Conceptual Developments In
The Span of Management

by David D. Van Fleet and Arthur G. Bedeian

The span of management concept is one of the most frequently discussed and controversial topics in management and organization theory. Recently, an exhaustive, if not definitive, review of the span of management literature highlighted the origins and extent of this controversy.[1] Historical in nature, however, that review did not address current theoretical developments associated with the span of management concept. The purpose of this paper is to expand upon that work by identifying conceptual developments in and the future prospects of this concept.

Background

Concepts of organization, including some related to the span of management, are ancient.[2] References to such concepts may be found in writings on the Roman Legions, the governance of Egypt, the Biblical account of the reorganization of the tribes of Israel, the Chinese civil service, hierarchies of India, and trade and development in early civilizations throughout the world. However, none of these represents an explicit recognition of the span of management concept as it is today.

Explicit expressions of the span of management concept first began to appear in military writings of the last of the 18th century. By the early part of the twentieth century, the span of management concept had fully emerged as a major tenet or principle of organization theory. Initial normative statements based on experience were followed by descriptive statistics based

on actual practices. The closest presentation to an explanation of any theoretical underpinnings was that of Graicunas.[3]

Graicunas' essay, "Relationship in Organization," in which he examined the numbers of interrelations among members of a work group, is perhaps the most widely cited early reference in this area. He recognized the impossibility of lying down "hard and fast rules for organization" and intended his essay to be "essentially of a speculative rather than a directly practical nature."[4] Thus, his work lacks a composite statement of underlying theory. Regardless of his intent, users of his ideas have attempted to present specific numerical guidelines. Numerous early authors used their experiences to form an additional basis for their views and, as a result, their writings took the form of prescriptive recommendations. It was not until descriptive statistics appeared that dissenting views began to emerge.

These descriptive statistics basically demonstrated the variability existing in actual organizations.[5] They did not, however, disprove earlier pronouncements. Discrepant results were obtained in different surveys and divergent interpretations of the same data by different groups led to an increase in confusion and controversy. As a result, statements suggesting variability became more the rule than the exception.

More recently, new approaches for analyzing the span have been developed. Leadership style and the size of span have been investigated.[6] An index to mea-

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[1] D. D. Van Fleet and A. G. Bedeian, "A History of the Span of Management," *Academy of Management Review,* Vol. 2 (1977), pp. 356-372.

[2] This section is based on Van Fleet and Bedeian, *loc. cit.*; complete references may be found here.

[3] See A. G. Bedeian, "Relationship in Organization: A Clarification," *Academy of Management Journal,* Vol. 15 (1972), pp. 238-239.

[4] A. G. Bedeian, "Vytautas Andrius Graicunas: A Biographical Note," *Academy of Management Journal,* Vol. 17 (1974), pp. 347-348 and Bedeian, "Relationship," *loc. cit..*

[5] See, for example, A. Baker and R. C. Davis, *Ratios of Staff to Line*

Employees and Stages of Differentiation of Staff Functions (Bureau of Business Research, Ohio State University, 1957); E. Dale, *Planning and Developing the Company Organization Structure* (New York: American Management Associate, 1952); D. R. Walton and J. Walton, "Observations on the Span of Control," *Administrative Science Quarterly,* Vol. 5 (1961), pp. 220-231; and K. K. White, *Understanding the Company Organization Chart* (New York: American Management Association, 1963).

[6] A. C. Filley, "Decisions and Research in Staff Utilization," *Academy of Management Journal,* Vol. 6 (1963), pp. 220-231.

sure "the shape of the hierarchical pyramid" has been developed.[7] Queuing theory, simulation models, and numerous mathematical derivations have been applied to the area.[8] A formula for determining the average span within an organization has been advanced and the original Graicunas' formula has been modified to allow for "fragmentation and coordination."[9] The characteristics of the superior, the work group, and the situation which are felt to be determinants of the span have also been expanded to include technology[10] and uncertainty.[11]

