PROPOSITIONS ON INFORMATION MANAGEMENT OF INNOVATION PROCESSES IN ORGANIZATIONS

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ABSTRACT

PROPOSITIONS ON INFORMATION MANAGEMENT OF INNOVATION PROCESSES IN ORGANIZATIONS

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It has been repeatedly postulated that communication, by providing the vehicle for social interaction in organizational settings, is the main, single determinant of success or failure of an organization. Past research and literature on the topic of organizational communication have failed to provide an integrative perspective for the scientific determination of the role of communication in organizational effectiveness or efficiency.

The present undertaking is aimed at providing such an integrated perspective, by which scientific research on organizational communication can be performed within the realm of practical implications.

Organizations, social units in which individuals group in search of a specific, predetermined purpose, are resources-allocation-optimizers. Communication, the transfer of patterns of matter-energy with symbolic referent, is the very essence of organizational activity.

Coordination, the purposive patterning of communication transactions, as opposed to their random distribution, is a necessary condition for the survival of any social unit. Management, or the decision-making approach, is the purposeful monitoring of the communication activities of an organization in order to achieve stated goals. We follow a decision-making approach in examining the role of communication in organized settings.

A managerial or decision-making perspective permits distinguishing three main functions of communication in organization: they deal with compliance and output--production--, with preservation and continuance--maintenance--and with change and output--innovation.

Organizations, in order to survive, have to change and adapt to changing environmental conditions. The innovation-communication function becomes decisive in the organization's perpetuation. Three dimensions are distinguished within the innovation-communication function: exploration--the process of scanning the environment in search for new ideas, creation--the process of fostering creativity, and diffusion, the process of dissemination of new ideas.

Computer technology has contributed to increase the speed and accuracy with which large amounts of information can be handled. Since the monitoring of these technological devices becomes also part of the

responsibilities of the communication manager for innovative processes, his general function is labeled information management.

Organizational effectiveness is defined as the degree of goal achievement; efficiency is defined as the ratio between effectiveness and cost.

Most past literature and research has placed emphasis on effectiveness of the communication processes; no study has yet been reported in which the measured dimension is efficiency.

By imposing a managerial, decision-making approach on the process of organizational communication, an integrated perspective is provided. The advantages of such a view of communication in organizations, are: (a) a macro-communication analysis allows relating the practitioners' needs to scientific inquiry, creating a linkage between them, (b) the general frame of reference that has been provided permits the study of causal relationships (communication and its effects on organized activity), (c) legitimizes the introduction of cost in the study of communication activities, and hence allows for the study of efficiency rather than only effectiveness, and (d) introduces the time dimension, points out the processual nature of communication, and increases the possibilities of generalizing from future research undertaken within the proposed framework.

The synthesis of research findings on organizational communication was done by stipulating propositions about the relationship of different variables. A typical example is Proposition 10.0, which states that: The more restrictions imposed on spontaneous channels of units devoted to creativity within an organization, the lower the effectiveness of the specific unit.

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CHAPTER I

A SITUATIONAL ASSESSMENT

This chapter contains a review of literature on organizational communication, an inspection of the most popular theoretical positions, an overview of the usual methodological tools that have either been applied or suggested for application to the field, and a summary of those aspects omitted in past research efforts.

Introduction

Organizations are social units in which individuals group in search of a specific, predetermined purpose.[1] Communication[2] is the linkage that allows

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[1] The term, "organizations," has been used in many ways, depending upon the interests and objectives of those who have studied the different aspects of organizational life. Etzioni (1964, p. 4) suggested that . . . "we can safely reserve the term organizations to refer to planned units, deliberately structured for the purpose of attaining specific goals."

[2] Berlo (1969, p. 1-3) states that . . . "Communication is a process involving the transfer of patterned matter-energy that carries symbolic information." He states (p. 1-1) that . . . "Everything man does involves some change in state of matter or energy. Given Mr. Einstein's expression of the relationship between matter and energy ($e = mc^2$), we can use the two terms interchangeably, and simply talk about matter-energy units."

individuals to achieve specific predetermined objectives through interaction.

Not only have particular disciplines evolved and flourished under both labels, but the search for the interrelatedness of the two concepts has captured the imagination and efforts of a wide variety of behavioral experts. A stream of related interests has transformed the study of the posited relationship into a multifaced, interdisciplinary venture.

Many confluents have added their contributions of theoretical formulations and empirical research data to compile an impressive amount of information that constitutes our present stock of knowledge. Executives and administrators, scientific management scholars, social psychologists, economists, sociologists, political scientists and, nowadays, communication scientists[3] have imposed their perspectives on this facet of organizational activity and incorporated their respective terminologies and professional biases into the subject.

The reasons for such a cognitive concern cannot be found exclusively in the intellectual challenge both concepts (organization and communication) undoubtedly posit to the initiated. The causes become apparent when

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[3]For a summary review of previous theory and research developments in the field, see Thayer (1967, pp. 70-115).

the theoretical implications of developments in both areas are matched with the practical potentialities of sound propositions to aid the decision-making necessities of those who maneuver social units into success or failure.

The reduced conceptual distance that separates organizations from the communication process that takes place within those social units, might be best described by Katz and Kahn's (1966, p. 223) assertion that . . . "communication . . . is the very essence of a social system or an organization."

Earlier, Barnard (1938, p. 91) stated that . . . "the structure, extensiveness, and scope of the organization are almost entirely determined by communication techniques." In recent years, organizations have confronted their members with a different perspective. They now work under the assumption of what has been termed the psychological contract,[4] in which mutual expectations and their fulfillment, rather than unilateral decisions are the basis for the interface of organizations and their members. As a result, the role of communications becomes even more determinant. Schein

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[4]For a detailed explanation of the characteristics and organizational implications of the psychological contract, see Schein (1965, pp. 10-13 and 63-65).

(1965, p. 104) posited the relevance of communication to more definite aspects of organizational life by summarizing that . . . "the organization expects its members to be committed, flexible and in good communication with one another, for the sake of over-all organizational effectiveness."[5]

The promises of social rewards derived from the study and explication of the role communication plays in organizations, were envisioned by McDonough (1963, p. 3) in the following statement: "The connection and conversion of energy in business information systems may require even more intensive analytical efforts. It is my impression that success in this field [organizational communication] will be more valuable to us as a society than that achieved in the development of atomic energy."

More so than in many areas of human knowledge, in this particular field independence of thought cannot be guaranteed anymore; criss-cross influences are perceptible everywhere, impeding clear-cut classification schemes resulting from the specific, mini-interest segments into which human beings have artificially divided systemic reality. But this interdependence of perspectives has also provided the field with ad hoc terminologies

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[5]Italics are the present writer's.

and new outlooks which are contributing to a decrease in conceptual barriers.[6]

A Review of the Literature on Organizational Communication

A review of the literature on organizational communication shows a growing concern, especially among scholars, to encompass the multitude of evidence that is available at the present time. Numerous bibliographies,[7] compilations of research findings[8] and efforts to develop theoretical positions toward the amount of empirical data that has been collected[9] are but one noticeable result of this assertion.

An inclusive conceptual framework is, unfortunately, still missing. As McGrath and Altman (1966, p. 9) pointed out, referring to the area of small group research . . .

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[6]Examples of these new technologies and outlooks are systems analysis, operational analysis, cybernetics, etc.

[7]Voos (1967), Weston and Schwartz (1967), Jain (1968), Reindl and Rivero (1969), and Correll (1969).

[8]Redding and Sanborn (1964), Miles (1964), Guetzkow (1965), Bass (1965), Shepard (1965), Leavitt (1965) and Jain (1968); Reindl (1969) suggested a methodology for integration of research in organizational communication, based primarily on McGrath and Altman's (1966) work on synthesis of small group research.

[9]Katz and Kahn (1966), Thayer (1967) and Berlo (1969).

"The rate at which empirical results have been adequately digested and integrated into theoretical formulations has not kept pace. If we continue to generate studies at even the present rate without a major leap forward in terms of integrative theory, we shall drown in our own data" and this pejorative process might well produce the anticlimax in the study of organizational communication unless the search for more encompassing perspectives is consciously intensified in the near future.

Pointing to the lack of a common, general framework within which to operate, Guetzkow (1965, p. 569) wrote: "Do we find in communications in organizations an area of study in which there is a special richness in contingent, interactive effects? Or is it merely that a clarifying perspective--which would make the pieces fall more simply into the whole--remains hidden?"

The ways in which theory and research studies were confronted in the past,[10] has contributed to the failure to develop a more encompassing, integrative view of organizational communication. The two most widely held theoretical views of organizational communication will be briefly examined.

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[10]For a critique of previous research, see Schwartz (1968, pp. 3-10).

The Theoretical Positions

(a) The machine-theory orientation guided most of the empirical research in ongoing organizations in the past; it assumed that organizations are composed of essentially independent parts whose unity is established by laws acting as rules for composition. As Schwartz (1968, p. 4) suggests, this position sustains that . . . "an organization is a social-machine designed to organize relationships between human parts in order to efficiently accomplish collective goals."

That particular outlook has a philosophical base which seems to imply that men were made for organizations, rather than organizations for men. It can be tied to the doctrine of the "rational-economic man"[11] which provided management with an excuse to manipulate, motivate, and control human beings solely on the basis of economic incentives.

The organizational communication studies done under this particular theoretical position[12] have placed

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[11]For a detailed description of the assumptions underlying this doctrine, see Schein (1965, p. 48-50). See also McGregor (1960) who posited these assumptions under what he labeled "Theory X."

[12]Significant studies undertaken within this approach are Simpson (1959) and Berkowitz and Bennis (1961) on communication patterns between hierarchical levels,

undue emphasis on the formalized, hierarchical, pre-planned communication structure.

This approach views the organization as a compilation of compliance-oriented roles, singling out individual or group communication behavior only during interaction through formally prescribed channels.

As Schwartz (1968, pp. 5-6) noted,

> The result is only a partial analysis which has restricted theoretic utility . . . . When the conceptual formulation underlying research is restricted to a view of communication as a form of control or a tool with motivational implications between superior and subordinate the fundamental role of communication as a functional information transmission process is obscured in terms of overall organizational dynamics.

It is difficult to disagree with the previous statements; the theoretical fallacies under which the machine-theory tradition operated and their consequential impact on the study of communication in organizations were apparently the stimuli that were conducive to the development of the "spontaneous-theory"[13] approach.

Read (1962) relating a subordinate's upward mobility aspirations to accuracy of upward communication, and Triandis (1959a,b) on cognitive similarity and effectiveness of superior-subordinate communication transactions. See also Dahle (1954), Burns (1954), Mischler and Tropp (1956), Walton (1959), Goetzinger and Valentine (1962) and Hinrichs (1964).

[13] Spontaneous-theory is used in this context to designate the school of thought in communication research that places the main emphasis on the study of the communication transactions within the non-official, sometimes called informal, communication structure. The development of these structures is spontaneous, as opposed to preplanned, official structures. A detailed explanation

(b) The spontaneous-theory orientation, which arose in response to the excessive emphasis placed by the machine-theory tradition on the study of the formal communication structure. The spontaneous-theory approach devoted its efforts to the study of the communication transactions that occur within the non-official, informal[14] communication network.[15]

Unfortunately, by becoming apologetic about the role that the spontaneous network plays in organizations, even with the help of rigorous methodological insights, this particular approach has still not contributed to the concrescence of the field, an integration which, as we have seen, is necessary.

However, the spontaneous-theory approach has contributed to a more encompassing view of the communication activities within organizations. The difference between both approaches might be stated as one of "how people are supposed to communicate"--the machine-theory--

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why the author has chosen to change the terms informal and formal for spontaneous and pre-planned will be provided in Chapter III.

[14]Berlo (1969), in conversations with the author, mentioned frequently the fact that the "informal" communication structure of an organization is "formal" to a large degree, i.e., it has hierarchical distribution, rules and procedures under which its members relate to each other.

[15]Significant studies in this tradition are, for example, Jacobson and Seashore (1951), Davis (1953), Weiss and Jacobson (1955), Weiss (1956) and Schwartz (1968).

vs. "how people really communicate"--the spontaneous-theory. The latter includes the communication transactions performed through the official, pre-planned channels of communication.

By placing the highest level of analysis on communication networks (or systems), the spontaneous-theory approach has contributed to the identification of several components or elements of this system; these components have been analyzed in terms of their communication behavior within the spontaneous network and their characteristics have also become part of the overall analysis of organizational communication. As an example, chains, cliques, dyads, liaisons, isolates, polarization nuclei[16]

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[16]Reindl (1968) suggested a different approach to the study of Walton's (1962) magnetic centers concept which postulated that the organization could be conceived as a communication network dominated by magnetic centers which attract messages and furthermore, that the attributes of these magnetic centers were authority, power, expertise and sociability; all but the last are closely related to the hierarchical position of the individual in the organization, reason why only the fourth and last variable yielded the highest and only significant values in the research undertaken by Walton. Reindl's contention was that polarization nuclei--individuals with large message attraction--should be considered independent of the hierarchical nodes of the organization and dependent of the individual communication style, for which variance two main variables could account: convergency, defined as the conscious or unconscious attempt to reduce the heterophily-gap with other organizational members, and March and Simon's (1958) concept of uncertainty absorption, defined as the process by which inferences are drawn from a body of evidence and the inferences, instead of the evidence itself, are then communicated.

or magnetic centers, and communication leaders have been studied by organizational communication research and the emphasis has been taken away from the formal, official, pre-planned communication structure of organizations.

A chain is defined as the interconnection of n number of transactional participants, at a given point in time, by means of patterns of matter-energy which carry symbolic content--thus, communication--in a communication system.

Cliques have been variously defined; Festinger, Schachter and Back (1950), stating a minimum-necessary criterion, viewed them as any subsystem in which at least three of the members interact mutually. Farace and Morris (1969, p. 9), in a more inclusive fashion, extended the previous approach to include . . . "individuals who interact with each other more frequently than with others."

The term is intended to designate those informal--not officially sanctioned by the organization--groups that arise in any organizational context as Schein (1965, p. 68) posits . . . "out of the particular combination of formal factors and human needs." Cliques, hence, are defined for the present purposes as groups of individuals who engage in patterns of heavier communication among themselves than with the rest of the organization's members. Acknowledging Festinger's et al. proposition, dyads will be excluded from forming a clique.

An interesting view is that suggested by Weiss and Jacobson (1964, p. 453) when they state that . . . "Groups should be defined in terms of their separatedness from each other, rather than in terms of inner-connectedness." This is apparently divorced from the view that the spontaneous theory approach has taken toward the study of cliques--concerning itself with the interrelatedness of different cliques in an organization.

Dyads are defined . . . "either as a subsystem in which two elements are engaged in mutual interaction (i.e., a <-> b), or a subsystem in which two elements are connected simply by one-way relations (i.e., a -> b)." (Guimarães, 1969, p. 29). The influence of sociometry or sociometrical measurements is clearly perceptible in the latter, one-way relationship;[17] within a spontaneous network, it seems rather difficult to conceive a one-way relationship as permanent.[18] By definition, communication is the transfer of matter-energy with symbolic content between at least two participants or participating systems;

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[17] It reflects the answers to sociometric-choice questions such as; "With whom do you communicate most often?", which does not necessarily mean reciprocal choice, i.e., the one chosen also chooses the same individual that choose him.

[18] Birdwhistell (1959, p. 104) posited that . . . "An individual does not communicate: he engages in or becomes part of communication . . . ."

a unilateral, unidirectional transference could be: (a) acceptable in the short-run, (b) caused by imposition of the hierarchical relative position of both participants--in such a way as to impede any retiral of the receiver--or, (c) due to the type of sociometrical question asked. Our present contention is that sociometry relies heavily on perceived relationships, which might exclude or introduce more than the effectively existing relations.

Isolates, as their name suggests, are those individuals that "neither seek nor are sought by any member of the communication system" (Guimarães, 1969, p. 29). Here, the sociometric bias becomes apparent again; aspects like the fragility of human memory, or the temporary nature of certain communication transactions are implicit in the determination of these elements of the communication network.

