskett, 1977; Hill, 1980, 1985, 1991; Shapiro, 1984; Skinner, 1969, 1978).[1]

In response to this appeal, several frameworks that describe how to perform such an incorporation have been developed, with names such as "logistics strategy" (Christopher, 1986; Heskett, 1977; Hoekstra and Romme, 1985; Sharman, 1984; Shapiro, 1984), "manufacturing strategy" (e.g., Fine and Hax, 1985; Wheelwright and Hayes, 1985; Hill, 1985; Mayer and Moore, 1983; Slack, 1991; Skinner, 1978; Swamidass, 1986), or, perhaps the broadest concept, "operations strategy" (OS) (Adam and Swamidass, 1989; Anderson et al., 1989; Hill, 1991). Excellent overviews and critiques of these frameworks have been provided by Adam and Swamidass (1989), Anderson et al. (1989), and Swamidass (1989).

Despite this impressive body of literature, there appears to be "no clear or consistent definition of operations strategy" (Anderson et al., 1989, p. 136). In this paper we will define an operations strategy as a pattern of choices concerning the operations objectives and the main lines of the operations processes, their interrelationships, their technical infrastructure, and their control systems (see Van Aken, 1978, p. 42). Although there are differences in emphasis, most of the current OS frameworks share some characteristics: they emphasize rational analysis and the use of formal planning techniques; they assume a linear, top–down planning process; and they focus more on OS content than on OS process. All of

The authors are Assistant Professor of Logistics Management and Full Professor of Organization and Management at Eindhoven University of Technology, Graduate School of Industrial Engineering and Management Science, P.O Box 513, 5600 MB Eindhoven, The Netherlands.

them appear to be designed after the strategic planning frameworks for general strategy that appeared in the 1960s, of which Ansoff (1965) and Andrews (1971) are perhaps the best known.

In the past decade, these OS frameworks have been used on numerous occasions, and several assessments of how they perform in practice have appeared (e.g., Anderson et al., 1990; Maruchek et al., 1990; Miles, 1987; Miller and Hayslip, 1989; Schroeder et al., 1986; Swamidass, 1986; Verstegen, 1989; Voss, 1990). According to these and other studies, the types of problems that turn out to occur with OS development in practice are mostly not addressed in the current OS frameworks. Rather than problems of an analytical nature, deficiencies in attitude, cognition, and organization appear to be blocking the successful development and implementation of operations strategies in practice. This paper examines these deficiencies in somewhat more detail. In order to overcome these problems it is advised that ideas and techniques be borrowed from the field of general strategy, where similar problems have been encountered in the past, and to which solutions have been found that might also be applicable to operations strategy issues.

Problems in operations strategy formation in practice

Despite the fact that there now are several frameworks to support the development of operations strategies, problems appear to abound. These problems are well documented in the reports and assessments of OS projects that have been published in the past decade. We have collected these problems and attempted to cluster them. Through this clustering, we identified three general types of problems in OS development: (1) problems regarding the organizational structure within which the persons involved work; (2) problems regarding the cognitive skills of the persons involved; and (3) problems regarding the attitudes of the persons involved. Among the various problems, several causal relationships exist.

Problems of organization

A first set of problems appears to be related to the way organizations have structured the way they work in general, and their strategic management process in particular. Three different lacks can be identified: lack of involvement, lack of representation, and lack of cross-functional communication.

Lack of involvement

As shown in figure 1, lack of involvement appears to be a central deficiency. Operations managers are often not involved in the development of the general business strategy. This is left to the general managers, marketing managers, financial managers, and corporate staff. Once this general strategy has been