Several noteworthy attempts have been made to ease the controversies of "large vs. small" and "limit vs. optimum" which surround the span of management concept.[12] Traditional management theory has been merged with selected findings from the behavioral sciences in an effort to integrate their divergent viewpoints.[13] These efforts have since led to the suggestion that span of management should be viewed as a concept for focusing attention on relationships between characteristics of organization and overall organizational effectiveness.[14] Consequently, this view shifts the emphasis away from numbers of subordinates and levels toward relationships among organizational characteristics. Hence, the specific number in a span is not so vital as is the manner in which it is affected by characteristics of the organization and the manner in which it in turn affects other organizational characteristics and overall organizational effectiveness.[15]

If someone asks, "Is X's span too large when he has 30 people reporting to him and a complex set of relationships exists?" How do you respond? Do you not ask, "How well is the group doing its job?" If the group is doing well, why risk ruining it? If the group is not doing so well, is it bad enough to risk "tinkering?" If so, with what shall we tinker? X's training, the training of the members of the group, the nature of the task, the number of assistants available to X, etc.? Reducing X's span is too simplistic (ignoring, say, the costs of reorganization, such as hiring another supervisor to handle those moved from X's group). Focusing on group and organizational effectiveness rather than on

the number of people supervised serves to maintain a proper organizational perspective.

Based on this philosophy, the present status of the span of management concept, while still controversial and complex, appears to be reasonably established. It serves to focus attention on the manner in which organizational characteristics interact and affect overall organizational effectiveness.

Future Prospects

What will the future bring for the concept of the span of management? More or less controversy? Resolution, revolution, rapprochement, or recantation?

Personnel vs. Organizational Issue

One conceptual issue is the role of decisions which affect the span. When was the last time a manager made a conscious decision about his or her span? Never? When the organization was just getting started or undergoing some major revision of direction or structure? How about when someone was hired, fired, promoted, demoted, transferred, and so on? Personnel decisions can affect the span of management just as much if not more than decisions about organizational structure and processes.

Hence, a major research design problem exists — separating these two types of decisions that affect the span of management. Additionally, specifying relationships from personnel decisions to organizational effectiveness may have profound implications for the personnel management field itself. For instance, a personnel decision (based on reliable and valid performance criteria) to terminate an employee will result in an organizational decision to, at least, temporarily reduce the size of an individual manager's span of management and that will in turn affect the effectiveness of his or her unit. Hopefully, a replacement is soon there, *but* the replacement should be a "better" employee and, hence, the previous optimum span based on a group member of one "quality" may be inappropriate based on a group member of a different "quality." Only through careful research designs will separation of these different effects be made.

[7]P. M. Blau and W. R. Scott, *Formal Organizations* (San Francisco: Chandler, 1962).

[8]J. J. Beckman, "Some Aspects of Returns to Scale in Business Administration," *Quarterly Journal of Economics*, Vol. 74 (1960), pp. 464-471; L. S. Hill, "The Application of Queuing Theory to the Span of Control," *Academy of Management Journal*, Vol. 6 (1963), pp. 58-69; and C. R. Scott, Jr., "Span of Control Optimization by Simulation Modeling," *Academy of Management Proceedings* (1972), pp. 71-74.

[9]A. Melcher, "Organizational Structure: A Framework for Analysis and Integration," *Academy of Management Proceedings* (1966), p. 149.

[10]J. Woodward, *Industrial Organization: Theory and Practice* (London: Oxford University Press, 1965) and *Management and Technology* (London: Her Majesty's Stationary Office, 1959).

[11]J. R. Galbraith, *Organization Design* (Reading, Massachusetts: Addison-Wesley, 1972).

[12]R. S. Parker, "New Concepts of Administration — Its Meaning and Purpose," *Public Administration Review* (Sidney), Vol. 21 (1961), p. 28 and J. M. Pfiffner, "Why Not Make Social Science Operational," *Public Administration Review*, Vol. 22 (1962), p. 109.