Polarization nuclei or magnetic centers, have already been defined in the preceding pages; some individuals have the ability to become centers of message vectors, which places them in an advantageous position within the organization, if the basic proposition that information is power, is accepted. They concentrate a larger amount of message-inputs than the rest of the individuals in an organization.

Finally, communication leaders have been detected also in the communication structure of organizations. Guimarães (1969, p. 29) defines such an element as one who . . . "is looked upon by his peers as both, a recipient and a source of communication." We would suggest that becoming a leader in an organizational setting, requires first becoming a polarization nucleus of information within any given social system, regardless of the degree of formalization of that system.

The Methodological Tools

One way of classifying the numerous research methodologies that have been used in organizational communication, is, as suggested by Downs (1969, p. 1) according to: . . . "(1) the nature of the data collected, (2) where the information is collected, and (3) the techniques used in data collection."[19]

According to the nature of the data collected, the tendency in the past has been one of emphasizing the

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[19]For a classification of research methods in organizational communication, see Blau and Scott (1962, pp. 10-11) who divide methods according to (a) the purpose, (b) the techniques employed and (c) the research design used. In the same order, they describe under (a) exploratory, descriptive and hypothesis-testing, under (b) observation, interviewing and analysis of documents, and under (c) sample survey, controlled experiments and field studies.

individual behavior in groups, using the group as a manipulable stimulus, rather than group behavior as such, phenomenon posited by Rogers and Bhowmik (1969, p. 1) as one of . . . "ignoring the importance of communication relationships as units of analysis."

The reasons for such a misleading approach to the study of organizational communication, can be found in the explanation given by Rogers and Bhowmik (1969, p. 2):

> We erroneously have assumed that if individuals are the unit of response, they must also be the units of analysis. A few recent communication researchers demonstrate that even when the individual provides the response data (as perhaps must ultimately be the case in the social sciences), the dyadic communication relationship, the communication chain or network, or a sociometricly-determined communication clique within a larger system, can be the unit of analysis.

According to where the information has been collected, there seem to be two most common ways of gathering information: (a) in the laboratory setting,[20] and (b) in ongoing organizations.[21]

Among the many constraints, two appear as major: financial reasons, and the unwillingness of ongoing

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[20]All the studies carried out under the influence of Lewin (1948), such as those performed by Bales (1950), Bavelas (1960), Heise (1951), Leavitt (1951), and others.

[21]For a review of these studies, see Blau and Scott (1962) and Guetzkow (1965).

organizations to submit themselves to a situation in which, as Crane (1965, p. 275) states, "the executive suite comes under the scholar's microscope"; the laboratory method has been used--and abused--to the extent that it is difficult to recognize presently if the current generalizations about organizational communication behavior are trustworthy or not.

The laboratory method, also called small-group research, necessarily imposes restrictions on its findings, since it has not been proven possible to extrapolate results to ongoing organizations. As Guetzkow (1965, p. 535) observes . . . "The richness of materials at the individual and group levels has induced extrapolation of findings perhaps inappropriate for rigorous analysis of communications in organizations."[22]

The implications of using the laboratory method have been synthesized by Crane (1965, p. 510) in stipulating that

> The laboratory experiment is a source-oriented communication situation, which gives the researcher a high degree of control. He can introduce and exclude stimuli at will and specify the order in which they will appear. Instead of asking questions, he can create laboratory analogues of real-life situations, and observe the ways his subjects respond to them. He can and does disguise the purpose of his experiments, often by giving a plausible but false explanation of

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[22]Italics are the present author's.

> Their purpose. He can use novel tasks and novel situations, and so eliminate the effects of previous habits.

The methods used in studying communication cover quite a range, as Bass (1965, p. 226) shows when he enumerates those used in the past as, . . . "case analysis, sociometry, position analysis, discretionary analysis, analysis of communication, comparative analysis, laboratory exercises, business games and mathematical simulation."; in addition, he lists the survey, field and laboratory experiments.

The techniques used in data collection range over the whole spectrum of possibilities. Case studies, in which the observer has limited himself to making random notes on certain communication behaviors that seemed important is one end of the continuum.[23] Rigorous statistical analysis, with the help of matrix analysis,[24] graph

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[23]Sanborn (1962) used the technique of following executives in an organization for four hours each, making systematic and unsystematic notations. Davis (1953) studied communication behavior as participants passed a certain spot in an organizational context; the latter technique is called "duty study."

[24]For a detailed explanation of matrix analysis applied to organizational communication, see Guimarães (1968), also Forsyth and Katz (1946), Festinger (1949), Hohn (1953) and Katz (1947).

theory[25] and other topological analytical procedures,[26] has also been applied to the study of organizational communication, reflecting the other end of the spectrum.

Field studies have gained more attention in recent years;[27] most of them have taken the form of field surveys and allow a closer insight into the problems of communication faced by ongoing organizations.

Computer simulation has become, just recently, an important tool for examining and understanding organizational communication behavior, on the basis of the possibilities it offers for varying communication patterns in a short period and relating these changes to the manipulation of other characteristics of an hypothetical organizational context.[28]

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[25]For a detailed explanation, see König (1936), Berge (1962), Flament (1963) and Ore (1962, 1963).

[26]For a description of topological analytical procedures used in communication in organizations, see Schwartz (1968).

[27]Two recent studies undertaken by members of the Department of communication of Michigan State University, are Farace and Morris (1969) on communication in a Residential College and D. K. Berlo, R. V. Farace, D. MacDonald, M. H. Reindl, J. Berley and R. Connelly (1969), a study of communication patterns related to personnel turnover, Chase Manhattan Bank, New York.

[28]For a description of the applications of computer simulation, see Carroll and Farace (1968, pp. 61-75).

A Critique

Generalizability of findings

The main problem faced, at the present, by research and theory on organizational communication, is the one that is related to the generalizability of findings.

The findings from small group research have been extrapolated quite liberally to ongoing organizations, giving as a constant the environmental conditions and the selection of subjects, the last characteristic being especially inappropriate to any intent of generalizing. As Guimarães (1969, p. 17) points out, most of the experimenters in this research tradition . . . "prefer to choose cases (small groups) that they can observe under special conditions, or that are amenable to experimental manipulation. Thus, representativeness is sometimes sacrificed because the researcher's design involves also the requirements of the analysis."

Maybe the unfortunate truth is that so many authors, given the limited scope of field research in the areas of ongoing organizations, have joined the bandwagon simply by inertia. Guetzkow (1965, p. 535), who has contributed in many ways to the development of a theoretically integrated approach to organizational communication, cannot resist the temptation of generalizing

findings from the small group research, when stating that . . . "Yet, with the dearth of studies about organizations, either from the field or laboratory, one can but join with others in speculation." Bass (1965, pp. 285-286) joins in by stating that . . . "While it may be impossible to translate[29] these experimental findings directly to organizations, the results are suggestive . . . ."

But then, even in known field research studies, the enthusiasm for generalizing seems unlimited; regardless of the sampling procedures used within the organizational context that has been studied, and assuming statistical significance of the findings, the question is still: Are the findings within one organization generalizable to all organizational contexts? Elementary sampling procedures suggest that for representativeness, at least thirty, if possible random, respondents in a sample should be taken in order to derive acceptable conclusions about the population studied. Yet, from the population--all existing organizations--we are generalizing from one, and one moreover, which is atypical, since the criteria for chosing it are based on its availability for study instead of other, more rigorous considerations. One organization, or even part of that organization, has been studied and

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[29]Italics are the present author's.

the conclusions derived from that specific survey have been extrapolated in a rather precarious fashion[30] to generalize that--in an organization, when this happens, that follows. Such a research procedure does not help when, as March and Simon (1967, p. 5) point out, the problem we are facing is that of . . . "many assertions, but little evidence to determine--by the usual standards of public testability and reproductibility--whether these assertions really hold up in the world of fact."

Etzioni (1964, p. 419) acknowledges that future break-throughs in this area . . . "require the development of methods of data collection which will make possible the gathering of quantitative materials on organizational variables, and methods of data processing which will allow us to draw conclusions concerning the state of organizational variables from information collected from or about individual respondents."

The social bias

A strong social or democratic bias is perceptible in the social science research tradition when applied to organizational communication. It is manifest in the

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[30]Blau and Scott (1962, p. 111) report only one study on interorganizational research in which data were restricted to the influences of formal organizations on work-group structure; no mention whatsoever of the communication problems involved.

literature by implicitly or explicitly favoring the idea that communication in organizations should be as "free" as possible; the idea that "more communication is good," and, obviously, that restrictions on communication are "bad," has created a vilified view of any attempt to monitor or to coordinate communication transactions in an organizational milieu.[31] The main reason appears to be the interpretation of terms like control and coordination, which have been confused in scholastic terminology with the arbitrary imposition of authority, for human manipulation, to the detriment of those who are manipulated; it implies frequently a unidirectional event, from source to receiver and its main objective has been stated as to achieve compliance.

But men are controlled by their environment and, at the same time, exercise control over it, via communication, in a reciprocal relationship; as Ascroft (1969, p. 11) states, this relationship requires . . . "an interactional view of the process of communication in which source and receiver are temporarily bound in mutual dependence, and in which messages convey information about new ideas as well as providing cues, at a usually subliminal

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[31]Katz and Kahn (1966, p. 224) discusses the view that more communication is good, and call it "a gross oversimplification."

level, which allow source and receiver to define relationships vis-a-vis each other."

Control is simply the process of verifying and regulating events in order to maintain them within certain patterns which have been agreed upon previously. Organizations, like any other social system, require coordination for success and survival,[32] and coordination without control is impossible. Societal activity without control is chaos and anarchy, by definition antagonistic to the very concept of organization.[33]

From the preceding discussion, it seems quite obvious that, no matter what his personal and intellectual attitude, the scientist who studies processes which happen to exist within an organization has to develop an understanding of the main function of organizations, if the goal of the undertaking is successful research.

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[32]Gardner (1965) examines organizations from the point of view of specific requirements for survival and stipulates that coordination is a basic sine-qua-non requisite for perpetuation.

[33]Olsen (1968, p. 2) states that . . . "social organization is the process of bringing order and meaning into human social life"; March and Simon (1967, p. 4) posit that . . . "High specificity of structure and coordination--as contrasted with the diffuse and variable relation among organizations and among unorganized individuals--marks off the individual organization as a sociological unit. . . ."

The focus of research and theory on organizational communication

Words are elusive in themselves; this might be the reason why many efforts in the realm of scientific inquiry in organizational communication have failed to provide a satisfactory answer to the need for theoretical integration and generalizability mentioned earlier. An organization has been defined traditionally as an autonomous whole, as one entity, with a specific predetermined goal to achieve.

However, reality seems quite different; if the basic criterion for the determination of exclusiveness--organization or non-organization--is the goal they pursue, no wonder that the numerous attempts to conceptualize a typology of organizations have failed to provide a definite answer to the study of endogenous processes (within the organization itself).[34]

The so-called "organizational goals" are only the composite of many, frequently antagonistic group

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[34]For approaches to typologies of organizations based on their goals--assumed or stated--see for example Blau and Scott (1962, pp. 40-45) in which a review of previous attempts is shown, and Bennis (1962, p. 442) in which the suggested typology is related to measurements of organizational effectiveness. See also Katz and Kahn (1966, p. 147).

and/or individual goals;[35] but apparently, social scientists seem to assume--as evidenced throughout the pertinent literature--that organizations are entities with singularity of purpose, and little or no attention has been placed upon the multiplicity of different goal-seeking behaviors within the given, specific organization.

Communication is a purposive activity in which individuals engage in order to achieve some goal, i.e., to change someone else's behavior. When studied in an organizational context, not relating the communication processes to the goals--explicitly stated or implicitly demonstrated by organizational behavior--it seems that a large potential in terms of verifying the effectiveness of communication is wasted. To ascertain simply that a "certain" behavioral change has taken place due to "certain" communication activities, is an aimless effort if unrelated to its effects upon the goal-seeking behavior of the organization itself.

The question then becomes one of finding goals that are operational;[36] given that the repertoire of

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[35]Etzioni (1964, pp. 10-16) discusses to a certain extent the phenomena of goal-multiplicity, goal-displacement, goal-succession and even the multi-purpose organization--the one that simultaneously and legitimately serves two or more goals.

[36]Berlo (1967, p. 2) states that in order to explicate a construct, two linkages should be attained . . .

objectives of organizational activity is almost unlimited, the present suggestion is that the level of analysis should be lowered to the point where identifiable objectives, operational goals are present.

The time dimension

Communication has been described as a process by which two or more participating systems exchange patterned matter-energy with symbolic content, and by definition, process is the occurrence of a certain event over time. Time is the main factor that allows a mode distinction between state and action, or structure and process, and as McGrath and Altman (1966, p. 72) state . . . "This distinction is essentially in the temporal dimension; structure implies a static temporal referent, process implies movement or change through time."

But communication research in organizational settings has never devoted efforts to include the time dimension as a variable, and that omission, although it provides an axenic, X-ray picture of the communication structure of certain organizations, tells very little of the functioning of the communication process itself.

"The first requires the term to be linked to nature, to physical events. This linkage represents the scientist's efforts to impose a perceptual structure on nature, and consists of specifying a set of operations. When these operations are performed, the resultant event in nature is the referent of this term." and further . . . "Typically this kind of linking activity is referred to as operationalization. . . ."

We would gain a much more comprehensive understanding of the role played by communication processes in organizational milieus if we had answers to questions such as: Do liaison individuals remain in that role over time? To what extent are cliques a permanent phenomenon? What are the variables that account for the variance in dyadic communication transactions, overtime, within organizations?

The cost dimension

Still another implicit assumption underlying past research on communication is that availability of financial resources is a given. They have been disregarded as a variable in spite of the fact that organizational decisions are, if not solely, at least primarily determined by the relationship between cost and effectiveness.

Organizations are, by definition, resource-allocation-optimizers, hence financial constraints impose a major limitation on communication activities within an organizational context. Prescribing--simultaneity of channel usage to increase accuracy of the message--becomes a trivial statement in an ongoing organization, regardless of the validity of the proposition itself, if unrelated to the cost-benefit analysis of the channel strategy.[37]

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[37]Guimarães (1969, p. 6) is one of the few authors that ask questions such as . . . "which network involves the lowest communication cost?"

Two subdimensions can be distinguished within the cost aspects of organizational communication (a) the amount of financial resources necessary for implementing a given communication strategy, and (b) the amount of time spent by the transactional participants in communication. Perhaps the latter aspect, time spent communicating, should in turn be related to the content of the transactions and compared with the objectives of the organizational setting in which the communication transactions occur.

From the preceding analysis, it is noted that (a) communication, as a process, can only be studied over time, (b) that communication cost is an important yet neglected variable in determining the communication process within organizations, (c) that organizational goals--taken as an autonomous whole--seem a too elusive concept to be operational, hence subject to measurement, and (d) that communication processes in organizations require some degree of control and coordination in order to perform a constructive function within the organization.

These interrelated, interdependent elements suggest the next step, which is to examine organizational communication from a systemic perspective. This task will be done in the following chapter.

CHAPTER II

A SYSTEMIC VIEW OF INNOVATION MANAGEMENT[1]

From the situational assessment of organizational communication literature and research done in the previous chapter, it is clear that an integrative perspective is needed in order to impose some structure on the disarray of research and speculation findings now available.

This present chapter is aimed at providing such an integrative perspective, (a) by means of examining organizational[2] communication as a system of interrelated

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[1] Innovation management, from a communication point of view, is defined as the purposeful monitoring of the communication activities in an organization, in order to foster (a) the dissemination of new ideas within that organizational context, (b) creativity in the organization, and (c) the exploration or search for new ideas. It will be used interchangeably with innovation-communication management, with management of change, and with management for innovation.

[2] Organizations, as posited in the previous chapter, are entities in which social grouping occurs, with the purpose of achieving specific goals. In this and subsequent chapters, organizations will be understood as formal organizations, namely those in which . . . "the goals to be achieved, the rules the members of the organization are expected to follow, and the status structure that defines the relations between them (the organizational chart) have not spontaneously emerged in the course of social interaction but have been consciously designed a priori to anticipate and guide interaction and activities." (Blau and Scott, 1962, p. 5.)

communication activities, and (b) by imposing on this systems view, a decision-making approach.