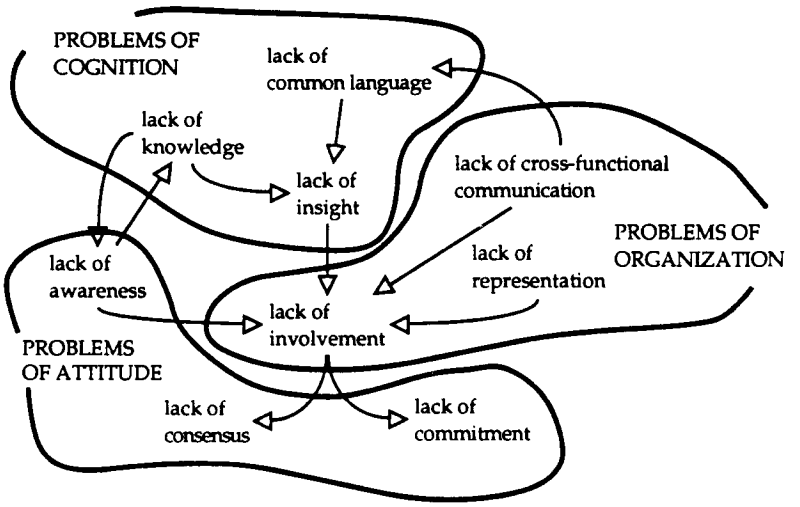

Figure 1. The main causal relationships between the various deficiencies in OS development in practice

developed, these operations managers are left with the task of finding out what its implications are for the operations function all by themselves, without cooperation from other, nonoperations, areas.

Hill (1980, 1985, 1991) has been among the first to observe this problem. Empirical studies such as Anderson et al. (1990) confirm this picture. In a recent survey, Bowersox et al. (1989) found that, in successful companies, the logistics manager participated fully in the strategic planning process. Similar results have been reported by Swamidass and Newell (1987).

Lack of representation

This situation may be partly due to a lack of representation of the operations function in top management. Although normally some manager with a technical background is present at the top, many management teams lack a logistics manager, or someone else who has an overview and a thorough knowledge of the entire primary process chain of the organization.

Sharman (1984) blamed this situation on the fact that logistics is a cross-functional activity, and that in management teams only functional managers tend to have a place. Also, Christopher (1986) suggested that the reason for this lies in the functional structure of many companies.

Lack of cross-functional communication

A third structural impediment to effective OS development appears to be the lack of contacts, and therefore the lack of communication, between people

from production, sales and R&D, accounting and finance, respectively. Throughout their career, people tend to remain in one functional area until they reach the highest level they will attain. Consequently, when these managers have to work together toward a common goal, they are simply not able to communicate.

As mentioned before, Sharman (1984) and Christopher (1986) also emphasize this point. Hill (1980, p. 4) blames this situation on the "typical value and reward systems used." Both Miles (1987) and Voss (1990) propose to set up cross-functional teams to overcome this problem. In the context of management training (see next section), Miller and Hayslip found it highly beneficiary "to involve manufacturing, marketing, engineering, financial, and planning executives in one simultaneous learning process" (1989, p. 27).

Problems of cognition

A second set of deficiencies apparently relates to the cognitive skills of the persons involved. Once again, three lacks can be identified: lack of common language, lack of knowledge, and lack of insight.

Lack of common language

Because they seldom meet and rarely hear about each others' problems, functional managers lack a common language by which they could communicate with people from other areas. Since they have spent most of their careers surrounded by people who share the same orientation and who work on similar problems, these functional managers cannot perceive and discuss problems in terms other than the ones they are used to. In most management teams, this problem is superficially resolved by translating everything into financial terms. Unfortunately, it is awkward to express many of the essential concepts in the area of operations (but also in the area of R&D, for example) in dollars, pounds, or guilders. Physical quantities and such apparent intangibles as "quality" or "flexibility" are essential elements of the language of operations.

Once again, Hill has noted that production managers do not have a history of explaining their function clearly and effectively to others in the organization. "On the other hand," he writes, "marketing and financial executives have explained their function well" (1980, p. 4). Miller and Hayslip also note that "traditional roles have limited what corporate, manufacturing, and other functions bring to the [operations strategy development] mix" (1989, p. 27). Voss stresses the need for the development of "a common understanding of the language and process of manufacturing strategy development" (1990, p. 954). Buffa (1980) admits that OM research has seldom attempted to deal with interfunctional relationships. The "common language" problem as such has been discussed extensively by such writers on general strategy as Ackoff (1981), De Geus (1988), and Richmond (1987).