[13]R. J. House and J. B. Miner, "Merging Management and Behavioral Theory: The Interaction Between Span of Control and Group Size," *Administrative Science Quarterly*, Vol. 14 (1969), pp. 24-69 and D. D. Van Fleet, "An Approach to a History of Management Thought: The Span of Management," *Academy of Management Proceedings* (1972), pp. 130-133.

[14]D. D. Van Fleet, "Span of Control: A Review and Restatement," *Akron Business and Economic Review*, Vol. 5 (1974), pp. 34-42.

[15]For a complete treatment of this view, see Van Fleet and Bedeian, *loc. cit.*.

[16]P. F. Drucker, *Management* (New York: Harper, 1973).

Definitions

Another conceptual issue is indicated by an examination of the writings of many early authors which reveals the use of several different terms. The general interpretation has been that they were merely different labels for the same phenomenon. But what if they were indeed discussing different phenomena? The "span of managerial responsibility," for instance, was stated by Drucker to be different and generally larger than the usual span of management.[16] Other writers may also have been addressing different aspects of related problems as well. Or, using the optimization concept, perhaps different writers had different criteria (leading to different optima) in mind.

Some preliminary research has already been conducted dealing with the issue of definitions.[17] That research has found evidence to support a "different definition" or "different criteria for optimization" point of view. Span of supervision is different from span of management and span of management is different from span of responsibility. Research is needed to identify the precise manner in which these concepts are different as well as the implications of such findings for the practicing manager.

In one study of such phenomena, Meissner[18] indicates that when members of a work group were asked, "Is there anyone working under your supervision?", 17 percent of workers whose jobs did not involve supervisory duties nevertheless indicated that they did supervise. When a reverse sort of question was asked ("Who tells you what to do?"), 22 percent said a "lead man," seven percent said no one at all, and five percent indicated a fellow worker. The span of management measured by the number of workers would appear to be greater than or at least quite different from the span of management measured by responses to "who is your boss?" types of questions.

To further examine this issue, 74 executives from 30 companies at 3 university executive development programs were asked two sets of questions. The first set dealt with the span of management or control and was:

> How many people *report directly* to you? How many people *report directly* to your immediate superior? About how many people (on the average) *report directly* to each of your subordinates?

The second set of questions dealt with the span of supervision or responsibility:

> About how many people do you *supervise*? About how many people does your immediate superior *supervise*? About how many people (on the average) do each of your subordinates *supervise*?

This issue had been discussed with an earlier group of such executives to arrive at the specific wording of the questions. Those executives indicated that these two questions were, in fact, different and dealt with precisely the issue at hand. To partially verify their judgments, the responses were examined in terms of whether or not they were the same or different for each of the three parts of the two sets of questions.

As indicated in Table I, the respondents did indeed "see" two different questions; in no case were all three responses for both sets of questions identical. Thus, even though nearly two-thirds of the responses for subordinates' spans are the same, the interpretations placed on those questions by the executives were different. The explanations varied from "they have the same number but two different sets of people are involved" to "rank and file employees (my subordinates) have no one reporting to them and do not supervise" (indeed, 16 of the 45 were zero responses in both cases). The few respondents who reported spans of supervision less than spans of management indicated that "professionals" were involved. For those people, the executives suggested that while they may report directly to you, you do not supervise them (as they use that word).

The results of this tentative "test" appear to confirm the idea that the span of supervision is generally larger than the span of management or control. Perhaps the ancient concept of supervisors as overseers is at work here, and hence, the span of supervision is more nearly equal to Drucker's span of managerial responsibility than to the traditional concept of span of management or control. Thus, while there are no doubt many problems with this tentative study, the results do suggest that two phenomena exist and need to be separately studied. Further research is needed to identify the precise manner in which these concepts are different as well as the implications of such findings for the practicing manager. But what mathematical treatment shall such research employ?

Mathematical Treatments

In the mathematical treatment of limits, a variable (y) is a given function of another variable (x). The variable, y, is said to approach a constant, b, as a limit when successive values of y are such that the numerical value of the differences y - b, becomes and remains less than any positive number no matter how small. One refers, then, to "y approaches b, as x approaches i," where i is also a constant.