The Managerial Approach

If an organization is viewed as a large information processing system,[3] with predetermined goals, which works under the assumptions of output maximizing and input minimization, a decision-making perspective[4] is a perfectly legitimate way of approaching the problem of studying organizational communication.

Forrester (1962) and Albaum (1967), suggested that management is the process of transformation between information and action; furthermore, that managerial success is determined by (a) what information is chosen, and (b) how the previously-mentioned conversion is done.

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[3]Leavitt (1958) proposed such a view of organizations.

[4]This approach, also called management, is defined as . . . "the accomplishment of desired objectives by establishing an environment favorable to performance by people operating in organized groups" (Koontz and O'Donnell, 1964, p. 1). It is another process of communication, although at the intrapersonal, organismic level; informational inputs are received (purposively sought or obtained by random chance, processed, evaluated and compared with different alternatives). The specific alternative that possesses the highest pay-off for a given course of action is selected, and that alternative is made known or implemented via communication again. For a detailed explanation of the decision-making process viewed as a communication event or sequence of events, see Dorsey (1957/58) and see also the decision-making process conceptualization by Cyert and March (1963).

Unfortunately, as Katz and Kahn (1966, pp. 282-283) posited . . . "There are always limitations with respect to knowledge of alternative courses of action, of the relative utility of these alternatives, and of the consequences of these alternative courses of action." These facts made Blau and Scott (1962, pp. 36-37) formulate the proposition that . . . "Individuals are not capable of making complex decisions rationally. The function of the organization is to limit the scope of the decisions that each member must make."

It can be concluded that decision-making is dependent upon (a) the organizational structure,[5] (b) the task to be performed,[6] (c) the type and amount of available information, and (d) the way in which the available information is translated into action by the decision-maker.

Berlo (1969, p. II-5) stresses the importance of the decision-making, managerial approach, by stating that . . . "The management of information systems has

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[5]The interdependence of decision-making and organizational structure has been posited and explained in detail by Dill (1958). Also, Crane (1965, pp. 268-269) suggests that decision-making is dependent upon the rules of the organization, and that these rules . . . "reduce uncertainty."

[6]The task to be performed by an organization or a subsystem of that organization, determines the structure of the organization, to large extent.

become one of the central competencies needed in modern society. It does little good to generate information if we cannot develop systems for storage and retrieval, for dissemination and utilization, and for the discarding of obsolete information."[7]

The whole concept of information management has evolved only in recent years. It is at the stage of development that Marketing was--some 20 years ago--when firms started to concede that attention should be given to the multiplicity of factors involved in "managing the sales," as it was called in the early 1950's.

It has been postulated that, to a large extent, information, the way in which this information is handled, and the output of the process involving information exchange, determine the decision-making process in an organization. On the other hand, the implicit postulate of Berlo's call for competencies in managing the information system, is coordination, the coordination of patterns of matter-energy. If symbolic content is added,

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[7]Berlo's postulate could be misinterpreted if a definition for information is not provided. He defines information by stating that there are discriminable units of matter-energy, on which pattern is imposed; in his words . . . "Information, then, involves the imposition of pattern on previously undifferentiated matter-energy." It can be stated that information is different from communication; in order to become communication, information must also carry symbolic content. In other words, communication is a sub-set of information. For an analysis of various types of information, see Morris (1968).

it becomes the coordination of media, structure, time, messages, means of storage and retrieval, and cost, in order to achieve some predetermined objectives. As Katz and Kahn (1966, p. 225) posited . . . "To move from an unorganized state to an organized state, requires the introduction of constraints and restrictions to reduce diffuse and random communication to channels appropriate for the accomplishment of organizational objectives."

In sum, the decision-making approach to organizational communication, suggested in the present chapter, presents several advantages over previous views of the field by:

(a) providing a context for the determination of causal relationships, i.e., a certain decision about communication elements, the cause, can be measured in terms of the effect produced, which has been stated as related to the organizational effectiveness (or efficiency),

(b) allowing the cost dimension to be introduced, since the alternative chosen has to be compared with the cost-benefit analysis of the media used,

(c) permitting the study of effects over time, and therefore becoming a study of the communication process, not of the structure, and,

(d) permitting the study of integrated variables,

i.e., the study of strategic[8] variables, which might be a composite of several individual variables, like channel variables, message variables, structure variables, etc.

By accomplishing the previously described objectives, the decision-making approach permits the study of communication processes in ongoing organizations and, at the same time, facilitates the linkage between research and the practitioners, pointed out in the preceding chapter.

Compared to the approaches taken in the past, the present view of organizational communication can be stated as studying the operational aspects of communication in formal organizations; it becomes a matter of what has to be done to the communication elements in the organization, in order to achieve certain desired end-effects, as opposed to the previous approach that can be stated as one aiming at the question--what happens in the

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[8] Organizational strategies are defined as designs that result from overall planning procedures in an organization; the planning is done on a large-scale basis and implies an interdependent view of the different elements that have to be taken into account in order to achieve a specified goal. Strategies pertain to the long-run; meanwhile tactics, defined as the expedient of seeking the objectives designated by strategies, pertain more to the short-run in organizational life. For a discussion of long-run and short-run planning, in organizations, see Drucker (1959).

communication system of the organization? It is the author's contention that the first mentioned approach is no less scientific than the second one, since by no means does science have to be at odds with practical implications.

The present view is not aiming at replacing, but rather at complementing, previous approaches--the machine-theory tradition and the spontaneous-theory view--by providing a unifying framework in which both approaches appear to be useful.

Information and Communication

Information, as it has been previously defined, consists of patterns of matter-energy which imply changes in the levels of uncertainty. Communication occurs when symbolic content is superimposed on these patterned amounts of matter-energy.

Frequently, information has been equated with changes in the uncertainty levels[9] at a given point in time, thus information will be more valuable if it provides a correspondingly larger reduction in the relative amount of uncertainty, which might be expressed in terms

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[9] Uncertainty is defined as a low degree of predictability of events, in a given setting, at a given point in time. For discussion of uncertainty and its relation to communication, see Berlo (1969, pp. III-14,15).

relative to the uncertainty counterpart, perfect information.[10] Information can then be stated as a degree of knowledge about uncertain outcomes. Rapoport (1966), defines information quantitatively as . . . "the improvement of one's chances of making the right guess."

From the point of view of a decision-maker in an organization, the types of information available seem important, since they will contribute to the decisions which have to be made. Figure I illustrates an attempt to provide a classification of information from the decision-making perspective, although, as March and Simon (1958, p. 1) assert . . . "We are dealing with empirical phenomena, and the world has an uncomfortable way of not permitting itself to be fitted into clean classifications."

The reasons for calling the process of monitoring communication activities in an organization information management instead of communication management, will become evident after the diagram in Figure I is analyzed.

There is a considerable amount of information at the disposal of anyone who wants it or is able to use it; but human beings, who are the principal components of any organizational system, have a limited, reduced capacity

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[10]Perfect information is an unattainable goal. It is assumed only for conceptualizing uncertainty. Perfect information would imply total certainty, which is not an acceptable postulate if one agrees with the proposition that everything is relative.

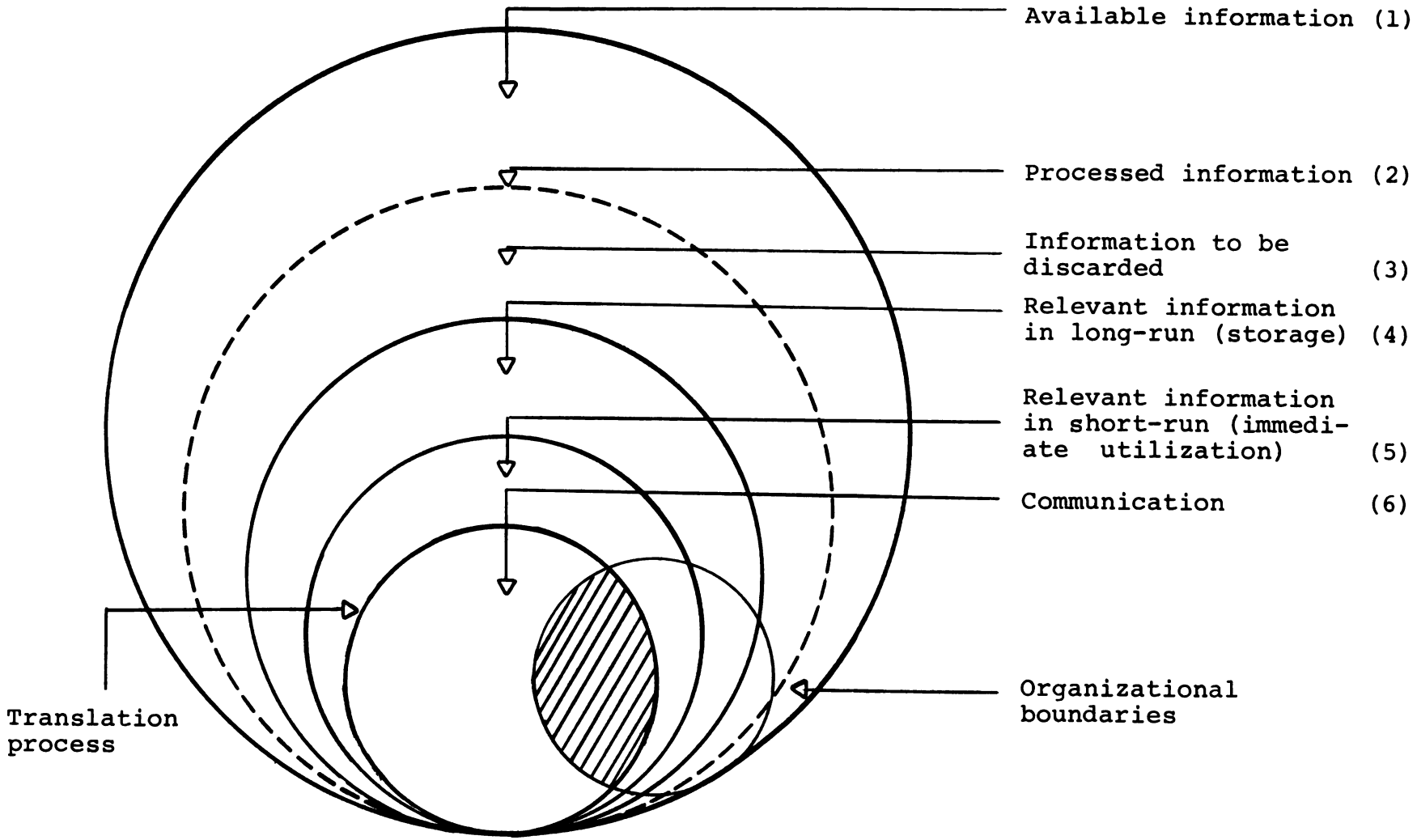

Figure I. Information for decision-making in organizations

to handle information. Hayes (1962) studied this particular aspect of decision-making and concluded that if more than four alternatives are presented simultaneously to an individual, his decision-making efficiency decreases in a positive relationship with the number of additional alternatives offered to him. Raymond (1962) went further, by observing that executives can absorb only about 1/100 to 1/1000 of the information that is available and relevant to their decisions. This allows, then, for establishing a difference between the available information and the processed information (1) and (2) in the diagram.

Another part of the processed information has to be discarded because it is (a) obsolete, or (b) inadequate to the general objectives the organization is pursuing. This type of information accounts for what has been shown as (3) in the diagram.

Of the remaining information, some has to be classified as related to the organizational goals, but with no immediate application, which means that it will not be discarded but stored[11]--either manually or by means of mechanical or electronic devices--for future use in the organizational context: No. (4) in the diagram.

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[11]For detailed explanations of the process of storage and retrieval, see Anderson Jr., et al. (1962); also Evans and Hague (1962), Dearden (1964, 1965), Diebold (1965), Roland (1961) and Burlingame (1961). For the relation between human beings and technological devices, see Bass (1965, p. 266) and Olsen (1968, p. 27).

The relevant information, for short-run decisions, will be used and maintained until the decision is made. It carries information, the immediate application of which will decide the tenor of the decision itself, in addition to previous inputs of information given to the decision-making unit, (5).

Finally, when symbolic content is superimposed on this information, it becomes communication. But for this to occur, a translation process has to take place; information--even that which has reached the stage of constituting useful information in the short-run--has been received in a fashion that impedes its immediate application. It has to be translated into the organizational code, by imposing a specific symbolic structure on it; then . . . communication.

Hence, information management is a more encompassing function than communication management; the former has to deal also with information that has not been classified and translated, although its final objective is the monitoring of the communication system. The use of computerized means for speeding up certain steps of the process is recognized as helpful and necessary--given the information explosion of the last decades--nevertheless, as Thayer (1967, p. 79) points out . . . "the sheer increase in speed and extent of data integration across functional boundaries has not

solved the basic questions of what?, where?, who?, when?, how?, and how much? In fact, such problems have actually been intensified by data hardware and software technology." The only answer seems to be the degree to which human beings are able to study, understand and explicate the role of information management.

Communication, the process of transference of patterns of matter-energy with symbolic content,[12] is, as stated, the final concern of information management. When analyzing individual components of the system of communication in an organization, we are arbitrarily dividing a seamless subject matter for the sake of better understanding of its function. The author is well aware of the fact that definitions given in precedent pages are not all-encompassing; as Newman (1966, p. 56) suggested . . . "The epistemological notion that a definition must account completely for that which it defines is impractical and should be rejected."

Organizations shape communication and vice-versa; Thayer (1967, p. 86) pointed to that particularity when stating that . . . "the emergent organization provides

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[12] Berlo (1960, p. 24) points to the processual nature of communication by stating that . . . "If we accept the concept of process, we view events and relationships as dynamic, on-going, ever-changing, continuous . . . . it does not have a beginning, an end, a fixed sequence of events."

significant constraints of various sorts on the behavioral systems involved. The communication that occurs is therefore in large part a function of the overlapping organization contexts in which it occurs." Blau and Scott (1962, p. 195) share this view when stating that . . . "The social environment influences organizations--their internal structure and their relations with one another--but there are also feedback processes through which organizations influence their environment."

Feedback is another elusive concept which determines in a certain sense the processual nature of communication transactions; Mehrley (1969, p. 4) suggests that feedback can be understood as . . . "a tool man can use to evaluate his success in affecting his environment." In a certain sense, feedback has been considered as an "answer" to a communication intent--it has not become a transaction yet, since only one participating system has intervened. This conceptualization is at odds with the idea of communication being a process, since it has been stated that communication has no beginning and no end.

Besides, intent appears to be of paramount importance in the labeling of this part of the process (feedback); it is possible to distinguish--from the point of view of the source of communication activity--two types of subprocess that appear as incidental: the one by which an answer to a certain communication decision

has been provided--spontaneously on the part of the "receiver"[13]--and that by which purposively sought answers to a certain communication activity are obtained. The first one will be called "feedback," and the latter will be designated as retrocommunication.[14]

Retrocommunication is, in intraorganizational terms, the equivalent of "intelligence" applied to extra-organizational communication. It is the present author's contention that feedback--the spontaneous providing of information about certain previous communication activities--cannot be left to chance, and that some built-in devices in the communication network have to be created in order to obtain information at the time and in the way in which it is needed to change tactical communication decisions.

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[13]The differentiation between source and receiver is an arbitrary classification, since communication is a process, without beginning or end.

[14]Retrocommunication can be equated with the concept in Marketing Management called "marketing intelligence"; for a description of the process itself, see Brink (1964), and Kelley and Lazer (1967). Katz and Kahn (1966, pp. 248-249) label a somewhat similar concept, "operational feedback," but in a more restricted sense; they state that . . . "It is frequently not informative about the performance of work groups or of individuals, and it does not deal with the effectiveness of social-psychological practices of the organization in carrying out its mission. . . ."