Lack of knowledge

One of the greatest deficiencies in current practice may well be the lack of knowledge. As with "lack of involvement" and "lack of awareness," which is discussed next, two types of deficiencies in knowledge can be distinguished. On the one hand, there is a lack of knowledge on the part of non-OM managers concerning operations terminology, concepts, techniques, tools, and the like. Most non-OM managers just do not know what is and is not possible in the field of operations. The story of the general manager who asks for 100.0 percent delivery reliability is just one of the classic stories in the field. On the other hand, operations managers are often not oriented toward the strategic aspects of their job. Often they do not know what it takes to develop a strategy, or, if they do, they are often the only ones in their department who have this knowledge of strategic affairs.

Miller and Hayslip (1989) stress the need to improve knowledge by both parties mentioned. They also talk about "a common language . . . that is being incorporated into the general manufacturing strategy process" (p. 26). Swamidass (1986) states that executives in manufacturing firms are not sufficiently "literate" in matters concerning manufacturing strategy. Anderson et al. (1990) note that "Often [operations managers] alone have the knowledge or strategic savvy to engage in strategic analysis and planning" (p. 10). In the Dutch context, Verstegen (1989) has found that in OS development projects, people started to think more and more in logistical terms and learned to appreciate the logistical relations between their own and other departments. Christopher also stresses the importance of "thinking logistically" (1986, p. 52).

Lack of insight

The field of operations is complex in itself. If the complex interactions between decisions in this field and other areas also have to be taken into account, as is the case at the strategic level, an operations strategy becomes analytically very demanding indeed. Together with the mentioned lacks of knowledge that appear to exist in practice, this results in a lack of insight into the many interrelations between the various subsystems in organizations and the relations with the environment—and, consequently, a lack of coherence between policies for different parts of the organization.

Voss (1990) notes that the process of manufacturing strategy development requires a high level of analytical skill. Miller and Hayslip say that "piecing together the complex relationships required to attack new markets, products and processes can be a swift-paced, highly analytical/logical exercise" (1989, p. 24). Maruchek et al. found that there was a consensus among manufacturing managers that "manufacturing decisions made in isolation could result in suboptimization of corporate strategy" (1990, p. 116). Hill has written extensively about the problems of translating marketing objectives into manufacturing policies and

vice versa (1985, 1991). Of course the problem of policies in different areas that are not synergetic but even work against each other is one that has also been noted in the general strategy field (e.g., Lyneis 1980).

Problems of attitude

Closely related to the two previous sets of problems are problems concerning the attitudes of the persons involved. In the literature the attitude deficiencies of lack of awareness, of consensus, and of commitment have been mentioned.

Lack of awareness

Here we should distinguish between a lack of awareness of the importance of operations for general management and other functional managers on the one hand, and a lack of awareness of the strategic dimensions of operations among operations managers on the other. These two forms of lack of awareness may lie at the root of many other deficiencies. In order to be able to solve a problem, one has to realize that a problem exists. Because there is a lack of awareness, there is a lack of involvement and a lack of knowledge.

Skinner (1969) already found that operations "is seen by most top managers as requiring involved technical skills and a morass of petty daily decisions and details," but this point has been made most eloquently by Hill (1980, 1985, 1991). Sharman has blamed top management for its "blinkered view of the scope and significance of logistics" (1984, p. 72). Indeed, lack of awareness is mentioned by a large number of authors.

Lack of consensus

Since not all the stakeholders are involved in all the relevant phases and aspects of the strategy process, it is not surprising that there is often little consensus regarding the resulting strategic plan. And, without consensus, at least to a certain degree, there can be little hope for commitment. If true conflicts of interest exist, however, one should not strive for full consensus. In such cases the highest achievable level of consensus may well be some kind of "grudging acquiescence," as John Rohrbaugh of the State University of New York at Albany put it.