From the standpoint of the span of management,

[17]R. R. Bell and F. S. McLaughlin, "Organizational Correlates of Span of Control," in D. F. Ray and T.B. Green (Eds.), *Management Perspectives on Organizational Effectiveness* (Mississippi State, Mississippi: Southern Management Association, 1975) and "An Information Processing Approach to the Definition of Efficient Spans of Control," *AIDS Proceedings*, Sixth Annual Meeting (1974), pp. 236-239; and W. G.

Ouchi and J. B. Dowling, "Defining the Span of Control," *Administrative Science Quarterly*, Vol. 19 (1974), pp. 357-365.

[18]M. Meissner, "The Language of Work," in R. Dubin (Ed.), *Handbook of Work, Organization, and Society* (Chicago: Rand McNally, 1977), pp. 205-278.

TABLE 1

SPAN OF SUPERVISION/RESPONSIBILITY VERSUS SPAN OF MANAGEMENT/CONTROL

General Version of Question (see text for exact wording) Groupings of Respondents[a]	Respondents' Reported Values								
	About Self			About Superior			About Subordinates		
	No.	Mean	Range	No.	Mean	Range	No.	Mean	Range
How many people are _supervised_?									
# supervised > # reporting directly	54	77.37	1-999	51	175.92	3-999	18	63.50	2-500
# supervised = # reporting directly	16	5.55	0-12	15	11.60	1-60	45	5.84	0-35
# supervised < # reporting directly	3	5.33	3-10	6	4.16	0-7	9	5.44	0-8
All Groups	73	58.66	0-999	72	127.37	0-999	72	20.20	0-500
How many people _report_ _directly_?									
# supervised > # reporting directly	54	5.98	0-50	51	5.60	0-17	18	6.11	0-36
# supervised = # reporting directly	16	5.55	0-12	15	11.60	1-60	45	5.84	0-35
# supervised < # reporting directly	3	24.00	6.26	6	20.00	6-65	9	16.11	2-50
All Groups	73	6.62	0-50	72	8.05	0-65	72	7.19	0-50

[a] _Groupings of Respondents_ refers to the three groups shown under each question. These groupings were formed by combining the responses of those for whom the number of people supervised was greater than, equal to, or less than the number of people "reporting directly."

several points are raised here. First, what is (are) the dependent variable(s) and what is (are) the independent variable(s)? Does the span (y_1) approach a limit (b_1) as the training of subordinates (x_1) approaches high school (i_1)? Does the effectiveness of supervision (y_2) approach a limit (b_2) as the span of management (x_2) approaches larger and larger numbers (i_2)? These very elementary issues are seldom clearly addressed even in current presentations on the span of management.

The literature suggests that the concept of optimization (maximization and/or minimization) is mathematically more relevant to the span of management concept than is the concept of limits. Even so, conceptual issues abound. Does the model describe conditions best treated by calculus, programming, or perhaps even catastrophe theory? Which are the independent variables and which are dependent? Should the range of the problem be restricted to treat it "realistically?" Are the relationships linear or non-linear?

Again, from the standpoint of the span of management, is "effectiveness of supervision per member supervised" a constant or is it an increasing or decreasing variable as the span increases? If there is an optimum span given the technology of the task before the group and a different optimum span given the training of the group, what is the optimum span considering both variables together?