The Functions of Organizational Communication

As described by Berlo (1969, pp. IV-8,9), communication performs three specific functions in an organizational context: production, maintenance and innovation. He describes these functions in the following terms: . . . "getting a job done (production), exploring new behavioral alternatives (innovation), and keeping the system . . . and its components . . . functioning (maintenance)."[15]

There seems to be a terminological confusion in current literature on the topic; the terms sub-system and function are used interchangeably, and when applied to communication they become almost indistinguishable. The contention of this paper, though, is that if the communication process is considered to be the system, any subdivisions of it can be labeled sub-systems; but considering the communication process as a functional

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[15]Thayer (1967, pp. 94-95) suggests a somewhat different classification of the communication functions: (a) operational, (b) regulatory and (c) maintenance and development. Berlo's division seems more adequate for the purposes sought in this paper. Katz and Kahn (1966, p. 86) suggest the following types of functions in organizational contexts: production, maintenance, supportive, adaptive and managerial; unfortunately, the authors do not relate these structures to the communication activities going on within the organization.

process in an organization, it seems more adequate to talk about functional units, components or functions of that overall whole, which is communication.

The production-function[16] of communication can be stated as composed of those communication activities that are aimed at insuring compliance with the system's goals. An instructional pattern and a review procedure can be distinguished within this particular function, the former aimed at socializing members of the organization in order to instruct them in the patterns of accepted social behavior within the organizational boundaries, and the latter in order to ensure that compliance with these norms and values has been achieved.

The maintenance-function of communication aims at regulating the organization in such a way as to achieve permanency and regularity in the functioning of the system. Its mission is to ensure that no dangerous deviations from rules and procedures may threaten the system's survival. Maintenance aims at standardization. Paradoxical as it may seem, frequently the maintenance function is working against the survival of the

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[16] Production is defined in this context as total output, not to be confused with physical objects only; as a matter of fact, ideas or, in general, intangibles, can also be the unit of output of an organization. Productivity, defined as units of output per given units of input, is a concept aiming at measuring the production performance.

organization; Gardner (1964) posits the sine qua non requisite for the survival of ongoing organizations, as one of renewal, of change, of searching for different, new patterns; maintenance communication appears to strive against this stipulated goal. The reason for the existence of this discrepancy is evident, if simultaneous activities are conceived; at the same time as an organization is pursuing the continuance of its operations in the way it has been done in the past, certain activities within the organization are aimed precisely at the opposite, namely the development and creation of means for organizational survival, i.e., innovation.[17]

This leads to the third function of communication in organizations, namely, the innovation-function. Its mission is to search for, identify, select, disseminate, and foster means of survival for the organization. It concerns itself with the . . . "search for new ways of doing things, for new things to do" (Berlo, 1969, p. IV-9).

The apparent antagonism between the maintenance and innovation functions is avoided if, within systemic

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[17] Innovation has two different connotations as used in this paper; as Rogers (1962) defines it, innovation is a new idea (or perceived as new by the individual). It is also used to designate a function to be performed in organizational life. Both connotations imply change.

reality, maintenance is assumed to be a strategy for the ongoing organization as a whole, and innovation is restricted to communication strategies aimed at certain specific units of the organization, whose task is, precisely, to establish vigilance of the environment and to provide the ongoing systems with means for survival, or innovations.

Figure II is a paradigm of the three functions of communication in organizations.

The Innovation-Communication Function

Innovation, the "survival function" of communication, is one of the least studied in organizational contexts.[18] Traditionally this function has been seen as a continuance of the process of diffusion of innovation[19] with emphasis on the way in which innovations are disseminated throughout an organizational setting.

But innovation management, or the purposive monitoring of change in organizations, is more than only diffusion; three dimensions can be distinguished within this function of communication: (a) the process that

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[18] Berlo (1969, p. 9) states that . . . "The techniques of effectively performing this function have not been so well explored . . . ."

[19] See for example, Rogers et al. (1968), Jain (1968), Rogers and Jain (1968).

FUNCTIONS	SUB-FUNCTIONS	OBJECTIVES
1. Production	a) Instruction (Socialization) (Resocialization)	Compliance
	b) Control	Output
2. Maintenance	Maintenance of self-concept	a) Preservation
	Maintenance of interpersonal relationships	b) Continuance
	Maintenance of innovation and production functions	
3. Innovation	Diffusion	a) Change
	Creation	b) Output
	Exploration	

Figure II. A paradigm of the communication functions in organizations. Partially adapted from Berlo (1969).

aims at the dissemination of new ideas into a system, (b) the process of fostering creativity within the system, for endogenous exogenous application,[20] and (c) the process of scanning the environment in search of new ideas, exploration.

As Kahn et al. (1964, p. 135) point out, "Innovation provides adaptive flexibility for what might otherwise be a dangerously rigid bureaucratic structure." Kelley and Lazer (1967, p. 276) go even further by suggesting the following activities to be performed by innovation managers:

1. Acceptance of the inevitability of change and innovation by management,
2. programmed perception of new . . . needs and of dysfunctioning in the system,
3. relating . . . opportunity to corporate resources,
4. specifying innovistic opportunities of the firm,
5. identifying practical alternative strategies,
6. determining the expected profitability of each of the major strategies,
7. making a decision on innovative action,
8. promoting the innovation, and
9. assuring . . . acceptance of the innovation.

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[20] Exogenous application is defined as the implementation of the new ideas that are aimed at the larger environment, from the point of view of the organization itself. Endogenous application is defined as new ideas, whose ultimate effect will be a change in the internal procedures, structure or rules of the organization.

Managing for change, or innovation management, is, as a matter of fact, commonly done in organizational milieus; furthermore, communication is already used in order to foster change in organizations.[21] The difference between what is actually done and the way it should be done in the future, is simply a degree of emphasis and expertise.

In spite of the awareness by the present author of the problems involved in modelling,[22] a parsimonious model of the innovation communication function is developed in following pages, in order to provide a visual referent for the analysis of the function itself.

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[21] Koontz and O'Donnell (1964, p. 565) call for an information manager in formal organizations; further, they add that . . . "many companies are recognizing that some sort of information digestion service is necessary if the expansion of basic data is to result in useful information." Harper, Jr. (1960) suggested a new profession of intelligence expert. Anderson, Jr. et al. (1962, p. 1) address themselves to the problem of the information explosion and to the difficulty of (a) locating potential information sources, and (b) segregation of relevant from irrelevant material; they add that . . . "More and better information effectively managed at reasonable cost will become a competitive edge." Daniel (1961) reports a study done in an oil company, detecting information needs and suggesting concrete steps to overcome the lack of information that became evident.

[22] For a discussion of modelling in communication, see Thayer (1967, p. 80) and Berlo (1969, pp. III-1-15). For a more general view of models, see McGrath and Altman (1966, p. 76).

Systems theory will provide, in turn, the general framework within which the model will be presented. A detailed examination of systems theory would go beyond the purpose of the present undertaking, therefore no attempt will be made to explain the technical aspects of systems theory itself.[23] However, it should be considered, as Carroll and Farace (1968, p. 37) pointed out, that . . . "Generally the relationships in heuristic models represent only a rough first approximation to the underlying mechanisms involved in some real-world system."

Organizations are open systems,[24] that means, they are characterized by wholeness (interdependence of their parts), self-regulation (monitoring of own, internal behavior for reciprocal adaptation with the environment), equifinallity (outcomes of change in the system are not primarily due to initial conditions, but to the

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[23]For detailed explanations of systems theory and its application to social science, see, for example, Buckley (1968), and Carroll and Farace (1968); for more specific applications, see, for example, Buckley (1967) for relating systems theory to sociology; Rapoport and Horvath (1959) to organization theory; Allport (1960) to personality theory; Ackoff (1957-58) to communications; Kelley and Lazer (1967) to marketing management; and Donald (1967) to information management.

[24]Systems can be divided into open and closed according to their relation with their environment; if there is no exchange of energy with the environment, they are closed systems, and if exchange takes place, then open systems.

action of the self-regulating processes within the system), and negentropy (internal order).[25]

Communication impinges upon all four previously-mentioned characteristics: (a) it contributes to increasing negentropy by providing the organization with a relationship to its environment, from where orderliness is obtained, (b) it facilitates equifinallity by providing an interconnective device among the self-regulating processes within the organization, (c) it contributes to self-regulation, since it links the organization with its environment in a reciprocal relationship, necessary for adaptation, and (d) it creates wholeness by permitting social interaction among the organizational parts.

A Model of Innovation-Communication Decisions

The model presented in Figure III, has been developed at a level of generality that allows its application to different levels of systems analysis, i.e., it can be applied to the study of the intrapersonal processes as well as to the organizational processes, when the organization is viewed as a whole.

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[25] Negentropy is the opposite of entropy, which is disorder or, more precisely, disorganization. As Schrödinger (1968, p. 146) points out, negentropy is . . . "the device by which an organism maintains itself stationary at a fairly high level of orderliness . . . and . . . really consists in continually sucking orderliness from its environment."

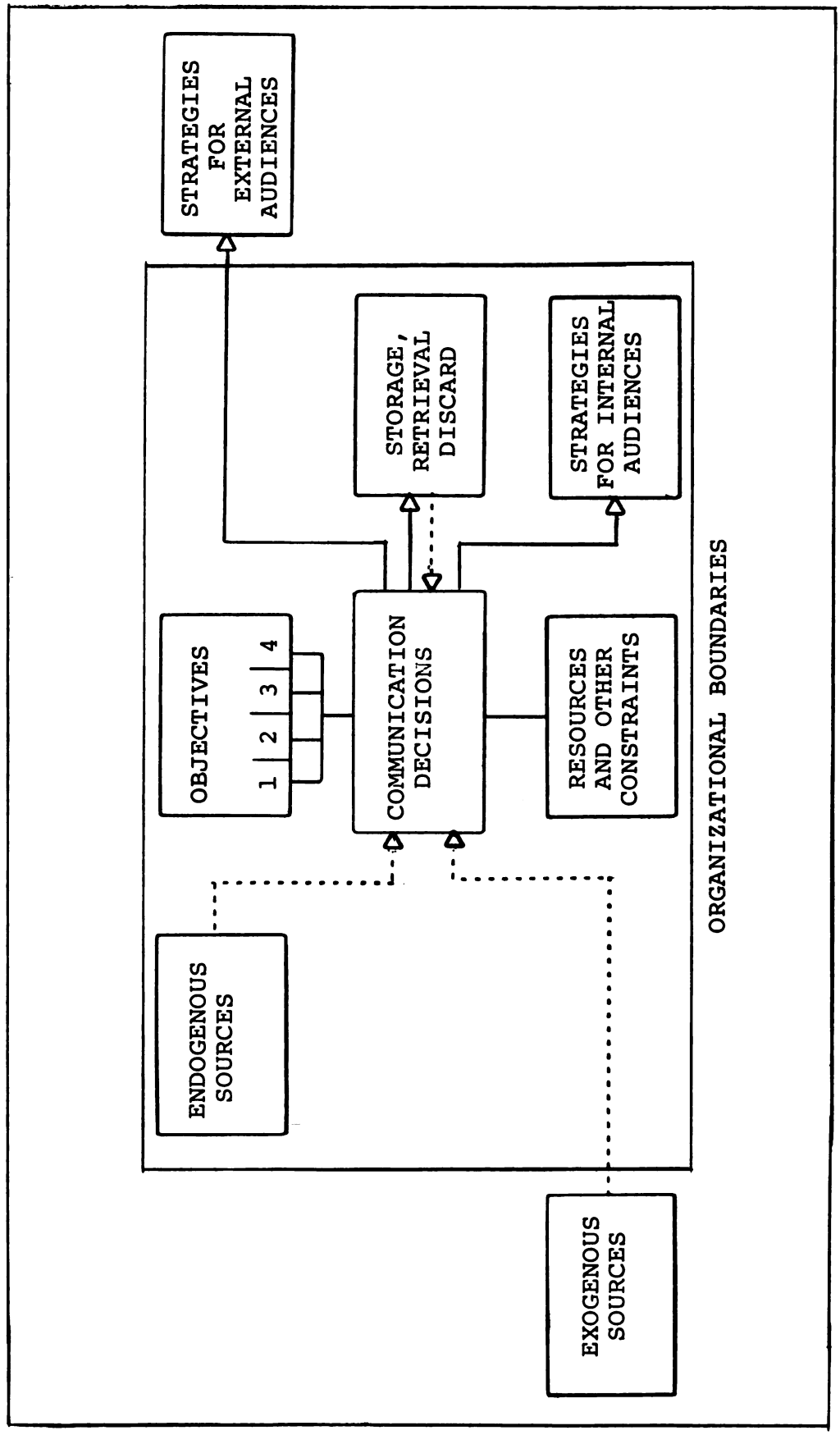

Figure III. A systemic model of communication in organizations $[T_{(n-1)}]$

Since it has been stated that communication is a process, the model will be examined in two different time periods; the first one, corresponding to period $T_{(n-1)}$, reflects the process occurring one unit of time before the second one, which has been characterized by $T_{(n)}$.

Dotted lines represent inputs of information into the decision-making unit of the organization. Straight, solid lines represent the incidence of constraints on the decision-making unit, and solid line arrows represent the outputs of the communication management unit.

Two main sources of incoming patterns of matter-energy, with or without symbolic content, can be distinguished: those exogenous to the organization, whose contribution is frequently called environmental information, and those internal to the organization itself, producing endogenous information.

Controllable and uncontrollable events account for the informational inputs to the organization; controllable events are defined as those able to be changed by organizational behavior, and uncontrollable ones as those which act upon the organizational activity as constraints, to which the organization has to adapt. They might be influenced and changed in the long-run, but not in the short-run.

The importance of the previous classification of innovation-communication management derives from the possibility of exerting influence over the controllable factors, and from requiring adaptation to the non-controllable ones in order to allow for survival of the organization itself.[26]

A screening or selection process, by which incoming information is classified as (a) unusable, hence discarded, (b) relevant in the long run, to storage, and (c) for immediate utilization, has to take place at a certain vital point in the organization. In the case of innovation-management, the criteria for selection would be determined by the goals of the organization with respect to change.

A reconciliation process has to be performed; financial resources and other constraints have to be matched with different objectives (goals and sub-goals within the organization). In addition to the previously received information, previously stored information might be retrieved in order to complement the new inputs.

Once a decision has been reached, communication strategies are designed, in order to achieve certain

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[26]For a detailed description of controllable and non-controllable factors, see Kelly and Lazer (1967), pp. 30 and 306-308).

predetermined objectives, within the limits set up by the constraints.

These strategies might be directed to different audiences; some of these audiences are located within the same organization, in which case we talk about intraorganizational communication, and some audiences will be located outside the systems boundaries, in which case we talk about extraorganizational communication.

Communication strategies are the combination or mix of communication elements, for the attainment of specific objectives. Figure IV provides a non-exhaustive view of these elements, with an indication of some of the dimensions which can be monitored within each of them; some of the most frequent problems in message and media management are also pointed out in this list.

Figure V shows the process presented in Figure III, but at a different point in time and from an innovation-communication perspective; endogenous and exogenous information is composed by feedback--random new information--and retrocommunication--purposively-sought new information. Retrocommunication is the report of previously-established positions, either in the organizational structure or outside the boundaries of the organization, which act as search mechanisms for the innovation function.

In intraorganizational communication, the task of linking decision-makers with their audiences is usually

COMMUNICATION ELEMENTS	DIMENSIONS	PROBLEMS
1. Messages	Content	Distortion
	Amount	a) Condensation
	Frequency	b) Accentuation
	Code	Omission
2. Media	Types	Overload
	Direction	Underload
	Amount	Noise
		Rigidity
3. Structure (Social Elements)	Size	Relational
	Location	Individual
	Space	
	Status	
4. Means for Storage and Retrieval	Speed	Adaptation
	Accuracy	Synchronization
5. Cost	Resources	
	Time	
6. Time: as a process variable, impinges on all the previous elements.		

Figure IV. A suggested list of communication elements that can be monitored to achieve efficiency.

