ELECTRONIC MAIL AND ITS POTENTIAL ROLE IN ORGANIZATIONAL COMMUNICATION

A Project Presented to the Graduate Faculty of the School of Business

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INTRODUCTION

"All men naturally desire to know"  
Aristotle: The Metaphysics

"The modern age has a false sense of security because of the great mass of data at its disposal, but the valid criteria of distinction is rather the extent to which man knows how to form and master the material at his command."

J. W. Von Goethe (1749-1832)

"Since the 1960s, the global environment of business has undergone major changes that frequently had no precedent in the historical business climate. Changes have become more frequent and faster developing, and the business world more complex."

H. Igor Ansoff (1989)

Effective communication is essential for the success of the organization. It is “one of the fundamental processes that is the basis for almost all activities in organizations. Thus, this activity is an important perspective for the analysis of organization behavior” (Cummings 133). Any organization should strive to find the best means to achieve a comprehensive effective and efficient communication system. Most communication tools have advantages and disadvantages. A literary review dealing with the use of electronic mail (e-mail) will be considered in the context of organizational and managerial communication.

This work examines the use of e-mail, when it is appropriate and effective, when it is an unnecessary luxury, and when it becomes an impediment to effective organizational communication. The purpose of this study is to attempt to deal with organizational and managerial communication, and the positive and negative impacts
of the implementation of an e-mail communication system in the larger organizational communication framework. The hypothesis is that e-mail can be an important asset within the larger communication systems of the organization. E-mail can improve efficiency and effectiveness at a global level. However, e-mail can have counter-productive effects, thereby jeopardizing organizational goals and objectives.

New communication strategies are becoming necessary as our world is becoming more inter-connected. Companies with international ramifications need to devise new communication strategies to remain competitive. E-mail is one of the alternative communication tools that international organizations need to seriously consider to improve their communication network. E-mail can help cutting down the cost of communicating since it is cheaper to send the same message by e-mail (than e.g., by fax). This study is important in the sense that e-mail can help a company retain or gain a competitive advantage, thereby increasing its overall global importance.

The data for this project has been gathered from a variety of sources: United Nations Environment Programme (UNEP) colleagues, the Internet, electronic mailing lists, and the USIU-A / L. K. Beam, UNEP, British Council, and French Cultural Center Libraries.

The first chapter reviews the literature about organizational and managerial communication. The second chapter will attempt to explain e-mail and its origins. The advantages and limitations of e-mail as a communication tool will be highlighted. Two examples will be provided: one in the context of R&D and one from UNEP. Finally, some conclusions and recommendations for further research in the field of organizational communication will be suggested.
CHAPTER 1 - LITERATURE REVIEW

Communication in itself is not *needed* as such. “Its only value is the illumination it brings to our life and work” (Kemp 1973). “Communication is what managers *do*. It is how some meaningful work gets accomplished through the ‘coordination of the efforts of other individuals’” (Timm 1980). Communication takes anything from 75% to 90% of a manager’s day (Mintzberg 1980; Cribbin 1972:61; Timm 1980).

Communication is widely used in at least three contexts (Timm 1980):

1. It deals with “the sending and receiving of messages.” When at least two people write or talk to each other, they are communicating.
2. Communication can refer to the actual message.
3. In a larger sense, communication deals with the exchange and “sharing of meanings.”

This is where the difference between communications and communicate can be seen. Two people might write each other, thereby sending “communications,” but not necessarily “communicate” in the sense that each of the two have a complete “understanding of each other’s feelings, ideas, or values.”

Communication comes from the Latin *communicare* which means to “make common.” Unfortunately, communication is not as simple as sending and receiving messages correctly. To “make common” communication, or the lack of it, comes in many different ways, often unpredictable. It is hard to examine communications since
we are in so doing examining ourselves. We are after all social animals, as the Greek philosophers emphasized. Communication is part of us. As a result, we resist change and we are comfortable doing things the way we always have, rather than trying new ways, methods, and techniques.

Our communication behavior defines who we are. We assume that others see the world like we do, and that it should be easy for the receiver to understand our message. This is where communication gets blurry. We cannot see the world as others do, because we do not live in the same physical lives. We have been exposed to certain experiences which are radically different from anyone else. Therefore each and every message we receive and send is “evaluated in terms of what we already know” if we are to make sense out of it.

To develop a “communicator” attitude, one needs to concentrate on the recipient of the message; to better understand what ideas, impressions, and feelings we are trying to convey, we need to become a better “understander.” The “ultimate communication improvement” is not to try to make the message sound better to us, but rather to make it better for the recipient of the message.

**Mis-Communication**

The goal of communication is understanding. However, even in its simplest form such as face-to-face, communication is laden with misunderstandings. During the communication process, the receiver is more likely to prepare a response instead of listening to the sender’s message. Our failure to listen makes us talk at the receiver
rather than communicating with the receiver. The major barriers to effective communication are misunderstandings, information overload, physical location, distraction and defensiveness.

It can be useful to consider what are the most common misconceptions about communication. An understanding of what we do wrong can help us redefine, and ultimately rectify, our communication behavior. The following are five misunderstandings about communication.

**Communication is a Fringe Benefit**

Communication is "the very process by which people become organized." Managers should not see communication as an extra, or as a way to keep the workers happy and improve morale. Instead, communication is the main job of a manager. If management is the act of handling, supervising, or controlling people's actions in order to achieve specific goals and objectives, then surely the manager's needs to communicate to his/her subordinates. The manager's success will depend on how he/she can relate to "the perceptions, the expectations, and the degree of involvement" required. A two-way understanding needs to be developed for communication to be successful. After all it takes at least a sender and a receiver to communicate (Timm 1980). This leads to the next misconception that communication is only "message sending."
Communication is Message Sending

The sender expresses thoughts and feelings into a form that will be understood by the receiver (encoding). The message is then sent through a specific medium (such as mail, fax, etc.) to the receiver. After decoding the message, the receiver becomes the sender and goes through the same process.

This over-simplified understanding of communication does not consider many other variables such as "personal pride, values, and sentiments, which affect the communication but are left unexplained." Communication as a simple message sending overlooks things such as "expectations, receptiveness to questions, and a desire to express rapport and friendship."

Communication is Message Receiving

This is the other side of the coin in communication. This is the "nothing-happens-till-someone-gets-a-message" type of approach. This approach seems to make sense, but it requires for a readjustment of the way we think about communication. People tend to emphasize speaking and writing skills rather than anticipate the audience's reactions. People take for granted that they can control the communication process when they actually do not.

Peter Drucker (1974:483) puts it this way:

... it is the recipient who communicates. The so-called communicator, the person who emits the communication, does not communicate. He utters. Unless there is someone who hears, there is no communication. There is only noise. The communicator speaks or writes or sings—but he does not communicate. Indeed, he cannot communicate. He can only make it possible, or impossible, for a recipient—or rather, "percipient"—to perceive.
The process of perception is the one by which people select, organize, interpret and assign meanings to external stimuli. Perception is a process by which people make sense of the world around them. This is the first step in communication. Again, to quote Drucker:

Perception ... is not logic. It is experience. This means, in the first place, that one always perceives a configuration. One cannot perceive single specifics. They are always part of a total picture. The “silent language,” that is, the gestures, the tone of voice, the environment altogether, not to mention the cultural and social referents, cannot be disassociated from the spoken language. In fact, without them the spoken word has no meaning and cannot communicate.

After the perception takes place, people attach a meaning to the message. Redding (1972:25) sees “these mental activities as the defining characteristics of communication.” A message is a stimulus that arouses a response we call meaning. Accordingly, communication occurs when one attaches a meaning to something (object, process, behaviors, climates, or intangible events). One is communicating whenever a meaning is attached to a message. The message can be conveyed not only by words, but also through certain actions, silences, and inactions. This leads to the next communication misconception, namely that managers can control the communication processes in their organization.