Anderson et al. (1990) found that for manufacturing executives a very influential determining factor for their perception of a successful strategy was the degree of satisfaction they had with the manufacturing strategy process. Voss describes the use of workshops in order "to get agreement and consensus on what the future manufacturing mission(s) or task(s) should be" (1990, p. 956). Miller and Hayslip (1989) stress both the need to arrive at consensus and the difficulties of achieving such a consensus, due to differences in opinions and perceptions in different functional areas.

Lack of commitment

If not all the stakeholders have fully participated in the strategic process it is not likely that the resulting plan will be understood and that there will be consensus regarding the plan. Therefore it is unlikely that there will be much commitment for thorough implementation of the plan. The stakeholders will feel little "ownership" regarding the plan. And without commitment and ownership, "the manufacturing strategy just becomes another plan" (Anderson et al., 1990, p. 14).

Anderson et al. (1990) have noted that the more manufacturing executives were involved in the OS development process, the more they felt ownership for the plan, the more they were committed to the plan, and the more successful the strategy became in their perception. Voss (1990) states that noninvolvement by line functions may result in a situation in which they "may not 'own' the eventual strategy. This may in turn jeopardize the implementation" (p. 953). Miles (1987) also stresses "full participation by key client staff who must ultimately identify totally with the solution. For this ownership to be achieved, full understanding of the key issues is required" (p. 100). Finally, Christopher has noted that "those companies that are often regarded as leaders in the development of logistics-oriented organizations are those where there is the highest level of commitment to the concept" (1986, p. 53).

Developments in general strategy

The question arises of what may be done about the problems in OS formation mentioned in the previous section. For this it may be useful to look at historical developments in general strategy. For perhaps the field of OS might benefit from the ways in which the field of general strategy has dealt with process-related problems. We have already seen that many of the theoretical foundations of operations strategy frameworks originated from the field of general strategy. In the use of these frameworks, similar process-related shortcomings were observed. In the field of general strategy there has already been a response to these process-related shortcomings. A switch of emphasis has taken place toward the process of strategy formation. This switch has taken the form of both practical techniques to accommodate the strategy process and of new theoretical perspectives on the strategy process. Current research efforts aim at the development of achieving a synergetic mix of sophisticated techniques for support of both content and process.

Originally the focus clearly was on strategy content. In the mid-1960s the first general strategy frameworks appeared. Most famous among these was perhaps Igor Ansoff's Corporate Strategy (1965). Such a strategy framework meant an enormous improvement. Here for the first time was a systematic

method by which one could arrive analytically at a sound strategic course for one's organization. Much emphasis was given to analysis of strengths and weaknesses, opportunities and threats. On the basis of this analysis and explicitly stated strategic objectives, the strategy content was derived. The process of strategy development was presented as a linear set of rational-analytical planning activities. Implementation issues were largely skipped over.

Then attention shifted to process-related issues. In the 1970s pretty much the same shortcomings mentioned in the previous section were found to be hampering successful development of general strategies in practice (see Ackoff, 1991; Mintzberg and Quinn, 1991; Quinn, 1980, 1989). In the years that followed, the field of general strategy has responded to these shortcomings with new developments both in theory and in practice.

In the theoretical arena, broader perspectives on the nature of the strategy process have been developed. At least three additional perspectives on strategy have emerged: the political perspective, the cultural perspective, and the learning perspective on strategy (see Chaffee, 1985; Morgan, 1986; Mintzberg and Quinn, 1991). The political perspective of strategy enables one to recognize that in practice strategy formation tends to be very much a political process. Individuals and groups use their power to safeguard their personal and/or organizational interests (Pfeffer, 1981; Mintzberg and Waters, 1985; Mintzberg and Quinn, 1991; Quinn, 1980, 1989; Wrapp, 1967). The cultural perspective of strategy illustrates the importance of corporate culture. When a firm decides, for example, to make strategic changes in its approach to the market, this not only means investments in new machinery or a new marketing campaign: such a change often also implies profound changes in the way people work, changes in their attitudes toward their work, changes in the whole corporate culture (Tichy, 1983). The third new perspective on strategy is that of organizational learning (Argyris and Schön, 1978; Senge, 1990). This teaches us that strategy making is not really about making plans: it's about changing people's minds (De Geus, 1988). In today's turbulent business environments, no competitive advantage will be sustainable in the long term, except, perhaps, the ability to adapt to changes in the environment quicker than your competitors. And adaptation means willingness to learn and adopt new ideas. This learning, however, is not aimed solely at the individual level. Learning needs to occur at the group level or organizational level if the organization as a whole is to become more flexible.