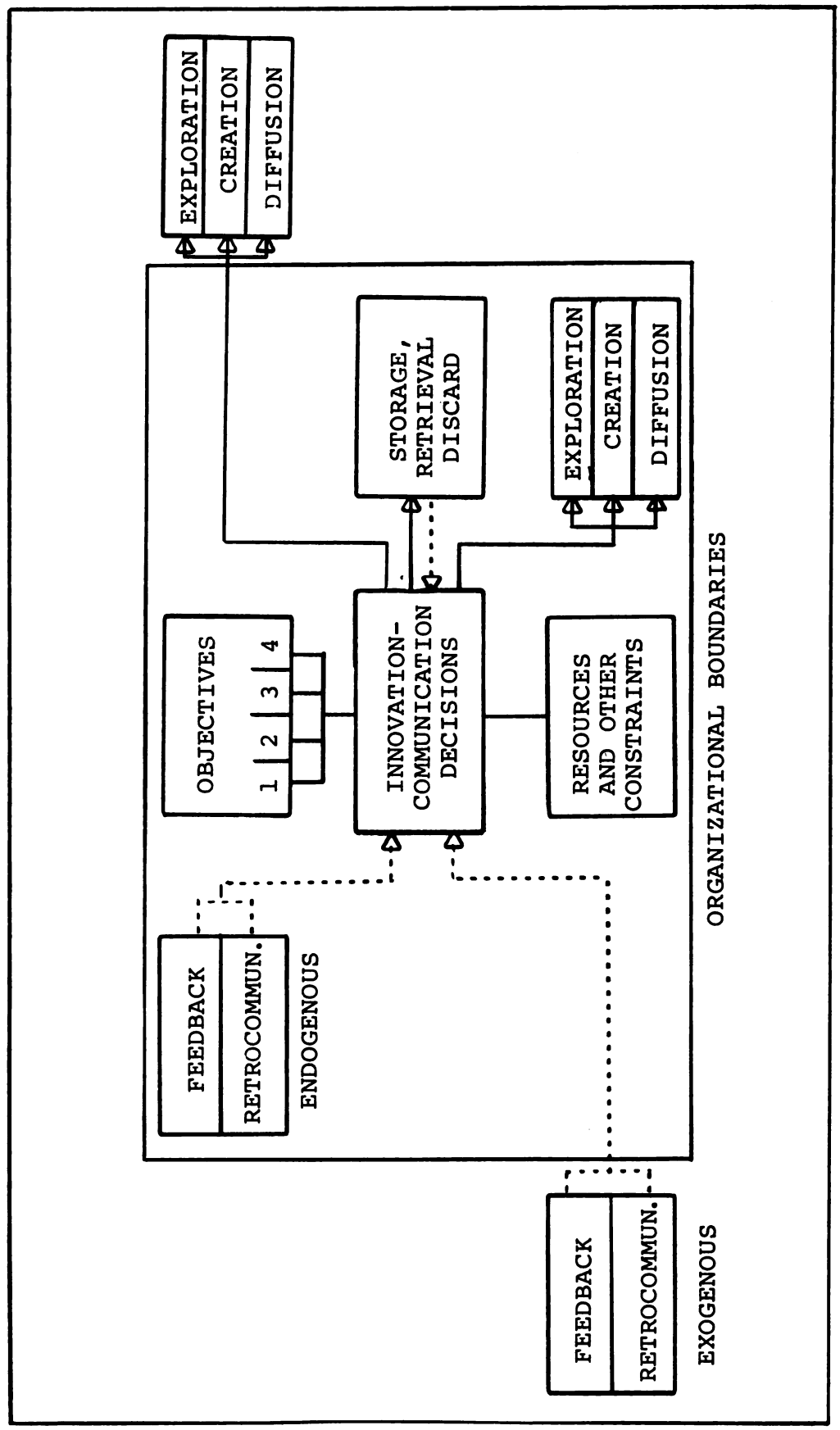

Figure V. A systemic model of innovation-communication - $[T_{(n)}]$

given to a certain number of individuals, such as an ombudsman in a university or a chaplain in the army.[27] In extraorganizational communication, it is usually an independent agency (consultants, marketing research firms, etc.) which provides the organization with information, but sometimes also endogenous units, i.e., marketing research departments, perform that task.

In possession of the new informational inputs, the reconciliation process takes place again, and objectives, resources and constraints are revised in order to determine the adequacy of the previous strategy. If minor changes appear necessary, a variation in tactical communication takes place, i.e., increasing the frequency of the messages, changing from one medium to another, changing the content of the messages, etc.

If the new information is discrepant, to a large degree, with previous informational inputs, a revision or reevaluation of the newly acquired information becomes necessary. Major changes pertain to the realm of strategies, for which probably higher echelons in the organizational structure have to concede legitimization.

But different strategies or tactics are necessary not only in order to reach different audiences; the

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[27]This concept, of purposively-sought feedback, has been expressed repeatedly by Berlo to the author in conversations.

sub-function of each of the three major functions of communication (production, maintenance and innovation) also require different strategic approaches. Within the innovation function, it might be necessary to establish different tactics for the three sub-functions that have been distinguished, namely diffusion, creation and exploration.

As it can be observed in Figure VI, the previously mentioned strategies of communication, then become inputs into the system or sub-system, whichever level is being analyzed. As inputs, they can be measured and related to outputs.

The independent variable then would be stated as a certain strategy for achieving a certain objective. The dependent variable is the output of the system.

The independent variable is the communication mix, or a single element of the strategy, such as message content, degree of channel usage, etc. and it has a definite, recognizable effect, which is the dependent variable, changes in the output of the system. Because of the existance of recognizable effects, measurement of the independent variable should not be difficult.

Exploration communication strategies might be measured in terms of their consequent variables, the number of new ideas obtained from (a) the environment, and/or (b) the organization itself. Creativity strategies

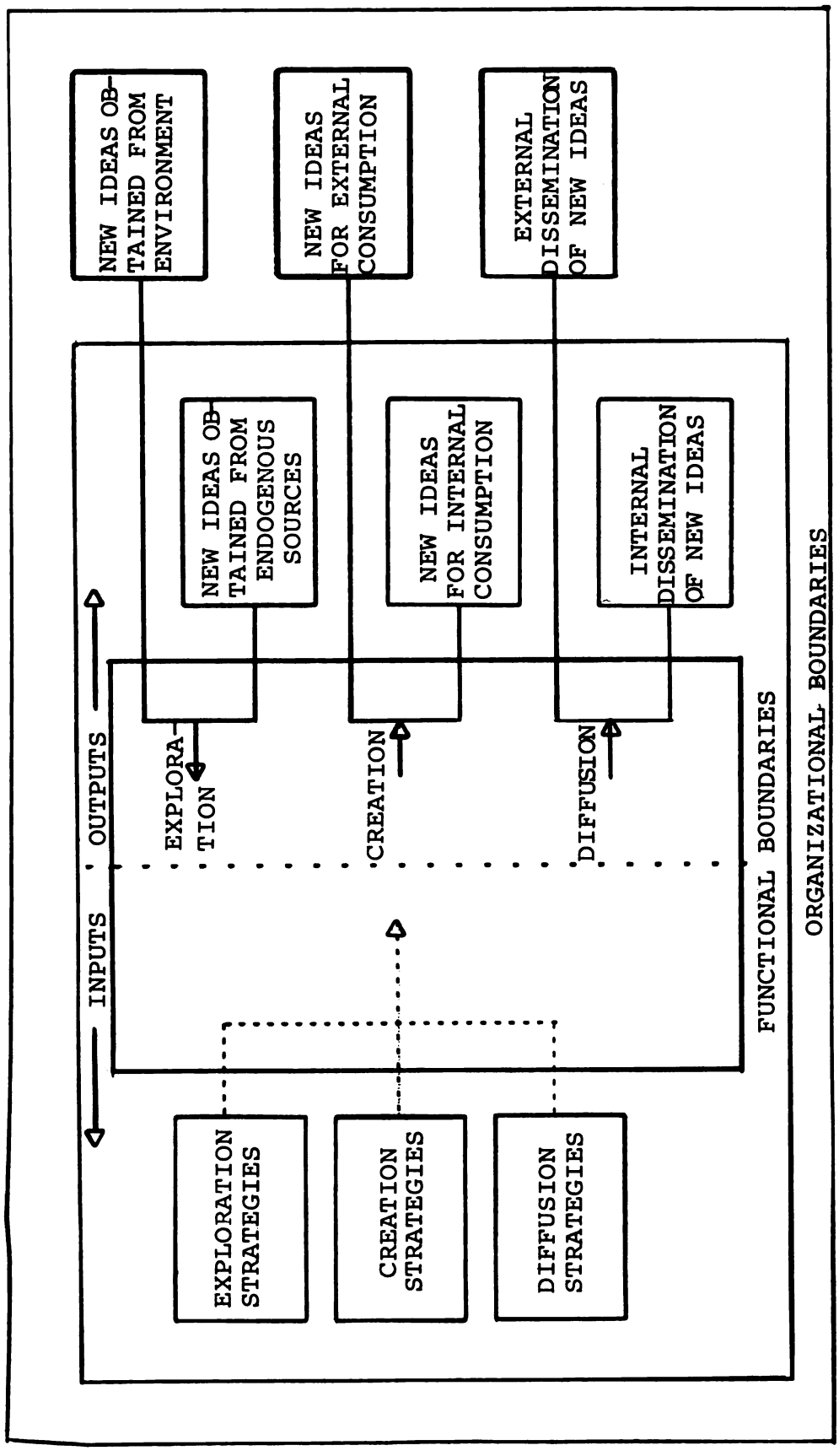

Figure VI. An input output model of innovation-communication

might be measured in terms of their dependent variables which are (a) the number of new ideas for internal consumption--those implemented within the boundaries of the organization, and/or (b) the number of new ideas for external consumption--to be consumed outside the boundaries of the organization. Diffusion strategies might be measured by the speed of dissemination of new ideas within the system, and/or outside the system.

Then it becomes possible to study not only the effectiveness of communication strategies, but, if related to the cost-benefit analysis of the different strategies--the independent variables--the study of communication efficiency in the organizational context could be started.

The Functions of the Information Manager

The era in which we live, combines advanced technology with massive use of capital, and its most conspicuous manifestation is the modern large corporation. Modern life tends toward the development of gigantic organizations. As Galbrait (1967, p. 9) describes,

> Nearly all communications, nearly all production and distribution of electric power, much transportation, most manufacturing and mining, a substantial share of retail trade, and a considerable amount of entertainment are conducted or provided by large firms. The numbers are not great; we may think without error of most work being done by five or six hundred firms.

The size and complexity of an organization determines the need for task subdivision, or specialization in order to achieve efficiency. In the realm of executive action or decision-making, the trend toward specialization has become also evident in recent years. Production managers, financial managers, personnel managers, marketing managers, and many others, have been emerging in the hierarchical structure of organizations; the time seems to have come where the monitoring of the communication activities of large organizations requires emphasis and expertise.[28]

In other words, information management appears to be the next step in this process of subdividing responsibilities for greater efficiency in organizations. Up to the present, monitoring communication has been part of the responsibilities of each functional manager, method by which the advantages of expertise have been lost to a certain degree.

The functions to be performed by an information manager[29] in an organization have been visualized as follows:

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[28]For a similar view of organizational communication, see Thayer (1967, pp. 92-96).

[29]The information manager would be responsible for intraorganizational and extraorganizational communication activities, although for the purpose of this paper, only intraorganizational communication management is analyzed.

1. The assessment of situational factors,
2. planning and programming the system,
3. implementation and organization, and
4. control, evaluation and adjustment of the system.

A brief description of these four different functions will be provided:

1. The assessment of situational factors.

It implies the study of existing conditions of the communication system; an inventory of available resources has to be performed in the first place, including financial aspects and technological facilities.

A revision of institutional policies and procedures regarding the expected communication behavior of the members of the organization should be undertaken at this point. Also, the organizational objectives--or perhaps the individual functional goals--should be operationalized as clearly as possible. Both existing policies and organizational or functional objectives should then be compared in order to establish the degree to which they coincide.

Mapping the extant communication structure of the organization is the next step; through sociometric techniques and network analysis, the elements composing the spontaneous communication structure can be identified. Determination of cliques, isolates, liaison members, polarization nuclei or magnetic centers, sub-cliques, etc.

will allow a better description of the communication practices within the organizational boundaries, hence, would serve the purpose of identifying audience targets for communication strategies.

It must be remembered that over time the communication structure may change in composition, which is why a revision procedure must be established.

2. Planning and programming the system.

Once available resources, organizational objectives and the present functioning of the extant communication structure are known, communication strategies for achievement of the specific goals can be designed.

Mechanisms for retrocommunication have to be established and programmed in terms of desired frequency of retrocommunication contacts, type of information that should be provided to the decision-making center, degree of accuracy needed and channels which will be used in order to maintain a regular information flow to the top echelons of the organization, and all the above mentioned decisions have to be related to the budgetary constraints of the organization.

The frequency of control procedures, by which changes in the spontaneous network will be detected, also has to be established. As pointed out previously,

a rotating inventory of the communication network is convenient in order to introduce variations in the tactics by which the overall communication strategies are carried out.

3. Implementation and organization.

During implementation of the strategies that have been designed previously, the focus of attention has to be devoted to the achievement of sub-goals of the communication function; several different tactics might be used, even within the innovation-communication function in order to attain creation, exploration or dissemination of information.

Individuals in the organization who will serve as links for retrocommunication have to be trained and assigned to their roles in the organizational structure. Members of the organization must be made aware of the existence of the different channels and of the integration of pre-planned and spontaneous networks through formalization[30] of the latter.

4. Control, evaluation and adjustment of the system.

New information received through feedback and retrocommunication in the decision-making center, will

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[30] Formalization is defined as the degree to which the spontaneous lines of communication are incorporated into the organization chart.

allow comparison and contrast of the stated objectives with degree of achievement of these objectives. If large differences appear between them, a revision of communication strategies might be advisable; if the differences stay within previously specified limits, only minor changes in tactical communication might be necessary.

Goals of the organization as a whole or of certain functions of the organization may have changed in the meantime, as a response to changes in the environment. A comparison of the strategic design with the initially stated goals seems advisable.

The system has to be tested permanently in terms of underload or overload of channels, distortion of messages, changes in the spontaneous communication network, flexibility[31] of pre-planned channels, omission of messages, noise in the channels and degree of synchronization of the information stored and retrieved by mechanical, manual or electronic means and the needs of the decision-making unit.

The following chapter will be an attempt to establish some propositions that can be tested by research in organizational settings, aiming at a better understanding of the innovation-communication function.

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[31] Flexibility of pre-planned channels of communication in an organization is defined as the degree to which these channels are able to carry messages they have not been designed to carry.

CHAPTER III

A PROPOSITIONAL APPROACH TO INNOVATION MANAGEMENT

The present chapter contains a non-exhaustive list of about 25 propositions and sub-propositions considered to be relevant to innovation-communication management. These propositions are intended to provide a basis for future research activities in organizational communication.

Significance of Propositions

A proposition is defined as "a plan or scheme suggested for acceptance."[1] As used in the context of the present undertaking, a proposition is a statement suggested for acceptance, specifying the determinants of certain phenomena, most frequently in terms of the relationship between or among variables, on the basis of research evidence and/or practical experience.[2]

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[1]American Heritage Dictionary of the English Language (1969, p. 1049).

[2]For examples of propositional inventories in current literatures, see (1) Rogers with Schoemaker

On the continuum of scientific formulation, propositions are placed between hypotheses and generalizations; hypotheses are simply "conjectural statements of the relation between two or more variables" (Kerlinger, 1964, p. 20), meanwhile propositions, as Rogers and Jain (1969, p. 8) observed . . . "are generalizations in that they are backed up by research evidence; . . ." But then, generalizations usually exhibit a larger amount of empirical evidence to support their statements than propositions.

Propositions, like hypotheses, have to satisfy two conditions in order to be of value to scientific inquiry. First, they must provide a clear statement about the relationship of two or more variables, and second, they have to carry implications for testing the stated relation.

Sometimes, propositions are simple statements of belief, based on previous experience and/or observation, suggesting potentials for further scientific inquiry; these propositions are close to hypotheses.