Communication Theory

Communication is often defined as “the exchange of information between a sender and a receiver, and the inference (perception) of meaning between the individuals involved” (Bowditch 1985:81). E-mail consists of messages sent and received electronically via telecommunication links, such as between microcomputers or
terminals. These communication networks, which are usually connected through the
Internet, use a particular set of communications standards known as Transmission

Before looking at the pros and cons of implementing an e-mail system, a review of
the literature about communication theories and managerial communication is useful
in assessing the different elements needed for a successful communication process to
take place. Most models include the four basic elements found in the above definition
of communication. In any communication process there is an information source, a
message, a receiver, and an interpretation of the message (O'Reilly & Pondy 1979:121-122;
Myers & Myers 1982; Costley & Todd 1983; Haney 1979). The message is transmitted through
either symbols (words, writings, drawings, etc.) or the exchange of behavior (gestures,
eye contact, body language, and other non-verbal behavior) (Cummings 133). As we will
see, this implies that there is a difference between the transmission of information
and the understanding of the meaning of the information. Transmission is the 'how'
of communication, such as the mathematical symbols used in computer applications.
In this narrow sense of communication, accuracy would refer to the extent to which
the information received is undistorted from that sent. The understanding of the
message is the 'what' of communication. Understanding refers to the extent to which
the receiver has correctly understood what the sender meant to communicate.
Effective communication has occurred when the intended meaning of the sender is
correctly perceived by the receiver.

Shannon developed a mathematical theory of communication based on studies of
telecommunications systems. "This theory allows for measurement of generation of
information and its flow rate along its channels, and it even describes the potentially
most effective symbols for encoding the information" (Shannon 1948). Since then
communication theories have been applied to various fields: neurology, biochemistry,
data processing, telegraph, radio, telephone, television, fax, and electronic
communications. For example, scientists have been trying to explain the reason why
a cancerous cell communicates a pattern of malignant growth. Neurologists attempt to
understand how the human neural system sends and receives information. However,
in terms of organizational communication, Shannon’s theory has been expanded to
incorporate new concepts such as feedback, noise, and comprehension checks.

Lindauer (1974:5) defined the communication process as follows:

Basically, a transmitter with a message to send selects signs from its storehouse of signs in
which to encode it. Then it (she, he) physically sends them as signals through some channel
to a receiver. But unless the receiver is actually changed by the message, communication
has not occurred.

In other words, unless the receiver has acknowledged, and understood the message,
sending a message is not by itself communication. For communication to occur, "the
signals of the transmitter must evoke equivalent signs (called interpretants) in the
receiver." A level of novelty in the message is also necessary to avoid redundancy. A
redundant message might be ignored altogether by the receiver, that is the message
was too similar to a previous one. Moreover, there must be enough "commonality of
language, experience, and interest" between the sender and the receiver for the
communication process to take place. The communication process can be simplified
as follows:

TRANSMITTER ————> RECEIVER

Channel of transmission
Shannon and Weaver argue that there is an encoding process - i.e., the information gets written down, spoken, put on discs, etc. Then the receiver decodes the information and takes action. Shannon’s theory shows that complications can arise during the communication process. The transmitter might have adequate “signs” for its communication but the receiver might not. No matter how many signs the transmitter has, if it does not have those of the receiver, communication is bound to fail. Even if both ends share the same warehouse of “signs,” some factors outside their control can jeopardize effective communication, e.g., bad connections or broken phone lines. These factors can be considered to be interference or “noise.” Communication is not complete until the receiver has interpreted the message. If the interference level is too high, then the communication will be incomplete or will fail. In this broader sense, accuracy in the communication process would refer to the extent to which the receiver’s perception of the message is consistent with the transmitter’s intent.

*The Conduit Model of Communication*

Figure 1 shows a more complete view of the communication process, where the process is influenced by feedback and interference. A more detailed explanation of interference and feedback will be attempted later on. The encoding, decoding, and feedback processes are shown as being an integral part of communication.
Figure 1 - A Conduit Model of Communication
Adapted from Shannon and Weaver

The Communication Process

As we have discussed, communication is closely related to how we perceive the meaning of the message. According to Cummings, there are six factors that one should consider to better understand the communication process:

1. Who is communicating to whom in terms of the roles these people play (e.g. management and labor, manager and subordinate)?
2. The language or symbol(s) used to communicate and its ability to convey information and be understood by both parties.
3. The communication channel or medium used and how information from different channels is attended to (such as a written instead of oral communication).
4. The content of the communication (good news or bad news, relevant or irrelevant, familiar or unfamiliar).
5. The interpersonal characteristics of the sender and the interpersonal relations between the sender and the receiver (in terms of trust, influence, etc.).

6. The context in which the communication is taking place in terms of such things as organizational structure (e.g., within or between departments, levels, and so forth), physical space (e.g., distance between sender and receiver), and social surroundings (e.g., in whose office, are uniforms worn, and so forth).

**The Perceptual Model of Communication**

Communication is basically built upon consecutively linked elements. Figure 2 represents the perceptual model of communication. It is interesting to compare it with Figure 1. There are some significant differences between the two models.

In the perceptual model, noise occurs at all levels during the communication process. Noise is part of the environment. In the conduit model, noise mainly occurs between the encoding and the decoding stage.

In the conduit model, the message is exchanged between the sender and the receiver with its intended meaning. In the perceptual model, the receiver creates the meaning after the decoding stage. The comprehension check and feedback then come into place to ensure that the intended meaning of the sender is similar enough to the meaning created by the receiver.
Figure 2 - A Perceptual Model of Communication
Adapted from Kinicki and Kreitner 1989:410

Historically, the communication process has been described as the *conduit* model, that is information and meaning are exchanged. Many scholars have challenged this opinion saying that the assumptions are unrealistic. The conduit model assumes that when communication occurs, *intended meanings* are transferred. If that was the case, then mis-communication would not exist. Anything that is communicated would be understood by the receiver. However, communication is not that easy. Research is now looking at communication in terms of a “social information processing in which receivers interpret messages by cognitively processing information” (Kinicki & Kreitner 1989:410). This is the so-called *Perceptual Model of Communication* in which receivers create meaning in their mind. The communication process under this model is divided in seven parts: encoding, the message, selecting a medium, decoding, creating meaning, feedback, and noise. In the following paragraphs, each of these
steps in the communication process will be dealt with in more details. A connection with e-mail and each of these steps will be attempted.

Encoding

Communication starts when the sender encodes an idea or thought. This is expressed by words, numbers, gestures, non-verbal cues, or pictures which act as a code or language for mental thoughts.

The encoding stage for e-mail consists of transferring the message into a text file. The choice is limited to 256 alpha-numerical symbols. Pictures, graphics, and sound files can be sent via e-mail, but this is rarely done due to the high computing power needed for such a communication. E-mail is essentially a written letter sent through electronic means. As such, e-mail lacks communication symbols and coding such as drawings, voice tones, gestures, etc.

The Message

This is what comes out of the encoding process. The encoding output, or message, needs to be carefully examined as it may contain more than the sender assumes.
Selecting a Medium

There are many ways for a manager to communicate, such as face-to-face conversations, telephone calls, written memos or letters, faxes, electronic mail, photographs or drawings, meetings, bulletin boards, computer output, and charts or graphs. The type of media chosen will depend on the nature of the message, the intended purpose, the type of audience, the proximity of the audience, the time horizon for disseminating the message, and personal preferences (Kinicki & Kreitner 1989:411).