Conceptual difficulties in the way of definitions present problems for future research on the span of management. Methodological difficulties in the way of mathematical treatments pose problems, too. Additionally, macro models of the theory underlying the span of management concept need to be more clearly specified; to do so might answer many of the above questions.
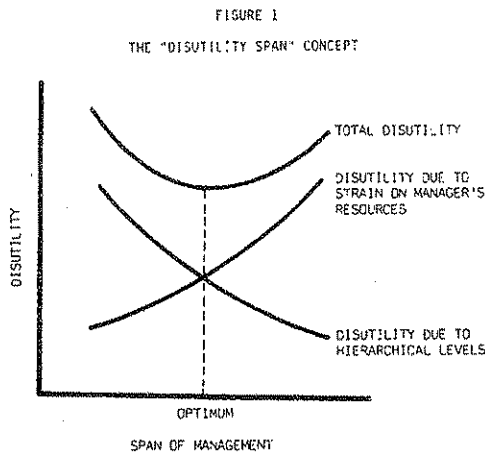
Macro Models

One such model, presented by Van Fleet and Bedeian,[19] was mentioned earlier. Another is suggested by Hostiuck.[20] Derived from economics, the Hostiuck model holds that the optimum span is one which minimizes a "total disutility" function (see Figure 1). This view suggests that a balance must be struck between the problems caused by too large a span (resulting from too few levels) and too small a span (resulting from too many levels). In each case, the impact of such "problems" is measured by disutility. The assumption of a direct connection between "levels" and "span"

[19]Van Fleet and Bedeian, _loc. cit._.

[20]K. T. Hostiuck, _Contemporary Organizations_ (Morristown, New Jersey: General Learning Press, 1974).

has not been adequately tested so that its use here weakens the model. Additionally, since utility does not enter into this analysis, the view must be regarded as incomplete, for no one would enter into a situation having only disutility or costs with no utility or returns.
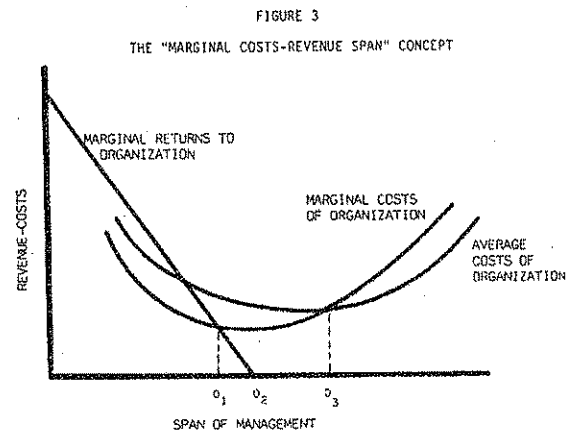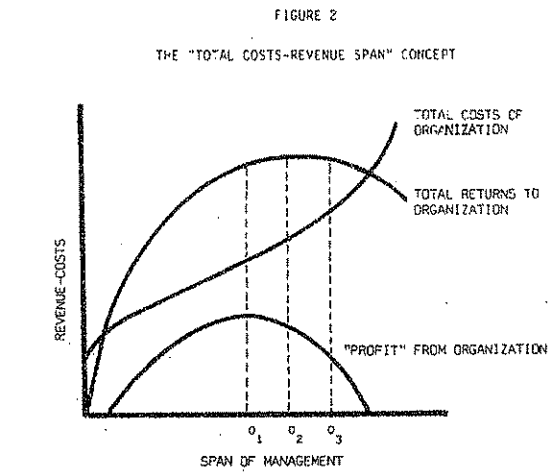
FIGURE 1

THE "DISUTILITY SPAN" CONCEPT

However, using the obvious device suggested by this approach, one can readily conceive of "returns to organization" (benefits) and "costs of organization" (costs), and proceed to analyze these in a more complete macro model. Indeed, Park[21] has done just that. If "returns" represent the productivity of one resource (management) per unit of another resource (group size), then equating the ratio of the marginal product of management to its price with the ratio of the marginal product of group size to its price would determine the optimum group size or span of management. Park's view of this idea, however, has been criticized as a bit simplistic,[22] especially in terms of the variables used in his model.

The use of models, such as those of Van Fleet and Bedeian, Hostiuck, and Park will hopefully lead to a more careful consideration and presentation of the theoretical base underlying the span of management concept. Extensions of those models are also very likely to be advanced.