In practice the emergence of these new theoretical perspectives has coincided with the development of several practical methods and techniques for dealing with process-related issues. Terms like multidisciplinary project teams, line management involvement, structured workshops, facilitators, small-group problem solving and training programs have become standard vocabulary for strategy formation in practice (see Mintzberg and Quinn, 1991).

At present, attention appears to have shifted back somewhat to content. Or,

rather, the attempt now seems to be to combine both process management techniques and content management skills (Idenburg, 1992). In combining these two, "the process management issues are not seen as independent of the content management issues. Rather, each aspect informs the way in which the other skill is best utilized" (Colin Eden, in Rosenhead, 1989, p. 21). Such combined approaches are rapidly emerging from the general strategy field. Examples are "participative modeling" or "modeling for learning" (Morecroft and Sterman, 1992; Richmond, 1987; Senge, 1990; Vennix et al., 1990); soft systems methodology (SSM); "strategic options development and analysis" (SODA); and "the strategic choice approach" (see Rosenhead, 1989, for an excellent overview). In many cases these approaches entail some kind of modeling activity. Of course, modeling is used here for its traditional purpose: content support by enabling both qualitative and quantitative analysis. But simultaneously modeling is also used to support the strategy process by serving as a vehicle for communication and as a means for creating consensus and commitment. Nowadays in most strategic planning processes for industrial organizations, some predefined conceptual model is used within a strategic workshop context, thus providing both process and content support. Best known among these is perhaps Porter's "value chain" model (Porter, 1985).

Implications for operations strategy formation

From our review in the previous section it becomes apparent that there has been a consistent flow of ideas from the field of general strategy to that of operations strategy. These historical parallels are represented, in an admittedly oversimplified format, in Table 1. If we extrapolate the parallels between general strategy and operations strategy into the future, then the field of operations strategy may benefit from the experiences gained in general strategy in three different ways. First, by broadening its definition of what operations strategy is. Next, by using techniques from general strategy aimed at overcoming process-related problems. And finally by directing research efforts at the developments of OS frameworks in which both process- and content-related issues are treated as one organic whole.

Broadening the concept of the nature of operations strategy

We may expect a broader perspective on the nature of operations strategy to become common in OS literature. So-called "soft" issues like organizational culture, politics, and organizational learning in the past may have been seen as not essential for the operations manager's job. They are, however, just as essential as thorough, "hard" OM analyses. First of all, this fact needs to be generally recognized in both textbooks and scientific publications in the field.

Table 1
An overview of historical developments in the fields of general strategy and operations strategy

Period	General strategy	Operations strategy
1950s	Recognition of the need for general strategic planning	
1960s	Analytical, content-oriented general strategy frameworks	Recognition of the need for strategy operations planning
1970s	Recognition of process-related problems in general strategy in practice	Analytical, content-oriented operations strategy frameworks
Early 1980s	A broader, process-oriented view of strategy and techniques for overcoming process-related problems	Recognition of process-related problems in general strategy in practice
Late 1980s	Sophisticated techniques for both process and content support of general strategy	A broader, process-oriented view of operations strategy and techniques for overcoming process-related problems
1990s	?	Sophisticated techniques for both process and content support of operations strategy

Using techniques from general strategy aimed at overcoming process-related problems

The second way in which the field of OS may benefit from developments in general strategy is by using its techniques. In the field of general strategy, several techniques that are aimed at overcoming process-related problems have become standard practice. To a large extent these techniques are already being employed in the OS arena. This is shown in Table 2, where we give examples of techniques especially aimed at overcoming one of the nine shortcomings mentioned above. In addition, one or more references from the OS literature in which the use of this technique is described are also given. It is to be expected that this development will soon make these techniques just as standard in OS frameworks and projects as they have become in general strategy.