Each media has its pros and cons. For example, face-to-face conversations are useful for sensitive or important issues that requires immediate feedback and intensive interaction. Telephones are convenient, fast, and private but lack nonverbal information. Electronic mail is similar to the telephone, but it lacks oral clues. A memo or letter might be time consuming, but it is appropriate when the other person is hard to reach, or if formality is required.

Decoding

This is the other side of the coin. Decoding is simply translating the message encoded by the sender in an interpretable form. This is when the social information processing takes place and determines what meanings are attached to the message.
Creating Meaning

In the conduit's model of communication, the meaning is directly transferred to the receiver. In the perceptual model, however, the meaning is actually created by the receiver. This is where mis-communication happens. Often the receiver's meaning might be different from that of the sender. Axley puts it this way:

Miscommunication and unintentional communication are to be expected, for they are the norm. Organizational communicators who take these ideas seriously would realize just how difficult successful communication truly is. Presumably, they would be conscious of the constant effort needed to communicate in ways most closely approximating their intentions ... Communication is fraught with unintentionality and, thereby, great difficulty for communicators. (Axley 1984:432)

Cummings argues that “‘common’ words are interpreted quite differently by individuals because meaning exists in people’s mind and not in the word themselves.” For example, the *Oxford Dictionary* shows that for the 500 most commonly used words, there is an average of 28 meanings for each word (Hayakawa 1949; Gumperz & Hymes 1972; Sattler 1957:30). Therefore, it is no surprise that miscommunication is very common indeed.

This is why managers are encouraged to use different medias for the same message to reduce miscommunication. For example, new dates for a meeting can be announced over the phone, and by e-mail or by memo.

Feedback

This is the *comprehension check*. This step is crucial in effective communication as it communicates to the sender how his/her message was understood by the receiver.
The feedback process makes the receiver a sender and vice-versa. E-mail is relatively low compared to other form of communication in terms of feedback. The telephone, and face-to-face conversations have a much higher feedback content than e-mail, as it is instantaneous. An e-mail message can stay in someone’s “in-box” without being read, and thus making the feedback process incomplete until the receiver opens the message and responds to it.

**Noise**

Noise “is anything that interferes with the transmission and understanding of a message” (Kinicki & Kreitner 1989:413). There are two types of noise: audible and inaudible. Audible noise includes speech impairment, poor telephone connections, illegible hand writing, inaccurate statistics, poor hearing and eyesight, and physical distance between sender and receiver. Inaudible noise consists of personal filters that bring in biases in the communication process. E-mail is comparable to a written letter and has the advantage of avoiding noise due to poor handwriting. In that sense, for example, an e-mail message is clearer than a blurry fax. Also, an e-mail message has a lower level of noise than a phone conversation in the sense that the receiver can come back to the message and clarify any doubts. If it was a phone conversation, then the receiver would have to call again the other person to clarify any doubts.
Managers Control Communication in their Organizations

Walter (1973:4) describes communication control in organizations:

Whether management likes it or not, it must face the fact that all nations, by all people, on all levels, in all functions of the organization, constantly communicate; that all actions create impressions in employees, judged by each employee from his peculiar frame of reference. It makes little difference whether the employee’s interpretation is correct—this is “his world” and he looks out of “his windows.” What he wants to see and hear is the impression he gains from the words and actions around him. The more diversified a work force, the greater the challenge to reach all people with the maximum degree of effectiveness.

This is the problem with controlling communication. It is very difficult to know what draws attention to people, and when communication has actually taken place.

Communication takes places every time human beings use their natural facilities to listen, think, observe, be impressed (for better or worse), have doubts, feel neglected, etc. This common trouble occurs when management takes the rather naive stand that “this is not the time to talk.”

For example, a manager announces that a certain person is getting promoted as the new training instructor through a simple memo. However, the manager did not know that most of the employees felt that the individual was very unprofessional in his business dealings. As a result, most employees felt that making the least professional member of the company the new trainer was a cruel joke from management. Managers need to be aware of this type of ripple effect, and ensure that their messages are sensitive to the impact they might have. Even the simplest message can have undesirable effects in any organization.
Managers Influence the Creation of Understanding in Communication

There are three things that we must keep in mind to have a better control over one’s communication. We must admit that some people will misunderstand the message, that we will misunderstand others, and finally that we can try to reduce these biases, knowing that we cannot eliminate them. At least by knowing that some people will misunderstand us, we can try to make the surroundings of the message more conducive to understanding.

Communication is never foolproof but we can try to improve the conditions for understanding. We need to be aware of the recipients’ expectations. We need to anticipate what they need and expect from us. We need to become better listener. We tend to ‘tune-in’ to messages that confirm what we believe, and we ‘tune-out’ of conversations that are in conflict with our beliefs. This is why a receiver-oriented approach, knowing that communication is never foolproof, can help in seeking to influence the communication process. We need to get away from the sender-oriented mentality, whether we want to impress our bosses, get acceptance from our colleagues or get our subordinates to work better. “Real communication improvement means real sacrifices. It means developing more understanding. It means looking at the world through the eyes of others” (Timm 1980:15). As Hatch has said, “... it’s a little bit scary to think about other people’s point of view too carefully; you may begin to think it makes sense!” (1977:19)
Common Barriers to Communication

Information Overload

This occurs when we are in a situation whereby we have more information than we can possibly sort out and use. This is one of the main consequences of modern electronic communication. Faxes, electronic mail, computer printouts, etc. have made the dissemination of information easy, and it has resulted most often in an overwhelming amount of information that organization members have a hard time dealing with. "When an overload situation exists, we select out information, delegate others to attend to the information, put off information until the overload situation is over, forget information, or avoid it altogether. While some of these tactics are quite helpful, others (such as putting things off) reduce our capacity for action" (Cummings :139). A moderator of an electronic mailing list, e.g., can spend two hours or more per day just to browse through the daily messages and post answers to the list.

The Kind of Information

The information received also can act as a barrier. Any message that contradicts what we know will be less readily accepted than a message that fits our self-concept. This ties in with the source of information. As some individuals are more "credible" than other, people will have a bias in accepting information from such individuals,
and might discredit information received from less "credible" individuals, without any basis for the difference.

This is related to the concept of cognitive dissonance. If a message does not fit with our values and beliefs, we tend to deny it, or simply "hear" the message in a way which is congruent with those beliefs and values (selective perception) (Cummings 139).

**Physical Location and Distractions**

These factors influence communication effectiveness. Research has shown that "the probability of two persons communicating with each other decreases by the square of the distance between them" (Cummings 140). However, e-mail can help break the physical location barriers, as communicators can feel that they are very close since the answer or feedback is rather quick (a day or two) and well thought out, unlike the phone. Distractions, such as phone calls, drop-in visitors, and time constraints can hinder communication. Once again, e-mail can help in the sense that the receiver does not have to be 'there' when the message arrives, but the person can read and answer at a time that is convenient (such as early in the morning or late in the afternoon) when the above distractions are less likely to happen.

**Defensiveness**

Whenever a person perceives him or herself as being under attack, then the probability of mutual understanding is seriously threatened. In order to protect their
self-concept, individuals will react defensively by either attacking the other person or ignoring the message altogether. Although this might protect one’s self-concept, it would be more productive to discuss or attempt to understand the message. In this context, it can help to take advantage of the ease of response that e-mail offers, to eliminate uncertainties and clarify comments that the receiver might consider offensive. Table 1 shows what type of style is defensive and should be avoided; and what style is supportive and should be used whenever possible.