Exploratory Model

For instance, a new, exploratory model is readily developed along these lines. "Returns to organization" may be readily conceived of as analogous to "revenues" and "costs of organization" as costs; in this way, a more complete macro model may be conceptualized. As shown in Figures 2 and 3, the optimum span could be thought of as that which minimizes the "cost of organization," O_3 (this is essentially Hostiuck's view), or that which maximizes the "returns to organization," O_2, or that which maximizes the difference between

"returns" and "costs," O_1 ("profit" or the "contribution" of the unit to the total organizational system or "costs/benefits" of organization).

FIGURE 2

THE "TOTAL COSTS-REVENUE SPAN" CONCEPT

FIGURE 3

THE "MARGINAL COSTS-REVENUE SPAN" CONCEPT

In this model, O_3 is that organizational unit size (span of management) which minimizes the average costs of organization and is readily read from Figure 3 as the lowest point on the average cost curve. That point is where marginal costs equal average costs as is indicated in that illustration. O_2, the organizational unit size which corresponds to maximum returns to organization, is readily read from either Figure 2 or Figure 3. That point is where total returns to organization are greatest in Figure 2 or where marginal returns to organization become zero in Figure 3. Finally, O_3, the organizational unit size corresponding to the maximum contribution of the unit to the system, is also readily read from both Figures 2 and 3. In Figure 2 it corresponds to the highest point on the "profit" from organization curve; in Figure 3 it is read from the point where marginal costs of organization are equal to the marginal returns to organization.

[21]K. E. Park, "The Span of Control: An Economist's View of the Facts and Fables," *Advanced Management*, Vol. 30 (1965), pp. 47-51.

[22]Van Fleet, "Span," *loc. cit.*.

This model, then, indicates that three different optima exist. The particular span would depend as much upon the criterion selected ("returns," "costs," or "contribution") as upon the usual organizational characteristics (which would determine the particular shape of the functions involved in the model). Further, each of these optima pertain only to "units" of the total organizational system. Hence, they may be suboptima from the point of view of the total organization. Thus, the use of this analogy suggests that three distinct optima exist for the span of management. No wonder previous empirical research found considerable variation!

This model also suggests that an organization with a climate of stressing "efficiency" and "minimizing costs" would be expected, *ceterus paribus*, to have larger spans of management than would other organizations. An organization with a climate stressing costs/benefits, profits, or contributions of subunits to the total organization, on the other hand, would tend to have smaller spans. Thus, organizational climate would need to be controlled for or somehow taken into account in future research designs regarding the span of management.

Conclusions

Clearly a finite and possibly large limit exists to the number of subordinates any given superior can effectively supervise, manage, or control. It is equally clear that this limit varies depending upon characteristics of the superior, members of his her group, and the situation at hand. Furthermore, an optimum or several optima also exist which is or are different from any such limit.

Efforts to identify such limits and/or optima have failed because of a lack of precision in definitions as well as in mathematical logic. Additionally, failure to separate components of the size of the span which reflect personnel versus organizational decisions has limited efforts to measure the true underlying relationships as well.

Research regarding the span of management should attempt to separate the impact of decisions which affect the span by whether such decisions are personnel decisions or decisions regarding the nature of the organization itself. The theory has dealt with only the latter type of decision; the practice, however, may be more strongly affected by the former. The mathematical relations underlying the research must be more clearly specified and identified, especially the causal connectiveness among the variables and the linearity versus non-linearity of those connections. The definition(s) used must be clear and precise and perhaps alternative definitions need to be simultaneously explored.

Additionally, the new, exploratory model presented in this paper suggests that at least distinct criteria for optimization may be involved in span of management decisions. This would indicate that three distinct optima also exist. Research must clearly identify not only the organizational characteristics which may affect spans but also the criteria upon which any value judgments of "too large" or "too small" are to be based. It was suggested that a measure of organizational climate be included in future research in an effort to deal with the complexities of that model.

The span of management remains controversial. The many conceptual developments in the span must be carefully explored through research. That research must be carefully done and deal with the above issues if the concept of the span of management is to continue to have any place in management and organization theory.