(1970) on diffusion of innovations, (2) Rogers and Jain (1969) on communication between research and client systems, (3) Rogers and Bhowmik (1969) on communication and homophily-heterophily, (4) March and Simon (1958) on organizational activity, (5) McGrath and Altman (1966) and Collins and Guetzkow (1964) on small group research, (6) Price (1968) on organizational effectiveness, Berelson and Steiner (1964) on human behavior, and Thompson (1967) on social science applied to organizations.

On other occasions, previous research on the topic is compiled and synthesized and a generic proposition derived then, . . . almost generalizations. But regardless of the way in which they are developed, the main importance of propositions in the technical literature resides in their pivotal role as Solo (1967, p. 116) describes . . . "to provide for the systematic and progressive development of these bodies of knowledge."

The interrelation of propositions and generalizations with theory construction, was pointed out by Blau and Scott (1962, pp. 8-9) when they stated that

> On the one hand the objective of all scientific behavior is to develop a body of substantive theory, that is, a set of interrelated, verifiable generalizations that account for and predict the empirical phenomena that can be observed. On the other hand, scientific research must be guided by a theoretical framework, that is, a system of interrelated concepts that suggest theoretically fruitful lines of empirical investigation.

Organizational communication is precisely at the stage of the chicken-and-egg paradox. Thayer (1967, p. 74) pointed in this direction when summarizing that . . . "One needs a comprehensive and veridical theoretical framework by which to perceive and evaluate relevant empirical data; but one also needs the relevant empirical data by which to construct the theory

that determines the relevancy of the empirical data."

The importance of propositions in providing a new starting point for inquiry seems rather obvious. But Olsen (1968, p. 13) throws in a word of caution about assigning a too definite role to propositions, when suggesting that . . . "The danger lies in the temptation to treat empirical generalizations as if they were theoretical explanations, and to forget that they are only the building blocks of theories."

Concepts are always in need of further testing, modification, development and broader perspective. Propositions are aimed at providing a linkage between past and future research, by means of reducing the universe of existing empirical data and theoretical formulations into more manageable dimensions. Furthermore, they provide direction to future efforts, performing a valuable resource-optimizing function.

But the usefulness of propositions goes beyond the realm of scientific inquiry by providing a linkage between research and practice. Collins and Guetzkow (1964, p. 2) recognized this additional attribute of propositions when pointing out that . . . "As we built on these [previous] findings, however, we tried to recognize that they ultimately have implications for practice."

The proliferation of research in most areas of human knowledge has determined the need for a linkage between research and practice.[3] Rogers and Jain (1969, p. 1) state that: "The problem of research dissemination and utilization is both complex and urgent in nature. There is concern among both scientists and practitioners about improving the research utilization process"; furthermore, they develop a set of propositions aimed at closing the existing gap. Jain and Amend (1969) addressed themselves to the problem of developing a conceptual framework that would facilitate such an endeavour.

Criteria for the Selection of Propositions

The selection criteria which were used while developing the propositions presented in subsequent pages, can be summarized as follows:

(a) First: the substantive interests of the present writer have guided the over-all approach to this undertaking. The role of communication in

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[3]Herring (1947), Schramm (1954), Guetzkow (1959), Havelock (1964) and Guba (1968), among others have, in one way or another expressed their concern with facilitating the transfer of research-based information to the potential users.

organizational management, specifically as related to the management of the innovation-communication function, has captivated the imagination of the author, a former business executive, whose professional biases are confessed and, presumably, prominent throughout the paper.

In this context, Berlo (1967, p. 7) wrote:

> I'm suggesting that the scientist can't escape the fact that he is a product of the data he is observing, and that his own background and experience, his own values and beliefs inevitably affect his structuring of physical reality. That relationship should be guarded against as a source of blindness and misperception; however, it should not be ignored as a source of insight and creativity.

(b) The second criterion is one of focusing on organizational variables whenever possible--as opposed to intrapersonal, organismic variables.[4] Although the importance of intrapersonal processes is recognized as a determinant of organizational communication behavior, both as cause and effect, an examination of those variables would have been beyond the central purpose of this undertaking, that is, the examination of the transactional,

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[4]For a discussion of the implications for communication research of studying individual behavior in groups vs. group behavior (intrapersonal vs interpersonal events), see Watzlavick et al. (1967), Guimarães (1969) and Rogers and Jain (1968).

interactive communication events, taking place in an organizational setting.

This approach of focusing on integrative communication transactions, can be equated with a macro-communication perspective, as opposed to micro-communication, which focuses its attention on individual or, at the most, on dyadic communication transactions. Macro-communication is communication analysis performed at the aggregate data level.

(c) The third criterion consists of the precedence given to existing field studies in ongoing organizations, over studies applying the laboratory method, whose research tradition is usually called "small group research." The speculative basis of extrapolation of findings from the latter tradition[5] to an organizational ongoing context is recognized. In certain cases though, mainly to the absence of field studies on the topic, certain generalizations appear to be safely guaranteed. This seems especially to be the case when smaller,

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[5]For our present inability to translate findings derived from the small group research into a superordinate theory of organizational communication, see Guetzkow (1965, p. 535) and Thayer (1967, p. 75).

functional units--as opposed to the organization as a whole--are examined, as it frequently will be in subsequent pages. Carroll and Farace (1968, p. 46), referring to the controlled laboratory experiments (small group research being a part of this methodological tradition), pointed out that . . . "they offer considerable promise in instances where rather precise measurements are needed and normal field conditions are too complex to be of help."

(d) The fourth criterion applied in selecting propositions deals with the selection of independent and dependent variables. An independent variable is . . . "The presumed cause of the dependent variable, the presumed effect. The independent variable is the antecedent; the dependent variable is the consequent." (Kerlinger, 1964, p. 39).

The initial objective was to state the dependent variable as organizational or functional effectiveness. Furthermore, the primary intention should be stated as aiming to stipulate the dependent variable in terms of organizational or functional efficiency.[6] Unfortunately current

[6]Effectiveness is defined as "the degree of goal-achievement," (Etzioni, 1964, p. 8) and efficiency as the ratio between effectiveness and cost. Cost is defined as the amount of time and resources spent in the process of goal-achievement.

literature on organizational communication shows no evidence that the cost factor has ever been considered as a variable.

The independent variable or variables have been stated as the communication elements that can be varied in order to achieve a certain effect.

During the process, however, of arriving at logical and supported propositions, it was found that communication variables also became dependent. Furthermore, the introduction of assertive statements with disregard for the variables involved were unavoidable in order to maintain the logical flow of ideas and to support subsequent propositions.

A ceteris paribus assumption[7] had to be made in order to simplify the formulation of the propositions themselves. It should be noted though that strategic decisions with respect to any given set of alternatives have also to consider that same assumption in order to become operational.

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[7]A systemic view of any organism is based on the premise that interrelatedness and interdependence are but necessary conditions, perhaps even "sine qua non" to the rigorous analysis of the functioning of the organism. Ceteris paribus--all other things remaining equal--is thus a conceptual license permitted for analytical purposes only.

Three main sources of inspiration will be perceptible during the development of the propositions themselves; (a) the logic with which the author attempted to relate and integrate different previously stated propositions and by means of which a certain structure was imposed on the disarray of research findings cited for this purpose, (b) previous research studies which provided the bulk of knowledge synthesized in subsequent pages, and (c) the accumulated knowledge of previous authors who synthesized findings from studies available at the time in which they wrote.

Communication in organizations is a multivariate phenomenon; when developing generalizations like the ones which will be presented in subsequent pages, it must be recognized that for analytical purposes, an oversimplification of real phenomena is created. Most of the propositions suggest relationships between two or three variables at the most, the implicit assumption being that these few variables account for a considerable amount of the variance in the dependent variable. But (a), how much of the variance is explicated by these variables, and (b) what other variables, in addition to the ones suggested for research, account for the total variance, is not known.

The propositions are grouped according to the independent variable, primarily as follows:

Propositions 1-4 deal with uncertainty and change.
Propositions 5-6 deal with channel integration.
Propositions 7-11 deal with channel restrictions.
Propositions 12-14 deal with channel formalization.
Proposition 15 deals with structural distance.
Proposition 16 deals with spatial distance.
Proposition 17 deals with written communication.
Proposition 18 deals with origin of information.
Propositions 19-20 deal with communication integration.

It should be noted that the number of derived propositions or sub-propositions under a given sub-set of the classification is not to be interpreted as reflecting a degree of relative importance assigned to that particular sub-set.

Finally, although the propositions have been centered on the innovation-communication function primarily, the degree of interdependence of the three main functions communication performs in an organization, limits considerably the possibility of claiming exclusiveness. Berlo (1969, p. IV-8) posited that . . . "Any given communication transactions may be used to

serve one or more of these three functions[8] [production, innovation and maintenance]; i.e., it is not suggested that only one function can be served at a time."

Exhaustiveness of the potential lucubrations on the topic is obviously impossible, given the purpose and scope of the present undertaking.

Listing of Propositions

Uncertainty and change

The first four propositions are aimed at relating uncertainty and the process of change in an organizational context to the volume or amount of communication transactions performed within the system.

Proposition 1.0 - The degree of uncertainty within a given organization is positively related to the total volume of communication transactions.

Uncertainty is defined as a low degree of predictability of events in a given setting at a given point in time. Berlo (1969, p. II,10) defines the two determinants of uncertainty in a system as . . . "(1) the number of alternatives that exist, and (2) the relative probabilities of those alternatives."

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[8]Italics are the present writer's.

New ideas emanating from a system, either directed toward the system itself or to its environment,[9] and new informational inputs from the outside, contribute to increase uncertainty to the extent that they are incompatible with the past experience of the members of the system, to the degree that they increase the perceived number of existing alternatives, and to the degree that they alter the perceived relative probabilities of those alternatives.

Change, defined as the variation from one state of a system to another different state, covers the physical and non-physical dimensions of that system. The latter deals with the development and/or transfer of new ideas or innovation.[10]

Proposition 1.0 can then be extended to state that:

Proposition 2.0 - The degree of change within an

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[9] Environment of a given system is defined as the set of exogenous constraints that influence and are influenced by the operations of the system. Olsen (1968, p. 27) discusses the reciprocal responsiveness and the interdependence of environment and social organizations.

[10] Rogers (1962, p. 13) defines innovation as . . . "an idea perceived as new by the individual." But innovation is also a function of the communication management in organizations, as used frequently in the present context.

organization is positively related to the total volume of communication transactions.

Downs (1967, pp. 128-129) posited the relationship between environmental change and volume of communication, by suggesting that . . . "The faster the rate of significant change in the bureau's external environment, the higher will be the total volume of messages within the bureau." Thus,

Proposition 3.0 - The rate of environmental change is positively related to the total amount of intraorganizational communication transactions.

A communication transaction is defined here as the event in which two or more participating systems interact with the help of a symbolic code.[11]

Systems theory allows general principles that have been found to be applicable to the system as a whole, to be transferred through different levels of systematic complexity without losing validity. From proposition 3.0, if the whole organization is defined as the environment for a specific functional

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[11]Berlo (1969).

unit[12] that operates within the boundaries of the organization, it may be concluded that:

Proposition 4.0 - The degree of change within a given organization is positively related to the total volume of intrafunctional communication transactions of a given functional unit of that organization.

It has been established so far that a positive relationship seems to exist between the development and/or transfer of new ideas in an organizational context and the volume of communication transactions occurring in that particular setting.

The possibility of operating conceptually back and forth between the system itself and the particular sub-system that is examined (organization vs. functional unit) offers rewarding perspectives. Furthermore, a bridge has been created between the larger environment and the organization itself (system and sub-system respectively).

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[12] Functional unit is defined here as any subset of the set constituted by the organization as a whole. In business organizations, the equivalent would be a department, who performs a specific function for organizational purposes.

Channel integration

The following propositions, 5.0 and 6.0, relate the degree of channel integration to organizational effectiveness.

Proposition 5.0 - Pre-planned and spontaneous communication networks are complementary and substitutable.

Pre-planned and spontaneous networks are what in current literature is known as formal and informal networks.

Formal communication channels are defined as those which "substantially coincide with the formal authority structure" (Downs, 1967, p. 113) and are used for the transmission of the official communication transactions, those which are commonly recorded and tend to legitimize the hierarchical subdivision of power. Informal channels are those which do not coincide with the lines of officially sanctioned power structure; as Schwartz (1968, p. 5) noted . . . "negatively defined as a residual category." Perhaps a better differentiation could be achieved by stipulating them in terms of the way in which they evolve: the "formal" channels are pre-planned during organizational life and the "informal" channels are developed from a

little known set of circumstances in which personality traits, convenience, empathy and functionality appear to contribute to a large degree. In other words, it is a "spontaneous" development. The previous proposition could then be reworded as follows:

Pre-planned and spontaneous [developed] communication networks are complementary and substitutable.

Burns (1954, p. 96) stressed the fact, derived from a field study in the production department of a British factory, that the informal [spontaneous] communication channels are "essential to the proper functioning of the vertical [formal] system. Habbe (1952, p. 34) corroborates these findings.

But there is also some empirical evidence which suggests that the degree of interdependence of both communication channels might not always be similar across different organizations. Davis (1953), in his classical study of the "Jason Company," found that grapevine did not fill the gap left after restrictions on the pre-planned communication channels were imposed.

Downs (1967, p. 114) after examining most of the available evidence at that time, sustains that . . . "within every organization there is a straining toward completeness in the overall communication system."

It is a contention of the present undertaking that the cause for such divergencies to exist is that all previous research was done under the assumption that a constant volume of communication had to find its way through the organizational structure. When stipulating proposition 5.0 it was considered that an increase of the volume of communicational transactions would develop on the basis of the amount of uncertainty introduced into the system due to new ideas.

This analysis allows the following generalization:

Proposition 6.0 - The degree of integration of pre-planned and spontaneous communication channels is positively related to the effectiveness of an organization.

Berelson and Steiner (1964, p. 370) related the effectiveness of an organization to the degree of integration of channels by stating that . . . "The efficiency[13] of a large formal organization is sizably enhanced when its own chain of command or decision

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[13]The authors do not explain their conceptualization of "efficiency," it is assumed that they are referring to the concept of "effectiveness," as defined earlier in this Chapter.

or communication[14] is tied into the informal network of groups within the organization, so that the network can be used to support the organization's goals."

Channel restrictions

Propositions 7.0 to 11.0 deal with the relation of channel restrictions to organizational and functional effectiveness and to organizational change.

Proposition 7.0 - Pre-planned communication channels in an organization are more rigid than spontaneous communication channels.

The change of the established, official communication network requires the development of policies and procedures which are time-consuming and require formalized sanctions to be carried out. The spontaneous network, since it arises from convenience, requires simple agreement (mainly tacit) of the transactional participants to become legitimized.

Rigidity of a communication channel is defined

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[14] Italics by the present author. Note the interchangeability of the terms "decision" and "communication" used by the authors. This corroborates previous statements in this paper that equate decision-making with a communication process.

here as the time and operations required to change previously established functions.

Proposition 8.0 - Given a higher volume of communication in an organization, restrictions imposed on the pre-planned channels are positively related to the volume of communication transactions in the spontaneous channels.

From propositions 5.0 and 7.0

Restrictions on pre-planned communication channels can be implemented, as stated by Downs (1967, p. 114) by . . . "ordering subordinates not to communicate with each other, by physically separating people, by requiring prior clearance for any communication outside a certain bureau section, or by hiring only reticent subordinates."

Proposition 9.0 - The innovation-communication process increases the volume of communication transactions in the spontaneous channels.

It has been stipulated previously that change appears to be positively related to a general increase in the volume of communication transactions in an organization. Further, it has been stipulated that

both pre-planned and spontaneous communication channels are complementary and substitutable.

Field studies and experimental research support the previous proposition. Brookes (1963) discusses the communication behavior of scientists in organized settings and concludes that there is a strong tendency to use spontaneous channels (visits with colleagues, meetings, conferences, etc.) to exchange information. Creative thinking seems to be hindered with the use of pre-planned, as postulated, more rigid channels. The exchange of new ideas, in search for creativity, appears to be motivated by what Gibson (1962, p. 35) defined as . . . "an uneasy feeling that a discrepancy exists between preconceived ideas and our observations of natural phenomena." "Uneasiness" might be called uncertainty.