**Table 1 - Supportive and Defensive Communication Styles**

<table>
<thead>
<tr>
<th>Supportive style</th>
<th>Defensive Style</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Evaluation</td>
<td>Judgmental comment tend to put people on the defensive.</td>
</tr>
<tr>
<td>Problem Orientation</td>
<td>Control</td>
<td>Control will put people on the defensive.</td>
</tr>
<tr>
<td>Spontaneity</td>
<td>Strategy</td>
<td>If the communicator seems to try to trap the recipient.</td>
</tr>
<tr>
<td>Empathy</td>
<td>Neutrality</td>
<td>A cold and distant person will be less accepted than a friendly person.</td>
</tr>
<tr>
<td>Equality</td>
<td>Superiority</td>
<td>A person that talks down on people will induce defensiveness</td>
</tr>
<tr>
<td>Provisionalism</td>
<td>Certainty</td>
<td>Those “know it all” person tend to create defensiveness</td>
</tr>
</tbody>
</table>

Adapted from J. Gibb (1961:141-148)
How Can We Improve Interpersonal Communication?

Communication is a two way process, and to overcome the above barriers to communicate effectively, we can work on two basic skills: sending and receiving.

A sending skill is the ability to make oneself understood by others by choosing the right media and use of language (Cummings 141). To better our sending skills, we need to use concise, appropriate language, and avoid jargon and complicated words when simple English will do. Avoiding physical and psychological interference, such as day dreaming, etc. and using multiple channels whenever possible will better our communicating skills.

Active listening is the ability to understand others, e.g., by having empathy, focusing on what one is saying, and reading body language and non-verbal cues (Cummings 141). “Effective listening is the willingness and ability to listen to the entire message (verbal, symbolic, and non-verbal), and respond appropriately to the content and intent (feelings, emotions, etc.) of the message.” However, it is best to avoid putting people on the defensive. Whenever someone engages in defensive listening, only a superficial and selective listening is achieved.

Empathy means that we need to be sensitive to the other person’s feelings and emotions while we are communicating. Essentially, this means trying to put oneself in the place of the other person’s situation. This can be hard to achieve in cultures where people are used to hide their emotions. Providing self-disclosure and encourage an
open dialogue might be considered risky but it can create an atmosphere conducive to effective communication.

Communication can also be improved through *reflecting*. By restating the message, we can avoid most mis-understanding. The trick is to restate the message without passing any judgments.

**The Role of Feedback**

Communication is a two way process. Using feedback can help reduce communication gaps and distortions. Feedback is the process of telling another individual how you feel about something they said or did (Anderson 1976:103-111). The problem in most organizations is that communication is often a one-way process from superiors to subordinates. The best way to use feedback is to do it in such a way that the recipient accepts it constructively. When this involves criticizing someone’s work, it becomes rather difficult to use feedback. In this case, feedback attempts usually turn sour, with people becoming defensive leading to negative feelings, which is achieving the opposite effect. The following guidelines should be considered in order to use feedback in a constructive manner (Morris 1981:26):

1. Examine your motives to ensure that your intention is to help rather than show your perceptiveness or superiority.

2. Especially in negative feedback situations, get to the point; beginning a discussion with peripheral issues and small talk usually creates anxieties rather than reduces them.
3. Consider the receiver’s readiness to hear the feedback.

4. Describe the situation as clearly and specifically as possible; avoid evaluative openings at all costs since they prejudge the receiver’s point of view and only pave the way for confrontation.

5. Avoid overloading the receiver with too much information and criticism; focus on what is most important and changeable.

6. Agree on the source of the problem and its solution; otherwise there is little likelihood that the issue concerned will be resolved.

7. Be prepared to receive feedback yourself, since your behavior may be contributing to the receiver’s behavior.

8. Use active listening techniques and observe the behavior of the other during the feedback session, which may either confirm or disconfirm the feedback. In closing, reflect upon and summarize the session to ensure that both you and the receiver are leaving the meeting with the same understanding of what was decided.
CHAPTER 2 - THE ROLE OF E-MAIL IN ORGANIZATIONAL COMMUNICATION

Before looking into the use of e-mail by certain organizations, such as in R&D and UNEP, it is useful to understand how e-mail came about. A general overview of the pros and cons of e-mail will then be attempted. Then, the important issue of media appropriateness will be dealt with, followed by the implications of technological innovation for managers. Finally, communication networks will be considered, using UNEP's InfoTerra information network as a case study.

The Origin of E-Mail: the Internet

In the 1960s, the US Defense Department's Advanced Research Projects Agency (ARPA) embarked on a project to design a new technology known as packet switching to enable information to be transmitted around broken communication lines. This was meant to develop a communication network that could survive a nuclear attack. This system enables users to share data and exchange e-mail. At the time this was a mini-revolution as detailed letters could be sent at the speed of a telephone call. This network was known as the ARPANet. This has become what is known as the Internet today.
Today's Internet is a high speed worldwide network linking over two million computers with about 30 million users in more than 160 countries (Blissmer 1994:162). It is about 10,000 computer networks loosely connected through the National Science foundation Network (NSFNET).

The Internet makes possible for users to exchange e-mail all over the globe. Users can access roughly 50,000 databases, and other services such as bulletin boards, newsgroups, and mailing lists for example. The Internet is mainly used by groups of scientists, researchers, business people, and students to exchange information.

**What Is Electronic Mail**

"E-mail is an application that handles the sending and receiving of electronic messages" (Blissmer 1994:160). The e-mail's concept is similar to that of the regular mail. To exchange mail, one needs the correct address of the recipient. E-mail is mostly used for exchanging short messages (text files in ASCII format). However, many communication softwares are starting to incorporate the capability to integrate spreadsheets, presentation graphics, voice, or video in the message.

**Advantages of E-mail**

E-mail has two main advantages over the regular mail. The first one is the element of speed. A message sent via e-mail can take anything between a few seconds to a few hours to reach the receiver rather than the several days of the regular mail. E-mail has also one advantage over the telephone since the recipient does not need to be there
when the message is received, and the same amount of information can be sent for a fraction of the cost of a telephone call.

The numbers of individuals who are ‘wired’ is expected to grow to 11 million by the turn of this century. The main reason why people are interested into being ‘online’ is an economic reason. E-mail is much cheaper than a fax, telephone or the traditional mail. Using e-mail, a message from California to Japan will cost just as much as a local phone call (Lloyd 1995). The cost of e-mail messages might be low, but there is still the initial cost of the computer, the modem, and the software that needs to be taken into consideration (Lloyd 1995).

Research institutions have used e-mail to exchange findings at a fraction of the cost of telephone conversations, faxes or regular mail. Organizations with international ramifications have also used e-mail to cut down on costs. One of the reason why some people are still hesitant to use e-mail is because of all the negative publicity surrounding electronic security, or rather the lack of security. Messages and confidential information can be easily intercepted and tapped.

E-mail is a cheaper way to connect businesses digitally so that they can gather information and communicate faster. In my opinion, E-mail is the most immediate and useful feature of the Internet. Another problem facing e-mail, on top of security, is the lack of a global directory of addresses. If it is a problem of standards, then the issue would most likely be resolved soon. However, some companies are reluctant to give away such information for the same reason that they do not like to give away their phone numbers (Lloyd 1995).
E-mail has a definite advantage “over the telephone when the user needs to exchange complex data such as documents” (Blissmer 1994:160-161). Similarly, e-mail has the advantage of not requiring the receiver to be present when the message is sent unlike, e.g., a fax. This means that a group of people does not need to be present at the same time in remote locations to do their work. E-mail can be a successful medium for the delivery of messages, thereby facilitating the work of remotely connected groups.