Table 2
Techniques to overcome process-related problems in strategy development (with major references in the OS literature)

Process-related problems in OS formation	Techniques to overcome these process-related problems and major references in the OS literature
Lack of cross-functional contacts	Multidisciplinary, interfunctional project teams (Miles, 1987; Miller and Hayslip, 1989; Voss, 1990)
Lack of representation	Adding interfunctional expertise to project team (Sharman, 1984)
Lack of involvement	Participation of all stakeholders in OS development (Christopher, 1986; Hill, 1985)
Lack of awareness	Top management support, training (Platts and Gregory, 1990; Skinner, 1978; Verstegen, 1989)
Lack of consensus	Workshops, facilitators (Miller and Haylsip, 1989; Voss, 1990)
Lack of commitment	Line management involvement, management workshops (Miles, 1987; Voss, 1987)
Lack of knowledge	Training in OS issues (Christopher, 1986; Hill, 1985; Verstegen, 1989)
Lack of common language	Multidisciplinary project teams, workshops (Miller and Hayslip, 1989; Voss, 1990)
Lack of insight	Adding analytical skills to project teams from outside consultants or staff (Miles, 1987; Voss, 1987)

Aiming Research Efforts at the Development of OS Frameworks That Integrate Support for Both Process and Content of OS Formation

If we look somewhat further into the future, we may expect the development of sophisticated approaches which are designed to support simultaneously both OS process and content. In these approaches, the two have become inseparable, they are integrated into one organic whole. Platts and Gregory (1990) describe one of the first of such approaches. Akkermans (1992) and Akkermans and Vennix (1990) describe a research project aimed at the development of another. No doubt more will follow.

Conclusion

The field of operations management is complex, both in an organizational and in a technical sense. It is especially complex if one intends to exploit the full potential of integral optimization along the entire value chain from procurement to the final customer. Such a complex field requires sophisticated analysis with sound theoretical foundations. In practice, however, clever strategic analyses will only be successfully realized if they are embedded in a sound approach to the process of strategy formulation and implementation. In view of the many process-related shortcomings in present OS practice, it is essential that effective techniques are used to overcome these shortcomings. This, however, is not sufficient. In the long run the major challenge in developing a successful operations strategy may well lie in achieving a synergetic combination of both rigorous technical analysis and effective process facilitation.

Note

1. Regarding "operations," there is considerable confusion in terminology. Depending on an author's background, focus of attention, or audience orientation, the term "operations," "logistics," "manufacturing," or "production" is used. Without denying the differences that exist, we think that common themes are an emphasis on the primary processes of the organization, an emphasis on chains of transformation, stock and transport activities, and an emphasis on taking an integral perspective of these activities, from the procurement of goods up to their delivery to a final customer. "Operations" may be the term that causes the least confusion and is broad enough to cover the whole area. Hence, "operations strategy" (OS).

References

Ackoff, R.L. (1981) *Creating the Corporate Future. Plan or be Planned for*. Chichester, UK: Wiley.

Adam, E.E., and Swamidass, P. M. (1989) "Assessing Operations Management from a Strategic Perspective." *Journal of Management* 15 (2), pp. 181–203.

Akkermans, H.A. (1992) "Participative Modeling to Support Strategic Decision Making in Operations—A Case Study." Presented at the 1992 International System Dynamics Conference, Utrecht University, July 1992.

Akkermans, H.A., and Vennix, J.A.M. (1990) "A Computer-Based Learning Environment for Logistic Management." In S. Belardo and J. Weinroth, eds., *Simulation in Business and Management*. San Diego: SCS, pp. 128–133.

Anderson, J.C.; Cleveland, G.; and Schroeder, R.G. (1989) "Operations Strategy: A Literature Review." *Journal of Operations Management*, 8 (2), pp. 133–159.

Anderson, J.C.; Schroeder, R.G.; and Cleveland, G. (1990) "The Process of Manufacturing Strategy: Some Empirical Observations and Conclusions." In C. Voss, ed., *Manufacturing Strategy—Theory and Practice*. Proceedings of the 5th International Conference of the Operations Management Association, pp. 1–23.