One of the characteristics of pre-planned channels is the official recording of communication events, and spontaneous channels appear to have the . . . "great advantage of not being official; hence they [messages] can be withdrawn, altered, adjusted, magnified, or canceled without any official record being made" . . . and further . . . "almost all new ideas are first proposed and tested as subformal[15]

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[15]The terminology used by Downs is based on a classification elaborated by Jones (1964); subformal

communications." (Downs, 1967, p. 114)

Several sub-propositions can be derived from the ones previously stated:

Sub-proposition 9.1 - The increase over the usual or normal amount of communication transactions in an organization, if due to the exchange of new ideas, will be absorbed by the spontaneous channels.

Sub-proposition 9.2 - When functional units of an organization are devoted to creativity, spontaneous channels will be preferred over the pre-planned ones to test the feasibility of new ideas.

Sub-proposition 9.3 - When functional units of an organization, are devoted to creativity, spontaneous channels will be used to reduce uncertainty.

Shepard (1954) stipulated that the free flow of information among scientists--spontaneous channel

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communications is used here in the sense of "the communication that takes place in an organization in accordance with the non-written rules and procedures about what to communicate to whom." It can take place along pre-planned channels but also along spontaneous channels. Downs tends to equate it with horizontal (among peers) flow of information, since "the informality of the messages exchange plays down variations in status," when it involves superior-subordinates transactions.

openness--stimulated ideas and provided additional incentives for further conceptual developments. This was achieved through the emotional rewards obtained from what could be called "knowledge demonstration"[16] to peers.

The preceding analysis suggests another proposition:

Proposition 10.0 - The more restrictions imposed on spontaneous channels of units devoted to creativity within an organization, the lower the effectiveness of that specific unit.

The process mentioned in proposition 8.0 does not seem to hold true when the inverse situation is presented, namely, the imposition of restrictions on spontaneous channels. Perhaps proposition 5.0 should be qualified by adding that pre-planned channels of communication appear to lack the capacity to absorb additional amounts of communication transactions when these additional volumes of communication are due to uncertainty-reduction-seeking behaviors.

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[16]"Knowledge demonstration" is used in this context to signal out a behavior that consists of communication transactions aimed at registering technical knowledge and intellectual proficiency.

Considering the organization as a whole, and superimposing the concept of organizational change on the system, it can be stated that:

Proposition 11.0 - The degree to which restrictions are imposed on the spontaneous communication channels of an organization, are negatively related to the rate of organizational change.

As synthesized by Crane (1965, p. 275) . . . "In addition to serving the ends of the individual employees, informal [spontaneous] communications . . . may help the firm itself, by providing flexibility for situations not covered by the rules. Going from one department up to the top and then down again, to another part of the same firm, or to another organization, is the time-consuming process."

It was stated in proposition 9.0 that the innovation-communication function tends to rely more heavily on spontaneous channels than on official pre-planned channels. It could be argued that in order to become legitimized, any innovation has to be incorporated into the pre-planned circuit of organizational communication. The contention here is, however, that the process of development and/or transfer of innovations

in organizational settings causes heavier amounts of communication transactions in the spontaneous channels, which is a postulate that does not deny the possibility of final legitimation through the pre-planned channels of communication.

Rewording proposition 11.0,

Sub-proposition 11.1 - The degree of openness of spontaneous channels of communication is positively related to the rate of change implementation in an organization.

There is also some evidence in the literature, although not conclusive, that a high volume of intra-functional communication transactions is positively related to the time-pressure under which a functional unit devoted to creativity operates. This appears to be related to an increase in uncertainty (since time-pressure might alter the perceived relative probabilities of task-completion), hence, it would corroborate proposition 1.0.

Proposition 11.0 and sub-proposition 11.1 should, though, be qualified further. As Bass (1965, p. 310) points out . . . "it was concluded that too much horizontal communication was taking place in this factory and too little between the different echelons for optimum operations. It may be that we find it

most comfortable to talk at length with our peers, rather than with our superiors or our subordinates." Further, he stresses the importance of horizontal lines of communication being incorporated into the organization chart. This process will be called "formalization."

This view, which is in accordance with previously postulated proposition 5.0, 6.0 and 7.0, permits some generalizations on channel formalization.

Channel formalization

The following three propositions, and the sub-propositions derived from them, relate channel formalization to organizational effectiveness and change.

Proposition 12.0 - The degree of formalization of spontaneous communication channels is positively related to the effectiveness of an organization.

In support of this statement, Bass (1965, p. 310) reports that research organizations (NASA,[17] for example) have found that formalizing the spontaneous communication channels has become necessary for the organization to achieve a convenient degree of

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[17]NASA, The National Aeronautics and Space Administration.

flexibility in the system, and that this flexibility has proven to increase the effectiveness of the entire organization.

If the stated goal is innovation (creativity and/or dissemination of new ideas), it can be concluded that:

Proposition 13.0 - The degree of formalization of spontaneous communication channels is positively related to the effectiveness of change implementation in an organization.

and, consequently,

Sub-proposition 13.1 - The degree of formalization of spontaneous communication channels in functional units devoted to creativity is positively related to the effectiveness of that specific unit.

Group behavior seems to acquire special relevance if the problem is confronted from the point of view of a specific functional unit of an organization, and it is especially worthwhile examining when the task the group is expected to accomplish is defined as creativity, the development of new ideas.

Blau and Scott (1962, p. 119) relate group problem-solving success to the volume of communication

that is performed within the group, when stating that . . . "social communication in a group working on a common task provides a battleground of ideas, which stimulates thinking and particularly facilitates detecting false leads, but which simultaneously interferes with coordination."[18]

There is, however, some indication as to the relationship between coordination of communication and accuracy of the developed solutions to certain problems. McGrath and Altman (1966, p. 140) after an examination of several studies relating performance to problem-solving behavior[19] determined that coordination appeared to be significantly related to accuracy.

It seems then that some degree of social control is necessary to maintain the proper balance between the volume of communication transactions and the effectiveness of a given functional unit of an organization. It has been stated previously that creativity and/or dissemination of new ideas is positively related to the degree of irrestricted communication transactions.

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[18]Italics are the present author's. Coordination is defined as purposive patterning of communication transactions, as opposed to random distribution of them.

[19]Experimental studies performed within the Bales (1951) tradition of small group research.

Furthermore, it has been stated that the innovation communication function tends to be positively related to the spontaneous channels of communication within an organization. The following conditional proposition can then be derived:

Proposition 14.0 - Given coordination--the degree of openness of formalized spontaneous channels of communication in a functional unit devoted to creativity in an organization is positively related to the effectiveness of that particular unit,

which subsumes several previous stipulations. A certain amount of centralization and structure seems important even for the adequate functioning of the spontaneous communication network.

Structural distance

Another apparent dysfunctional phenomenon in group performance is the degree of status differential within the members of a group.[20] Blau and Scott (1962, pp. 116-128) distinguish three main dysfunctionalities

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[20]See for example studies performed by Torrance (1955), Wessen (1958) and Hurwitz et al. (1953).

of status differences[21] in group problem-solving. "First: . . . explicit status distinctions tend to reduce social interaction and social support . . . Second: . . . formally instituted status differences tend to undermine the process of competition for respect . . . and Third: . . . status differences distort the error-correcting function of social interaction."

Rogers and Bhowmik (1969, pp. 9-11) discuss also the functionality of low status differences in general communication effectiveness; the phenomenon of status collation as determining higher likelihood of communication interaction is posited by the authors under the name of "homophilis," and a reciprocal causal relationship is suggested when stating that . . . "homophily may be (1) the result of previous interaction, or (2) the basis of choice of those with whom interacts."

The preceding discussion leads to the following:

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[21] In this context, status is defined as the relative position of organizational members in either one or both, the official hierarchical structure of the organization and/or in the non-official, sometimes called informal hierarchical structure that develops in the organizational context. For a detailed analysis, see Kahn et al. (1964, pp. 137-149.)

Proposition 15.0 - The degree of homophily existing among the members of a functional creative unit of an organization, is positively related with (a) the total volume of intrafunctional communication transactions and (b), the effectiveness of that particular unit,

which coincides with Blau and Scott's (1962, p. 123) conclusion that . . . "the more pronounced the hierarchical differences in a group, the less effective it will perform."

The previous analysis leads also to some sub-propositions:

Sub-proposition 15.1 - Status similarity (homophily) is positively related to the use of spontaneous channels of communication.

This assertion is also supported by several findings from field studies and experimental research.[22]

Spacial Distance

Another determinant of communication transactions occurring in an organizational context is the spatial distance separating participants in the

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[22]For example, see Burns (1954) and Donald (1959), and the summary of findings in Guetzkow (1965) In connection with the topic, see also Krech, Crutchfield, and Ballachey (1962).

communication network.[23]

Bürolandschaft is a word coined by Eberhard and Wolfgang Schnelle, German management consultants known as the "Quickborner Team." Literally translated, Bürolandschaft is office landscape, a new technique of designing organizationl buildings in a highly unconventional and controversial way, in order to facilitate human interaction, and hence work relationships. The starting point of office design is the extant communication structure, which is mapped and lines of communication density drawn among the members of the organization on a chart of communication density.

A matrix chart is developed showing numerical values for communication density, and computers are used to test different alternatives for minimizing the length of high density communication lines. The real work patterns--as distinguished from those supposed to exist--determine the internal spatial arrangements among members of the organization. Removable furniture and moveable partitions, called "action furniture," provide but the minimum necessary separation.

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[23]For further references, see Pile (1970). The Krupp Building in Reinhausen, Germany, the new offices of the Rhode Island Research and Design Institute, the offices of the Citizens and Southern Bank of Atlanta, and the new building of S.A.S. (Scandinavian Airlines System) in Copenhagen are but a few examples of the landscape tecniques in application.

Barnlund and Harland (1963, p. 468) determined that the physical (spatial) distance among individuals is inversely related to the amount of communication transactions in which these individuals will engage . . . . "unless there are physical barriers that intervene, such as filing cases, walls, or desks,"[24] which supports the conceptual basis for the office landscape techniques.

It can be concluded that:

Proposition 16.0 - The degree of spatial distance separating members of a functional creative unit in an organization is negatively related to the effectiveness of that particular unit,

since the relationship between amount of communication transactions and the effectiveness of a certain group has already been established in previous propositions.

There is, however, some evidence that suggests that the type of task performed[25] is also positively

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[24]Reviewing studies done by Blake et al. (1956), Caplow and Forman (1950, Festinger, Schachter and Back (1963), etc.

[25]For a summary of the relationship between interpersonal relations and task obstacles, see Collins and Guetzkow (1964, pp. 56-68).

related to the impact of communication transactions on effectiveness. In the present context it is assumed that the creative functional unit of an organization is striving for group effort[26] rather than for individual, isolated performance.

Based on previously mentioned studies, a sub-proposition can be derived, to state that:

Sub-proposition 16.1 - The number of physical barriers (walls, desks, filing cases, etc.) in a creative functional unit of an organization is negatively related to the degree of effectiveness of that particular unit.

Communication technological devices introduce another dimension into the problem. Simon (1962), stated that spatial propinquity becomes less determinant of volume of communication interactions, as the amount of communication technological devices increases the possibility of reaching other individuals through

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[26]Whether group performance is superior or inferior to individual performance is discussed to some length in, for example, Blau and Scott (1962, pp. 116-121). Type of task seems to be the single most important variable in determining it.

interposed[27] communication. Proposition 16.0 still holds true, if not the amount but the type of technological devices is taken into consideration. It is our contention that, to the degree that these technological devices allow for simultaneous multiple exchange of ideas, spatial propinquity becomes less important; but that the available media in organizations is not designed for this specific purpose, i.e. to replace face-to-face, group communication transactions.

Written communication

The type of channel used imposes additional restrictions on the effectiveness of a given functional unit. Farmer (1963) discusses the incidence of written communication by the speed with which certain activities in an organization are carried out. His conclusion is that written communication introduces a delay factor in decision and implementation. Perhaps a further qualification should be added, namely the type of function to be performed by a certain functional unit of the organization.

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[27] Interposed communication is defined as the transfer of matter-energy with symbolic content in any situation different from face-to-face communication, normally through mechanical or electronic devices.

However, from previous propositions and from the precedent discussion, it could be stated that:

Proposition 17.0 - The amount of intrafunctional written communication in an organizational functional unit devoted to creativity, is negatively related to the effectiveness of that particular unit.

Furthermore, Downs (1967, p. 129) stipulates that . . . "situations that must be described in qualitative terms will tend to generate more message volume for a given degree of precision than those that can be described primarily in quantitative terms."

Origin of information

Up to the present point of the present chapter, it was assumed that endogenous generation of new ideas is the pattern followed by creative functional units of an organization. This "closed-system" view of a creative unit is inadequate. To a large extent, informational inputs from the environment (either the organization as a whole or sources external to the organization) also determine the effectiveness of the unit. The following propositions are derived:

Proposition 18.0 - The amount of exogenous information received by a creative functional unit of an

organization is positively related to the effectiveness of that unit.

It is assumed that in discussing exogenous information, relevant information from the point of view of the functional unit is examined, since the quality-dimension of informational inputs into a system is more determinant than quantity.

Amount (volume) of exogenous information is but one contributor to functional effectiveness. Translation (the coding or recoding of the information for the purpose of adaptation to the operating code of the unit), interpretation (as related to present and potential needs of the unit), selection (in terms of classifying into immediately useful, delayed--storage--or rejected--discarded--information) and dissemination (diffusion within the unit) are also confluents to the over-all effectiveness of the creative functional unit.

The following sub-propositions attempts to clarify the problem:

Sub-proposition 18.1 - The quality and speed of the translation activity is positively related to the effectiveness of the creative unit.

Sub-proposition 18.2 - The quality and speed of the interpretation activity is positively related to the effectiveness of the creative unit.

Sub-proposition 18.3 - The quality and speed of the selection activity is positively related to the effectiveness of the creative unit, and

Sub-proposition 18.4 - The quality and speed of the dissemination activity is positively related to the effectiveness of the creative unit.

It is not implied that these activities have to be performed necessarily within the functional creative unit. As a matter of fact, it might be more efficient to perform these activities in a centralized node of communication in the organization. Several qualifications should, though, be considered: (a) the degree of code-homogeneity[28] between the creative unit and the creative unit and the organization as a whole, (b) the degree of homophily existing between the members of the central node and the members of the creative unit,

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[28] Code homogeneity is defined as the degree to which systems and subsystems use similar symbolic structures imposed on the patterns of matter-energy transmitted within each of them.

(c) the degree of uncertainty introduced in the system by the exogenous information itself and (d) the degree to which the pre-planned communication network is capable of transferring information without distortion, omission and/or overload.[29]

Communication integration

Communication integration is defined as the degree to which all members of an organization relate to each other and to the larger environment through the exchange of information with symbolic content.

Two dimensions of communication integration become evident, the external integration, which refers to the degree to which exogenous input channels available to the system members are interconnected or combined, and the internal integration, defined as the degree to which the intraorganizational communication

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[29] Distortion is the degree to which a message changes between source and receiver. Overload is defined as the amount or volume of communication inputs into a system as related to the capacity of the system to process that particular volume: if the system's capacity is lower than the volume of inputs, we talk about overload, and when the capacity of the system exceeds the volume of inputs, then underload. For a model of distortion, see Tullock (1965). For a detailed analysis of distortion, see Correll (1969); also Guetzkow (1965).

structure is interconnected.[30] The degree of communication integration in an organization and between the organization and the larger environment are closely associated with the uninterrupted flow of information. For that reason, communication integration is also related to various concepts stated in previous propositions, such as change, effectiveness and creativity. The following propositions can be derived:

Proposition 19.0 - The degree of external integration of the organizational communication network is positively related to the rate of change implementation in the organization,

and, consequently,

Sub-proposition 19.1 - The degree of external integration of the organizational communication network is positively related to the effectiveness of a creative functional unit of the organization.