While the total volume of mail delivered by the post office has actually risen 5% since 1988 in the United States, business-to-business mail during that period dropped an alarming 33%. Most of that, the post office acknowledges, has been lost to fax machines, E-mail and electronic funds transfers. Among the many reasons: E-mail sent via the Internet arrives instantly, provided it is addressed correctly, while the post office is lucky to deliver 80% of first-class letters within three days (Suneel Raatan Times:1995).

Limitations of E-mail

The reasons for the high degree of interest in the Internet as a communication vehicle are straightforward: speed, flexibility, manageability, and it is inexpensive when compared to traditional communication methods such as telephone, voice mail, regular mail and fax. However, the cost and complexity of setting up and managing numerous Internet accounts can be daunting to many organizations. Organizations have found that to satisfy Internet e-mail requirements they are faced with the
prospect of multiple Internet access accounts (each with a connection time based fee), or complex router and gateway solutions.

E-mail is relatively easy to use and users tend to emphasize the convenience of this new communication tool rather than the actual contents of the message(s) which can be poorly written, ill-conceived, and even downright embarrassing. The message creation requires no thought, just type and click on “send.” The problem is that most people do not write a good message without running a spell-check, and showing it to colleagues. Another issue is that there is no confirmation of receipt unless the receivers responds. E-mail addresses are like phone numbers. Unless the exact address is used, the message can reach the wrong person or come back to the sender. This can be problematic when important or vital information is exchanged. Sending a message to John Doe at jdoe@unm.edu will go to the University of New Mexico, whereas jdoe@umn.edu will go to the University of Minnesota.

E-mail can work just like the regular mail, but no one seems to realize that. Most people assume wrongly that the message will get to its destination in the seconds. This might be true of internal communications, but not necessarily when that message is external to the organization, especially international. Since most networks cannot afford to be connected to the world on a constant basis, the network will be open for anything between every 15 minutes to once a day (Manes 1995:59).

This means that if the sender misses the period when the network is connected to the outside, then the receiver might not get his/her message until the next day. This is like missing the collection time with the post office. Unless someone knows the rule, it is unlikely that one can guess how long it will take before that e-mail message
reaches the other side of the globe, or how long one has to wait until a reply becomes posted to the in-box. Depending on what services one relies on, the message can take from five minutes to more than one and half day to reaches the receivers’ mail-box. Another issue is that of ‘undelivered e-mail.’ This once again is similar to the postal mail where it is hard to confirm delivery of a message unless the recipient acknowledges it.

E-mail, according to Raskin, is the new “quicker, easier way to correspond.” All it takes to send an e-mail is to type up the letter, and compose the correct electronic address. Very soon, the letter will be sitting in the “in-box” of the correspondent, awaiting retrieval. “The benefits of electronic mail are evident: It’s cheap, simple, and convenient. But the ease of e-mail drags along with it a new, unforeseen problem—e-mail guilt.” E-mail has become so easy that one’s “volume of correspondence (increases) to frightening proportions. E-mail usually brings the problem of information overload right at home. It is not uncommon for someone belonging to a few mailing lists to receive 30 to 50 daily messages from strangers sharing some common interests. An individual will tend to feel guilty if no answer(s) are provided to the many questions asked on those lists. On top of these messages, an individual can expect all the other messages from colleagues.

Managerial Communication

Managerial activities involve some form of communication, direct or indirect. Managers communicate with or through others. Unless people understand these
communications, managers' policies will be ineffective. In *The 100 Best Companies to Work for in America* (Levering, Moskowitz, & Katz 1984:ix), communication was emphasized as one of the 12 characteristics of the "ideal company::"

Each company is unique, but there were certain themes we heard over and over again, and the urge to draw a kind of composite picture of the ideal company is irresistible. Beyond good pay and strong benefits, such a company would … encourage open communication, informing its people of new developments and encouraging them to offer suggestions and complaints.

Empirical research supports this idea. For example, a study of 327 hospital nurses (Pincus 1986:395-419) showed that job satisfaction and performance were related positively and significantly to efficient organizational communication. Another study (Snyder & Morris 1984:461-65) showed that the organization performance was related to its communication efficiency. This is underscored by the fact that managers tend to spend at least 70 percent of their time communicating (Mintzberg 1980).

The figures on the following page show the distribution of time and activities by media based on five weeks of observation of chief executives' work (©1973 Henry Mintzberg).
Figure 3 - Distribution of Hours

- Telephone Calls: 6%
- Desk Work: 22%
- Scheduled Meetings: 59%
- Tours: 3%
- Unscheduled Meetings: 10%

Figure 4 - Distribution of Number of Activities

- Telephone Calls: 24%
- Desk Work: 33%
- Scheduled Meetings: 19%
- Unscheduled Meetings: 19%
- Tours: 5%
The high quantity of communication does not guarantee the quality of the process. Levinson describes the typical manager as talking too much, expressing himself poorly, and having an uncanny ability for evading the point, and that most managers cannot "write a coherent letter, make a compelling presentation, dictate a concise memo, or put together a speech that doesn't have half his audience looking at their watches" (Levinson 1986:40).

It is also very instructing to see what type of media a manager will use, and to whom this messages are for. In the following page, two figures describes these two variables. Interestingly, managers prefer from far the face-to-face communication method as it is very rich in feedback. Meetings are also an usual way to communicate. Memos and telephone rank relatively lower in usage.

Managers spend most of their time communicating with their subordinates (44%), and external others (24%). A large part of their time is also devoted to communication with their superiors (15%).

The next logical step is to analyze media choice, and see how a manager can select the best media for a specific situation.
The following two figures show how managers communicate, and to whom they communicate (Luthans & Larsen 1986:167-68).

**Figure 5 - Managers Use the Following Media**

![Bar chart showing media used by managers](chart1)

**Figure 6 - ... to Communicate with the Following People**

![Pie chart showing people managers communicate with](chart2)

---

1 Total does not equal 100 due to overlapping categories
2 More than 100% due to rounding of figures
Choosing the Appropriate Media

In obtaining and disseminating information, managers need to choose the right media. Decisions based on inaccurate information can have disastrous repercussions. Important messages may not reach the intended receiver due to the use of the wrong media. Information richness is defined as “the potential information-carrying capacity of data. If the communication and an item of data, such as a wink, provides substantial new understanding, it would be considered rich. If the datum provides little understanding, it would be low in richness” (Daft & Lengel 1984:196). According to this definition, different media have different levels of richness.

Information richness is based on four pillars: ① feedback (from an immediate to a very slow response), ② channel (visual and audio to a limited visual), ③ type of communication (personal versus impersonal), and ④ language source (body, natural, or numeric). Face-to-face would be considered the richest of all form of communication in terms of feedback. The response is immediate and it allows for multiple communication cues to exist at the same time. On the other hand, numeric communication would be the lowest, as feedback is slow. The information is impersonal and the channel only allows for limited visual information. E-mail would range somewhere in between the telephone and formal writing. Table 2 shows the characteristics of information richness and a contingency model example for selecting communication media.
Table 2 - Characteristics of Information Richness for Different Medias

<table>
<thead>
<tr>
<th>Information Richness</th>
<th>Medium</th>
<th>Feedback</th>
<th>Channel</th>
<th>Type of communication</th>
<th>Language Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Face-to-face</td>
<td>Immediate</td>
<td>Visual</td>
<td>Personal</td>
<td>Body Natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Audio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e-mail</td>
<td>Telephone</td>
<td>Fast</td>
<td>Audio</td>
<td>Personal</td>
<td>Natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal Written</td>
<td>Slow</td>
<td>Limited Visual</td>
<td>Personal</td>
<td>Natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formal Written</td>
<td>Very Slow</td>
<td>Limited Visual</td>
<td>Impersonal</td>
<td>Natural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Formal Numeric</td>
<td>Very Slow</td>
<td>Limited Visual</td>
<td>Impersonal</td>
<td>Numeric</td>
</tr>
</tbody>
</table>

Source: adapted from Richard L. Daft and Robert H. Lengel

The contingency model depicted in Figure 7 can be related to the perceptual model of communication (see Figure 2). The overload and oversimplification zones shown in the contingency model are 'noise zones' where the communication process is seriously impaired. It is therefore vital to match the richness of the communication medium to the level of complexity of the situation to ensure successful communication. As the contingency model shows, different mediums should be used for different situations.
As shown in the contingency model, there are three zones of communication effectiveness. The most effective form of communication is to be found in the middle zone (between the dotted lines), when the medium is matched with the complexity of the problem or situation. Accordingly, simple problems are best handled by formal numeric or formal written. More complex problems are best handled by face-to-face communication or telephone.
Little research has been conducted on correlating media richness and problem/situation complexity as the theory is relatively new. However, it has been shown (Daft & Engel 1984:191-233) that "managers used richer sources when confronted with ambiguous and complicated events."