Andrews, C.G., and Johnson, G.A. (1982) "The Crucial Importance of Production and

Operations Management." *Academy of Management Review*, 7 (1), pp. 143–147.
Andrews, K.R. (1971) *The Concept of Corporate Strategy*. Homewood, IL: Dow Jones Irwin.
Ansoff, I. (1965) *Corporate Strategy*. New York: McGraw-Hill.
Argyris, C., and Schön, D.A. (1978) *Organizational Learning: A Theory of Action Perspective*. Reading, MA: Addison-Wesley.
Bowersox, D.J.; Daugherty, P.J.; Dröge, C.L.; Rogers, D.S.; and Wardlow, D.L. (1989) *Leading Edge Logistics—Competitive Positioning for the 1990's*. Oak Brook, IL: Council of Logistics Management.
Buffa, E.S. (1980) "Research in Operations Management." *Journal of Operations Management*, 1 (1), pp. 1–7.
Chaffee, E.E. (1985) "Three Models of Strategy." *Academy of Management Review*, 10 (1), pp. 89–98.
Christopher, M. (1986) "Implementing Logistics Strategy." *International Journal of Physical Distribution and Materials Management* 16 (1), pp. 52–62.
Cohen, S.C., and Zysman, J. (1987) *Manufacturing Matters. The Myth of the Post-Industrial Economy*. New York: Basic Books.
De Geus, A. (1988) "Planning as Learning." *Harvard Business Review*, March–April, pp. 70–74.
Fine, C.H., and Hax, A.C. (1985) "Manufacturing Strategy: A Methodology and an Illustration." *Interfaces*, 15 (6), pp. 28–46.
Hayes, R.H.; Wheelwright, S.C.; and Clark, K.B. (1988) *Dynamic Manufacturing—Creating the Learning Organization*. New York: The Free Press.
Heskett, J.L. (1977) "Logistics—Essential to Strategy." *Harvard Business Review* (November–December).
Hill, T.J. (1980) "Manufacturing Implications in Determining Corporate Policy." *International Journal of Operations and Production Management* 1 (1), pp. 3–11.
———. (1985) *Manufacturing Strategy—The Strategic Management of the Manufacturing Function*. London: Macmillan.
———. (1991) *Production/Operations Management—Text and Cases*, 2d ed. New York: Prentice Hall International.
Hoekstra, Sj., and Romme, J.H.J.M. (1985) Op weg naar integrale logistieke structuren [Towards integral logistic structures]. Deventer, The Netherlands: Kluwer (in Dutch).
Idenburg, P.J. (1992) "Bossa nova in stategie-ontwikkeling" [Bossa nova in strategy development]. *Economische Statistische Berichten*, April 22, 1992, pp. 398–402 (in Dutch).
Lyneis, J.M. (1980) *Corporate Planning and Policy Design: A System Dynamics Approach*. Cambridge, MA: MIT Press.
Maruchek, A.; Pannesi, R.; and Anderson, C. (1990) "An Exploratory Study of the Manufacturing Strategy Process in Practice." In C. Voss, ed., *Manufacturing Strategy—Theory and Practice*. Proceedings of the 5th International Conference of the Operations Management Association, pp. 450–501.
Mayer, R.J., and Moore, J. (1983) "Applying Manufacturing Strategy Concepts to Practice." *Operations Management Review*, Fall, pp. 23–28.
Miles, R.T. (1987) "The Role of Logistics in Developing Business Strategy." In J.M. Williams, ed., *Logistics*. Proceedings of the 7th International Congress, London. Bedford, UK: IFS, pp. 95–100.
Miller, J.G., and Hayslip, W. (1989) "Implementing Manufacturing Strategic Planning." *Planning Review* (July–August), pp. 22–48.
Mintzberg, H., and Quinn, J.B. (1991) *The Strategy Process*. Englewood Cliffs, NJ: Prentice-Hall.