Since it has been stipulated in preceding pages that the amount of exogenous information, given certain

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[30]For a discussion of communication integration, see Guimaraes (1970, pp. 70-80) and Yadav (1967, pp. 32-35).

conditions, is positively related to functional effectiveness.

Proposition 20.0 - The degree of internal integration of the organizational communication network is positively related to the effectiveness of a creative functional unit of that organization.

Sub-proposition 20.1 - The degree of internal integration of the organizational communication network is positively related to the rate of change implementation in a creative functional unit.

Communication integration can be equated to a certain extent with the concept called previously channel openness; high integration presupposes exchange of information through the spontaneous and/or pre-planned communication channels. It can then be stated, on the basis of proposition 11.0, that

Proposition 21.0 - The degree of internal integration of the organizational communication network is positively related to the rate of change implementation in the organization.

The preceding discussion and the consequently derived propositions presented in this chapter, have

been developed as an example of the way in which macro-communication variables at the aggregate level can be analyzed for the purpose of suggesting directions and pointing out potentially rewarding targets for future research efforts on organizational communication.

CHAPTER IV

SUMMARY, CONCLUSIONS AND IMPLICATIONS

The present chapter contains a synthesis of the main aspects that have been discussed in preceding pages, the conclusions to which the foregoing analysis has led, and the implications for research and practice that have become apparent throughout the present paper.

Summary

It has been repeatedly postulated that communication, by providing the vehicle for social interaction in organizational settings, is the main single determinant of success or failure of an organization. Past research and literature on the topic of organizational communication has failed to provide an integrative theoretical and practical perspective for a scientific determination of the role of communication in organizational effectiveness.

The present undertaking is aimed at providing such an integrated perspective, by which scientific research on organizational communication can be performed within the realm of practical application.

Organizations, social units in which individuals group in search of a specific, predetermined purpose, are resources-allocation-optimizers. Communication, the transfer of patterns of matter-energy with symbolic content, is the very essence of organizational activity.

Coordination, the purposive patterning of communication transactions, as opposed to their random distribution, is a necessary condition for the survival of any social unit. Organizations, given their purposive orientation, require structure imposed on the communication activities performed within the organization and on those by which the organizations relate to the larger environment, in order to accomplish their predetermined objectives.

Management, or the decision-making approach, is the purposeful monitoring of the communication activities of an organization in order to achieve the stated goals. The degree of goal achievement is called effectiveness, and the ratio between effectiveness and cost, is efficiency. Managerial activity can thus be defined as the search for efficiency through the monitoring of communication activities, in an organized setting.

By analyzing organizational communication from a managerial perspective, three main functions of the communication process in organizations become apparent:

they deal with compliance and output--production--with preservation and continuance--maintenance--and with change and output--innovation.

Innovation is called the "survival function" of communication in organizations. In order to survive, organizations have to innovate and adapt to changing environmental conditions. Innovation-communication management, the use of the communication process to foster change, becomes decisive in the organization's perpetuation.

Innovation-management operates on three different dimensions of the organizational system. The process that aims at the dissemination of new ideas--diffusion--, the process of fostering creativity--creation--and the process of scanning the environment in search for new ideas--exploration.

The monitoring of communication processes in organization is done by combining the different elements of the communication system, i.e., messages, channels, structural or social elements, cost and time. When these elements are combined to produce results or effects in the long-run, communication strategies have been devised. When the decisions pertain to the short-run, tactical communication is being used.

The information explosion that has occurred in recent years, introduces two additional constraints

into the managerial activities related to communication: (a) the need to discriminate between relevant and non-relevant information, and (b) the need for storage and retrieval of larger quantities of information.

Computer technology has contributed to increase the speed and accuracy with which large amounts of information can be handled. The monitoring of these technological devices become also part of the functional responsibility of the communication manager. When this is the case, it is more proper to label the function information management.

The functions to be performed by the information manager (or innovation manager if the specific focus of emphasis is the innovation-communication function) have been stipulated as: (a) assessment of the situation, (b) planning and programming the system, (c) implementation and organization, and (d) control, evaluation and adjustment of the system. A description of each was provided.

A systemic perspective has been superimposed on the decision-making approach suggested in the present study. By doing so, the possibility of operating at various levels of systems complexity in a simulaneous fashion has made the development of models of organizational communication feasible. The systems approach

used in the present undertaking also allowed the individual components or elements of the communication process in organizations, which were presented by means of paradigms, to be further elaborated.

Conclusions and Implications

The main conclusions at which the present study arrived can be divided into two specific areas: one dealing with organizational communication as a whole, and the other dealing with the specific innovation-communication function in organized settings.

From the analysis in preceding chapters, information management consists of the monitoring of the levels of uncertainty in a system. Uncertainty is defined as low degree of predictability of events at a given point in time, in a given system. Via communication, the levels of uncertainty can be changed, causing changes in behavior of the members or components of the system, behavior which in turn can be related to the input-output ratio of the system itself.

Organizational communication

Organizations are resources-allocation optimizers, so the ratio between inputs and outputs seems of primordial importance to the continuance and survival of the organization.

The previous statement implies recognition of the pivotal role of resource-availability on decision-making. Strategic and/or tactical decisions are a function of the availability of resources.

Given definitions of effectiveness--the degree of goal achievement--and efficiency--the ratio between effectiveness and cost--it becomes evident that past literature and research on organizational communication placed heavy emphasis on effectiveness, but not on efficiency.

Communication effectiveness has been the main dependent variable in communication research. It is of paramount importance when the knowledge of the effect of certain stimuli on human behavior is the core of a research undertaking. Of interest is the final outcome of the process in terms of the individual receiver.

The contention of the present study, however, is that the primary unit of analysis is the organization. The question posited is: What can be done to help organizations to achieve success in their goal-seeking behavior?

If communication research enters the realm of organizational activity, the present undertaking concludes that the scientist necessarily has to take into account the organizational constraints imposed on the

individuals who drive the organization to success or failure. Organizational communication occurs in a predetermined and structured environment and not in a vacuum.

Cost of communication activities, then, becomes an important variable to be studied and related to the degree of goal-achievement--effectiveness--in order to facilitate the study of communication efficiency in the future.

As an example, Sub-proposition 13.1 states that: The degree of formalization of spontaneous communication channels in functional units devoted to creativity is positively related to the effectiveness of that specific unit.

Formalization is the incorporation of horizontal lines of communication into the hierarchical, official organizational chart.

The fact that an increase in effectiveness of the particular creative unit has been achieved, is of little help to the decision-maker who asks the question: How many resources have to be devoted to achieve this effectiveness? It might even be possible that the cost exceeds by far the advantages of formalizing the spontaneous channels, measured in terms of effectiveness.

In the present example, cost is represented by the amount of time involved in carrying out the process

of formalization (studying the spontaneous communication structure, defining corporate policies in terms of degree of formalization, etc.). In many other cases, the cost of the type and amount of channel usage, the time of frequency of channel usage, the time spent designing an adequate strategy, etc., may be prohibitive as compared with the potential benefits derived from the implementation of a certain specific strategy or tactic.

In sum, until research takes into account the cost dimension of particular communication decisions, and relates cost to achieved effects, from the point of view of the practitioners, little help has been provided.

Another aspect that has been overlooked in past research is the time-dimension of communication transactions. These transactions have been studied under the implicit assumption that certain communication patterns and/or behaviors are not of a temporary nature, but are permanent.

Communication is a process, without end or beginning; as such, changes over time acquire relevance. By studying organizational communication transactions in an X-ray fashion, only the interaction arrangements at a certain point in time are described.

Replicating studies pertaining to a certain specific aspect of organizational communication can provide a better description of the evolutionary

aspects of the communication process, which should be the focus of scientific inquiry.

Strategic and/or tactical communication appears to determine the effectiveness (or efficiency) of communication activities in the organizational millieu. For this reason, the analysis of combinations of communication elements--variables--appears to be more rewarding for the understanding of the process of organizational communication than the analysis of single, unrelated variables.

The difficulty of operationalizing organizational goals suggests the determination of more concrete, manageable concepts for comparison with the communication activities. The suggestion is to concentrate future research on units of high code-similarity, like similar functional units across organizations, i.e., the marketing departments of several different organizations, rather than approaching the problem in an interfunctional way in which comparisons are elusive, i.e., across different functions in the same organization, whose codes and objectives frequently are dissimilar.

The degree of generalizability of organizational communication findings in the past has been questioned on the basis of the lack of representativeness of one-unit samples. Furthermore, studies which have been

carried out in different code-contextual arrangements (interfunctional studies), lack a design to account for the variability introduced by code-dissimilarity.

The innovation-communication function

It has been stipulated that innovation-management in organizations is the "survival function" since change is the main element that permits an organization to adapt to its environment in the long-run, and hence to survive.

From a communication point of view, there appear to be three sub-functions of innovation-communication management: exploration--the search for existing new ideas--creation--the impulse to the birth of new ideas--and diffusion--the dissemination of new ideas.

Innovation-communication is by no means restricted to the intraorganizational realm, but the present discussion is. Furthermore, the interdependence of the three sub-functions defies a clean-cut taxonomy. Frequently, communication strategies aimed at one of the posited objectives foster developments in one or both of the other sub-functions, as some sort of unplanned by-product.

Uncertainty, defined as a low degree of predictability of events at a given point in time, in a

given social situation, appears to be positively related to the degree of effectiveness of the innovation-communication function, although as a result rather than as cause. And the degree of uncertainty in a system (the organization in the present case) determines the volume of communication transactions within the system and also the speed at which change can be disseminated in that particular setting (Propositions 1.0 to 4.0).

Written regulations in an organization are means by which the predictability of events in the system can be raised and uncertainty reduced. Times of crisis in an organization, it can be hypothesized, tend to increase uncertainty and raise the total amount of intra-organizational communication transactions; this is the defensive mechanism by which the system tries to cope with change, by preparing itself for immediate response to the challenge.

In organizational life, replacement of decision-makers in the system is one noticeable feature that raises uncertainty among organizational members, due to an alteration of the probabilities of predicting consequent events.

Not only do intraorganizational events increase uncertainty; drastic changes in the environmental conditions lead also to increased communication interaction

among the members of the organization. The system develops receptiveness to change by this process.

The degree to which spontaneous and pre-planned channels are integrated (interdependent), appears to be positively related to the effectiveness of (a) the organization as a whole, and (b) the functional units of the organization which carry the responsibility for creation, i.e., research and development departments, scientists in a university, etc. (Propositions 5.0 and 6.0).

Liaison individuals, those performing the role of interconnecting different groups and sub-groups in an organization, contribute to achieve channel-inter-dependence, if placed within the official decision-making structure. It would be interesting to confirm the extent to which liaison members maintain their role when their hierarchical position within the organization changes.

Personal experiences of the author indicate that liaison roles appear to change over time, as does clique composition. It would seem that time, and not change in the hierarchical position, determines the continuance or discontinuance of communication role performance.

The innovation-communication function seems to rely more heavily on the spontaneous channels of

communication of an organization than on pre-planned ones, due to the higher rigidity (resistance to change) of the latter channels.

The innovation-communication function tends to increase the total amount of communication transactions in the spontaneous network of the organization, since these will be used by members of the organization to (a) test the feasibility of new ideas, and (b) to reduce uncertainty (Sub-propositions 9.2 and 9.3).

As a consequence of the assertions made in the preceding paragraph, restrictions imposed on the spontaneous channels of communication in an organization lower the effectiveness of functional units devoted to creation, and decrease the speed at which the organization is able to implement change (Propositions 7.0 to 11.0).

Restrictions can be imposed by means of physically separating members of the organization. The spontaneous channels of communication within an organization cannot be blocked by establishing regulations or prohibiting exchange of information among members of the organization. Personal experiences of the author indicate that when such measures are attempted, information will continue to flow through the spontaneous channels, although in a less visible manner, and the

only effect may be a decrease in effectiveness of the organization or functional unit in which the restrictions are imposed.

One way of avoiding the previous problems is the formalization of the spontaneous channels of communication in the organization.

The extent to which the spontaneous channels of communication are incorporated into the organization chart (formalization) is positively related to the effectiveness of (a) the organization as a whole, and (b) the functional unit (or units) devoted to creation. In the same fashion, formalization is related to the speed of change implementation in the organization (Propositions 12.0 to 14.0).

By legitimizing the use of spontaneous channels, an increase in efficiency can also be obtained. Preplanned channels, due to the need for recording most of the information that passes through the network, are frequently more expensive than the use of the spontaneous channels.

For example, oral channels are used more frequently than written channels if the spontaneous network has been legitimized, with an obvious cost advantage in terms of time and need for storage and retrieval systems. The disadvantage of not permitting easy access to the exchanged information, over time, is also involved.

Status collation or similarity (homophily) appears to be positively related to preference for the use of spontaneous channels of communication and to organizational and/or functional effectiveness, especially when the objective of the functional unit is creation (Proposition 15.0).

The previous assertion indicates the convenience of not introducing heterophily-gaps in organizations, and especially in functional units devoted to creativity, except for the minimum necessary status differences needed in order to obtain coordination of activities.

For example, research and development units of formal organizations should aim at reducing heterophily within the unit. This goal can be achieved by hiring only individuals of similar professional status, age and social background, since such elements appear to be major determinants of heterophily.

Spatial distance among members of a certain organization is also related to effectiveness of innovation-communication, when the creation task relies on group rather than on individual effort (Proposition 16.0).

Recent techniques of office landscaping (Bürolandschaft) are precisely aimed at reducing the

barriers to interpersonal communication derived from location and spatial distance. The degree of effectiveness achieved by the implementation of these new techniques has apparently not yet been tested by research done over time.

Research efforts are needed to establish the degree to which interaction patterns change over time in organizational settings. Sooner or later, the rearrangement of furniture and office partitions in organizations applying landscape techniques has to be done on the basis of research.

Written communication appears to be a deterrent of change and effectiveness in organizations, except when the messages are of a quantitative nature (Proposition 17.0).

Most organizations still operate on the basis of written communication as the main intraorganizational communication medium. It has been suggested that a change in degree and type of sensorial involvement is taking place among the new generations, i.e., they tend to become more multi-sense oriented, probably in detriment of the mainly visual involvement traditionally fostered through print media.

Any examination of the emphasis placed by organizations on the types of channels that are

recommended for intraorganizational communication, shows that written channels are still considered and accepted as the only channel for transmission of messages of certain importance.

If the previous postulate that the younger generations are more multi-sense oriented is accepted, organizations should venture along new pathways in order to achieve efficiency of intraorganizational activities. For example, technological devices are now available which permit a larger degree of sensorial involvement, such as closed circuit TV, TV telephones, audio-visual equipment, etc. It may well be that by using such technologies, not only organizational efficiency but also individual contentment of the members of the organization, can be achieved.

Exogenous sources of information appear to contribute to organizational and functional effectiveness, given certain degrees of quality and speed in the process of adapting that information to intraorganizational and/or intrafunctional needs (Proposition 18.0).

The relationship between the organization and its environment in terms of informational inputs, is the major factor in placing organizations in the category of open systems, dynamic, receptive to change entities.

The process, however, by which information inputs are translated into the operating code of an organization, interpreted in terms of present and potential needs of the organization's functioning, selected into useful, delayed or rejected information, and disseminated throughout the organizational system, have not been studied to the extent that would appear desirable.

Finally, it has been suggested that the degree of integration of the communication network (the interrelatedness of the patterns of communication transactions performed by the members of the organization) is related to the speed of change dissemination within the system, and of organizational and/or functional effectiveness (Propositions 19.0 to 21.0).

In sum, by imposing a managerial, decision-making perspective on the study of organizational communication, which answers the stipulated objective of the present undertaking, several advantages occur:

(a) macro-communication analysis becomes meaningful and allows relating practitioners' needs to new paths for research.

(b) by providing a general frame of reference, the decision-making approach presents a context for the study of causal relationships between communication and organizational effectiveness.

(c) by legitimizing the introduction of the cost dimension, cost-benefit analysis of communication activities can be performed and communication activities studied in terms of efficiency rather than only as effectiveness; furthermore, by introducing the time dimension as a variable, communication as a process can be studied.

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