Ineffective communication occurs when the media does not match the complexity required. This is when the richness of the information is either too high or too low for what it is required to do. For example, if a manager decides to communicate a major layoff through a simple formal memo, then this situation would be one of oversimplification. On the other hand, if a manager decides to conduct face-to-face communication with each and every salesperson to announce the monthly sales results, this would be an overload for the salesperson. In this case, it would be more appropriate, e.g., to announce the sales results by providing a computer sales chart to each salesperson.

**Matching the Communication Media with the Situation**

As discussed previously, the Media Richness Model has received quite some attention in the field of organizational communication (Fulk & Boyd 1991:409-411). The richness of a media is determined by "① the speed of the feedback involved, ② the variety of communication channels utilized, ③ the personal content of the source, and ④ the richness of language used" (Daft & Lengel 1984:191-233; 1986:554-571).

The richest form of communication would be face-to-face contact which has the greatest ability to resolve ambiguous situations, followed by the telephone, e-mail and
written documents (Cummings 152). The interesting part about media choice is that it carries a symbolic meaning. A rich form of communication such as face-to-face contact carries with it some informal overtones. Thus, even though the situation might require a rich medium, managers might choose a less rich medium that carries formality, such as a memo, in a situation where formality is required. Studies have shown that high performing managers are better at matching the appropriate media richness with the complexity of the situation (Daft, Lengel & Trevino 1987:355-366).

It seems that for “non-routine tasks, difficult communications, implementing organizational strategy” it is best to use a “rich” medium such as a person-to-person meeting. On the other side of the scale, “leaner” medium such as e-mail, memos, and letters should be used for “routine, simple communications.” In case of a critical situation, the manager should use a combination of the two to ensure effective communication and appropriate use of media (Cummings 152-153).

*Communication and Technological Innovation*

The research that has been done on media richness unfortunately does not always include the newer computer-based communication technologies such as e-mail. Many studies have found that e-mail ranks relatively low in terms of richness but it is nevertheless widely used (Fulk & Boyd 1991:411; Steinfield 1986:777-804).
A Social Influence Model of Technology Use

This model suggests that “(1) perceptions of electronic media differ across individuals in systematic ways, and (2) this difference is as important for media choice as are any of the variables in the Media Richness Model” (Fulk & Boyd 1991:411-412; Schmitz & Steinfeld 1990).

The perceptions of e-mail by employees are “directly linked to the social processes at work in the organization” (Cummings 153). The views about e-mail for instance will vary depending on broader social factors such as “remarks by co-workers, vicarious learning experiences, and organizational norms for how different media should be evaluated and used” (Cummings 153). Thus, the use of e-mail might not be entirely rational, but peer pressure might make individuals use it although it is not the most appropriate medium for the task. Due to its novelty aspect, individuals might start using e-mail because this is what everybody else is doing.

Managerial Implications

E-mail is becoming quite popular, at least in the developed world, and it has made some organizational tasks easier to do. However, there is some questions about its limitations. There are three major limitations to e-mail. First, to rely heavily on electronic communication negates the positive effect on communication that social cues can bring to the situation. Second, research has shown that electronically connected groups perform as well as groups using multiple communication media.
However, the "electronic" group display a lower level of satisfaction (King 1991:246-250). As the remoteness of communication is felt due to the unpersonal aspect of the computer, the members of the group will have a reduced sense of membership, and this might lead to a reduced commitment to the organization (Putti, Aryee & Phua 44-52). Finally, due to the resistance some individuals might have against new technologies, it is important to ascertain whether and how e-mail is used, rather than simply checking for which activities is e-mail used for. There are quite a few examples of organizations which have implement e-mail systems that are not entirely used for their intended users and original purposes (Cummings 154).

As the use of e-mail might expand, it is then vital for the manager to "carefully consider the intent, impact, and context of their communication efforts" (Fulk & Boyd 1991:415). The manager needs to consider the following four points before introducing e-mail in his/her organization (Cummings 154):

1. What is the audience’s preference (that is the receiver)? Is he/she more receptive to face-to-face contacts, or to ideas put in writing?
2. Most organizations usually dictate what should be formalized and written and what can be informal and verbal.
3. When introducing e-mail it is important to consider that the perception of individuals does not simply reflect the technology, but also how it is considered by peers, and other members of the organization. "Providing informal help sessions, using opinion leaders to support the new system, and encouraging peer training can readily improve the initial acceptance and ultimate effectiveness of the new system."
4. It is also important to consider "organizational policies (e.g., budget constraints), individual working styles and preferences, and managerial pressures and time constraints" which all have an impact on the overall communication process and its effectiveness.

**Communication Networks**

The key to organizational communication is the arrangement and structure of *how* information is transmitted to the persons and groups who requires it for task, problem-solving, control, or decision making purpose.

Communication patterns in organizations are more complex than meets the eye. The formal and informal structures of an organization affect the communication activities, such as how reports are handled, which channels of communication are used, what sort of information flows through these channels, etc. Moreover, in every organization, the informal communication (such as the *grapevine*) has also a strong influence on how information is handled (Cummings 144).

The following figure shows the five basic communication networks.

**Figure 8 - Basic Communication Networks**
Adapted from Cummings
Recent research has shown that these communication networks “can either facilitate or hinder the full and effective use of an organization’s information resources” (Bush & Frohman 1991:23-36). Depending on the complexity of the task, some networks are more efficient than others. With simple tasks, a centralized network—that is one individual must receive information from others—performs better in problem solving. With more complex tasks, research has shown that decentralized or completely disconnected networks are more efficient than centralized networks.

The *wheel* is a good example of a centralized network. Only the central individual can communicate with everyone in the network. This is an efficient model for simple tasks, but the “outer members” have a low satisfaction. The *circle* and the *all-channel* on the other hand allow for more interaction, and thereby increase the satisfaction of its members. An electronic mailing list follows the model of the *all-channel*. Once one individual posts a message to the list, every member of the list will get a copy in their ‘mail-box.’ Then each individual can choose to follow the *all-channel* model by replying to the list, or the *circle* model by replying to one specific individual. Mailing lists will increase the satisfaction of its subscribers, but it can become very time consuming as one individual can read each messages posted to the list. For example, the United Nations Environment Programme has a mailing list on Environmental Impact Assessment. The number of postings per day averages 30, which can take some time to go through. This sort of network is more effective in dealing with complex issues as it draws expertise from many different resources. Feedback is more direct and immediate. People are more involved, and as a result these networks are
more efficient in dealing with organizational change. The "Y" and the chain are typical of a subordinate-manager relationship. These types of networks can "readily hinder organizational innovation and change" (Bush & Frohman 1991). The circle and all-channel "encourage information sharing that is more simultaneous and spontaneous, contributes to more interactive learning across organizational members, and enhances intergroup interactions." As such, electronic mailing lists avoid an "excessive emphasis on a linear progression of scientific discovery that can result in suboptimal resource allocations, slow and costly new product and process introductions, a failure to tap the creative potential in a wide range of employees" (Cummings). This is where e-mail can be used to influence the way information is shared in the organization, thereby boosting creativity, innovation, morale, and the speed and accuracy of organizational problem solving.