Mintzberg, H., and Waters, J.A. (1985) "Of Strategies, Deliberate and Emergent." *Strategic Management Journal*, 6, pp. 257–272.
Morecroft, J.D.W., and Sterman, J.D., eds. (1992) *Modeling for Learning. European Journal of Operational Research*, Spring 1992, special issue.
Morgan, G. (1986) *Images of Organization*. Beverly Hills, CA: Sage.
Pfeffer, J. (1981) *Power in Organizations*. London: Pitman.
Platts, K.W., and Gregory, M.J. (1990) "Manufacturing Audit in the Process of Strategy Formulation." *International Journal of Operations & Production Management*, 10 (9), pp. 5–26.
Porter, M. (1985) *Competitive Advantage. Creating and Sustaining Superior Performance*. New York: The Free Press.
Quinn, J.B. (1980) *Strategies for Change. Logical Incrementalism*. Homewood, IL: Irwin.
———. (1989) "Retrospective Commentary to 'Strategic Change: Logical Incrementalism.' " *SMR Classic Reprint, Sloan Management Review*, 45, (Summer), pp. 55–60.
Richmond, B.T. (1987) *The Strategic Forum: From Vision to Strategy to Operating Policies and Back Again*. Lime, NH: High Performance Systems, Inc.
Rosenhead, J., ed. (1989) *Rational Analysis for a Problematic World. Problem Structuring Methods for Complexity, Uncertainty and Conflict*. Chichester, UK: Wiley.
Schroeder, R.G.; Anderson, J.C.; and Cleveland, G. (1986) "The Content of Manufacturing Strategy: An Empirical Study." *Journal of Operations Management*, 6 (4), pp. 405–415.
Senge, P. M. (1990) *The Fifth Principle. The Art and Practice of the Learning Organization*. New York: Doubleday Currency.
Shapiro, R.D. (1984) "Get Leverage from Logistics." *Harvard Business Review* (May–June), pp. 119–126.
Sharman, G. (1984) "The Rediscovery of Logistics." *Harvard Business Review* (September–October), pp. 71–79.
Skinnner, W. (1969) "Manufacturing—Missing Link in Corporate Strategy." *Harvard Business Review* (May–June).
———. (1978) *Manufacturing in Corporate Strategy*. New York: Wiley.
Slack, N. (1991) *The Manufacturing Advantage—Achieving Competitive Manufacturing Operations*. London: Mercury Books.
Swamidass, P. M. (1986) "Manufacturing Strategy: Its Assessment and Practice." *Journal of Operations Management*, 6 (4), pp. 471–484.
———. (1989) "Manufacturing Strategy: A Selected Bibliography." *Journal of Operations Management*, 8 (3), pp. 263–277.
Swamidass, P. M., and Newell, W.T. (1987) "Manufacturing Strategy, Environmental Uncertainty and Performance: A Path Analytic Model." *Management Science*, 33 (4), pp. 509–524.
Tichy, N.M. (1983) *Managing Strategic Change*. Chichester, UK: Wiley.
Van Aken, J.E. (1978) *On the Control of Complex Industrial Organizations*. Leiden: Martinus Nijhoff.
Vennix, J.A.M.; Gubbels, J.W.; Post, D.; and Poppen, H.J. (1990) "A Structured Approach to Knowledge Elicitation in Conceptual Model Building." *System Dynamics Review*, 6 (2).
Verstegen, M.F.G.M. (1989) "Ontwikkeling van een logistiek concept [Development of a logistic concept]." *Tijdschrift voor Inkoop en Logistiek*, 5 (7–8), pp. 22–29; (9), pp. 50–55; (11), pp. 42–46 (in Dutch).
Voss, C.A. (1990) "The Process of Manufacturing Strategy Implementation." In C. Voss, ed., *Manufacturing Strategy—Theory and Practice*. Proceedings of the 5th International Conference of the Operations Management Association, pp. 949–959.

Wheelwright, S.C.; Hayes, R.H. (1985) "Competing through Manufacturing." *Harvard Business Review* (January–February), pp. 99–109.
Wrapp, H.E. (1967) "Good Managers Don't Make Policy Decisions." *Harvard Business Review* (September–October), pp. 91–99.