An example of Electronic Communication: R&D

The most consistent result out of research in R&D management, is that "personal contacts are the best form of communication. The most interesting aspect of this communication problem in an international context is the added difficulty of geographical distances. Indeed it makes the core element of communication in R&D, the informal personal contact, much more difficult." (De Meyer, p.178)

The travel budget in most companies ranges from 5% to 7% of the total R&D budget, which is not considered too high. The travel restrictions have more to do with the scientists’ time utilization than the actual cost of traveling. However, these
companies have high expectations of the role electronic communication can play in reducing the burden of traveling. The companies studied by De Meyer experimented with anything from e-mail to full-fledged video-conferencing.

One of the main concerns of electronic communication is the extent to which it can “replace direct personal contacts.” Techniques such as “video-conferencing, electronic databases, electronic mail and intensive jet travel all contribute to lower the communication barriers.” However, according to De Meyer, the most effective form of communication is the hand shake across a table, on which mutual trust and confidence can be built. Only after that first contact can the electronic communications be effective. Even then, the confidence tends to fade with time, even with the intensive use of electronic communications.

In the words of one of the engineers with a considerable experience of video-conferencing:

[Although it is a great system], I have two difficulties with it. I still cannot express emotions on a video-conferencing system. It seems silly to become angry, to joke, to deviate from the subject and to talk about your family, to complain about your boss, all those things you need in order to get to know each other. And I am never sure that my colleagues at the other end are not taping me, to use my own words against me. I know it is silly, because I am not scared of taping at the phone, but video-conferencing meetings still create much more official commitments than a simple phone call.

Even the best e-mail system cannot supplant face-to-face contacts to boost the level of confidence needed for efficient teamwork. Another issue that has hindered the use of e-mail in R&D is that of security, and the increase of problems in security. Although the issue of security is mostly technical, the risk of intrusion by outsiders has “inhibited a full commitment to computer communication in R&D.” The
sensitive materials and vital data are usually kept out of electronic communications. As a result, electronic communication is used mainly for routine results.

UNEPA's *Use of Electronic Communication: the InfoTerra Information Network*

UNEPA was set up to catalyze, coordinate and stimulate action within the United Nations system. In 1972, the Stockholm Conference, called for an international mechanism for the exchange of environmental information (scientific and technical). The body then formed was referred to as the International Referral System (I.R.S.) which was later renamed "InfoTerra." It operates through a network of institutions designated by governments to act as focal points for the scheme. InfoTerra is now the largest environmental information system in the world and it is currently being used by over 6,500 institutions and has over 600 databanks covering 149 countries. InfoTerra's participating countries spend US$ 20,000 per annum on requests processing. In 15 years, InfoTerra has processed 147,000 queries from over 114 countries.

InfoTerra responds to about 38,500 queries annually. The detailed and tailored responses are provided in the form of bibliographic references and abstracts, documents, articles, technical reports, lists of consultants and database printouts. New communication technology, such as "satellite, telefax, electronic mail and computers with vastly increased data handling capabilities has, and will, greatly increase both quantity and quality of information processed. Information needed to address most sustainable development problems is already available somewhere in the world. The
development of companion relationships between network users, especially between developed and developing countries, has proved a further means of providing information to decision-makers, resulting in well-informed and timely decision making (from the Internet at http://www.unep.no).”

InfoTerra has set up a public list for exchanging information on the environment and any environmental topics, posing queries to the network, requesting information from UNEP, and raising environmental awareness in general. The list is being used by individuals, United Nations partners of UNEP, NGOs, and the governments. The list is an open communication network, i.e. an all-channel network. Queries are not only responded to by UNEP, but also by the users themselves. InfoTerra, which is UNEP’s environmental information exchange network, processes more than 38,500 queries every year, mostly from developing countries (Our Planet 1995:42-43). The branch of InfoTerra that deals with electronic communication is UNEPnet, an electronic network of interconnected Bulletin Board Systems, and its use has been integrated through the use of the Internet. In May 1994, InfoTerra established an electronic subscription list on Internet. More than 150 queries are registered every month in Nairobi. This list has currently over 1,000 subscribers.

UNEP has also setup in April 1995 a more specifically focused list that deals with Environmental Impact Assessment (EIA). The principle is the same, except that the focus of attention is narrowed down to encompass only EIA discussions. The list is already used by over 300 persons, and encompasses professionals in the field of EIA, government officials, NGOs, academic and research institutions.
The ultimate aim of InfoTerra and UNEP is to “change people’s attitudes, as well as to empower them to act for the protection and sustainable use of the environment.”

UNEP will use UNEPnet for a variety of use. For example, it can support remote translation exercises such as the Conference of the Parties to the Biodiversity Convention in Bahamas. Instead of flying the translators to the Bahamas from Nairobi, the documents were e-mailed to Nairobi, translated and then e-mailed back to the Bahamas. The same work was done at a lower price to UNEP. Databases can be synchronized daily or hourly, high-volume of data set transfers (satellite images; Geographical Information Systems (GIS) data; monitoring data from Regional Seas exercises and bibliography search results) can be done in near-real-time. UNEP also envision using the network for two-way voice and video exchange, and secure corporate e-mail and document transfer. UNEP’s e-mail system not only allows the exchange of text files but also notifies the user of in-coming mail, and can forward messages while the user is on mission. UNEP has also set up shared address lists since no “White Pages” are available. Finally, the system recognizes undelivered mail, and notifies the user of e-mail errors. Undelivered mail is returned to the sender. This system allows for a more reliable use of e-mail. As a result, there is an heavy usage of e-mail by UNEP. For example, in May 1994, about 1700 messages per week - equivalent to about 5000 pages of text - passed through the network, of which about $\frac{2}{3}$ to $\frac{3}{4}$ involve senders or recipients outside of Nairobi.
The Creation of the "Information Environment"

E-mail is used in the consumer goods' organizations, where managers coordinate and communicate their activities through e-mail (Zuboff 1991:115). R&D organizations of large companies have greatly enhanced their interaction with video-conferencing. There might be reduced face-to-face interactions, but the technology makes it easier for people to meet and initiate communication.

The information environment refers to, according to Zuboff (1991:117), the "quality of organizational life that emerges when the computer mediates jobs and begins to influence both horizontal and vertical relationships." Such an environment makes individuals usually feel more powerful and orderly. This affects the environment of the professional. A vice president of a company that has come to rely on e-mail said:

"I used to make notes to myself on things I had to follow up. Now those notes go into my electronic mail system. The system automatically tracks these things and they are there in front of me on the screen if I haven't followed up yet. Nothing slips through the cracks, but certainly for the way professionals usually operate, it's more regimented."

This lead to the side-effect of the so-called empowerment: many professionals, instead of feeling more powerful due to increased information, feel that the technology limits their freedom, encroach on their creativity and increase the measurability of their work (Zuboff 1991:118).

There are three main categories of opinions on e-mail. Some people are conscious of new developments and "see them as particular form of human debasement and depersonalization." On the other hand, there are individuals that welcome any new technology, as a "conquest of dumb nature." Finally, some argue that technology is
neutral, and that it depends on what people do with it. These views, however, are very superficial and insufficient (Zuboff 1991:119).
CONCLUSIONS

While it seems that the noise level is ever increasing, and that people are "less and less communicating," we are experiencing at the same time an "information explosion." Everyone has access to "data in inexhaustible abundance" (Drucker 1974: 481-482). Is this actually becoming knowledge or is it a simple information overload? It seems that this abundance of information changes the communication problem and makes it only even more complicated. It is interesting to note that the information dilemma is nothing new, as the above comments were made by Drucker in 1974.

New technologies change the way we live and communicate. We live in an epoch of communication. For a technology like e-mail to be truly successful, it needs to become as easy to use as a telephone, and more reliable.

New communication technologies create new possibilities for management to explore. Managers need to consider the quality of the employment relationship, the new attitudes toward the technology, and its impact on the organization.

The most significant impact of new technology is the shift in the organization shape from a pyramid to a diamond shape. Due to information technology, managers will do tasks that once other people did for them. As a result, the numbers of clerical positions will diminish, with an increase in the number of middle-management and
professionals, and "an even more remote, elite, policy-making group of senior managers" (Zuboff 1991:121).

This increased reliance on information technology is likely to alter organizational behavior. As Zuboff argues, "who interacts with whom in the organization? Can the neat chain of command hierarchy be maintained? Should it be? What does it take to influence others when communication itself becomes computer mediated? Finally, who is likely to gain or to lose as we make the transition to this environment?" (1991:121)

Managers need to consider the impact on the quality of work environment if the organization would not need to have people come face-to-face to conduct business as usual. What will happen to confidence, purpose and commitment of individuals if the organization becomes an abstract one? How will these affect the productivity of the organization?
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GLOSSARY OF TERMS

1. **Alphanumeric**: consisting of letters, numbers and other symbols, such as punctuation marks or mathematical symbols. Refers to the keyboard characters and character set available for various operations of the computer.

2. **American Standard Code for Information Interchange (ASCII)**: a set of 256 binary codes that represent the most commonly used letters, numbers and symbols. ASCII has two meanings. ASCII is a universal computer code for English letters and characters. Computers store all information as binary numbers. In ASCII, the letter “A” is stored as 01000001, whether the computer is made by IBM, Apple or Commodore. ASCII also refers to a method, or protocol, for copying files from one computer to another over a network, in which neither computer checks for any errors that might have been caused by static or other problems. See binary.

3. **ARPANet**: A predecessor of the Internet. Started in 1969 with funds from the Defense Department’s Advanced Projects Research Agency. backbone A high-speed network that connects several powerful computers. In the US, the backbone of the Internet is often considered the NSFNet, a government funded link between a handful of supercomputer sites across the country.

4. **Binary**: the base two number system, in which numbers are represented by zeros and ones. For example, the number 5 is expressed in binary as 101. Most digital computers use binary. See ASCII.

5. **Bit**: a contraction of BInary digiT, the basic unit of information used by the computer. It represents either zero or one. There are eight bits in one byte. See binary.

6. **BITNet**: Another, academically oriented, international computer network, which uses a different set of computer instructions to move data. It is easily accessible to Internet users through e-mail, and provides a large number of conferences and databases. Its name comes from “Because It’s Time.”

7. **Bits Per Second (BPS)**: a rate of transmission speed.

8. **Bulletin Board Systems**: A system that enables users to send or read messages that are of general interest and addressed to no particular person.

9. **Communication**: the means by which a computer transmits and receives data to and from another computer or device.

10. **Communications**: A program that tells a modem how to work.

11. **Data**: information that is factual, measurable or statistical and which is ordered or formatted to be computer processed, stored or retrieved.

12. **Domain**: The last part of an Internet address, such as “news.com.”
13. **Down:** When a public-access site runs into technical trouble, and you can no longer gain access to it, it's down.

14. **Download:** Copy a file from a host system to your computer. There are several different methods, or protocols, for downloading files, most of which periodically check the file as it is being copied to ensure no information is inadvertently destroyed or damaged during the process.

15. **Electronic mail:** Messages sent and received electronically via telecommunication links, as between microcomputers or terminals. Also called e-mail.

16. **File:** A set of information such as the data required for a program or a document. A file is a collection of data, saved on disk, that has a unique name.

17. **Graphics:** Information presented as drawings, pictures or other images such as chart or graphs.

18. **Handshake:** Two modems trying to connect first do this to agree on how to transfer data.

19. **Hang:** When a modem fails to hang up.

20. **Host system:** A public-access site; provides Net access to people outside the research and government community.

21. **HTTP (Hyper text transfer protocol):** World wide web standard for transferring data between web servers and clients.

22. **Internet:** A worldwide system for linking smaller computer networks together. Networks connected through the Internet use a particular set of communications standards to communicate, known as TCP/IP.

23. **Log off:** Disconnect from a host system.

24. **Log on/log in:** Connect to a host system or public-access site.

25. **Mailing list:** Essentially a conference in which messages are delivered right to your mailbox, instead of to a Usenet newsgroup. You get on these by sending a message to a specific e-mail address, which is often that of a computer that automates the process.

26. **Message:** is the signal or symbol that stands for something in experience. It is information which is transmitted from one individual to another.

27. **Modem:** A device that converts (Modulates) digital data for transmission over telephone lines, and then converts modulated data (DEModulates) to digital format when received. A smart modem also interprets and executes commands received from the computer.

28. **Moderator:** A person that is assigned to moderate an electronic mailing list. This usually implies screening messages and deciding which one will be posted to the members of the list.

29. **Netiquette:** A set of common-sense guidelines for not annoying others.

30. **Network:** A communications system that links two or more computers. It can be as simple as a cable strung between two computers a few feet apart or as complex as hundreds of thousands of computers around the world linked through fiber optic cables, phone lines and satellites.

31. **Noise:** This is any disturbance in the communication process.

32. **NSF:** National Science Foundation. Funds the NSFNet, a high-speed network that once formed the backbone of the Internet in the US.

33. **Off-line:** When your computer is not connected to a host system or the Net, you are off-line.
34. **On-line:** When your computer is connected to an on-line service, bulletin-board system or public-access site.

35. **Parity:** in serial communications, an error detection bit that is added to a group of data bits making the sum even or odd. Parity can be set to none, odd or even.

36. **Post:** To compose a message for a Usenet newsgroup and then send it out for others to see.

37. **Postmaster:** The person to contact at a particular site to ask for information about the site or complain about one of his/her user's behavior.

38. **Protocol:** The method used to transfer a file between a host system and your computer. There are several types, such as Kermit, YMODEM and ZMODEM Protocol (MNP), which can correct for these errors or which "compress" data to speed up transmission.

39. **Serial communications:** a communications technique that uses as few as two interconnecting wires to send bits one after another.

40. **Server:** A computer that can distribute information or files automatically in response to specifically worded e-mail requests.

41. **Signal-to-noise:** The amount of useful information to be found in a given ratio Usenet newsgroup. Often used derogatorily, for example: "the signal-to-noise ratio in this newsgroup is pretty low."

42. **SLIP:** Serial Line Internet Protocol. Used to turn home computers into Internet sites over a phone line.

43. **Smiley:** A way to describe emotion on-line, e.g., :-). There are scores of these smileys, from grumpy to quizzical.

44. **Source:** this is the origin or sender of a communication message.

45. **TCP/IP:** Transmission Control Protocol/Internet Protocol. The particular system for transferring information over a computer network that is at the heart of the Internet.

46. **Telnet:** A program that lets you connect to other computers on the Internet.

47. **Terminal emulation:** There are several methods for determining how your keystrokes and screen interact with a public-access site's operating system. Most communications programs offer a choice of "emulations" that let you mimic the keyboard that would normally be attached directly to the host-system computer.