

The Impact of Technological Change on Organization Management

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ABSTRACT

Technological change will have an impact on all organizations. There will be a need for new types of managerial, diplomatic, and social skills and a concomitant need for a new type of decision making process that will not be accommodated by existing organizational structures.

Three particular aspects of the organizational environment will be affected by technological change: the amount of market competition and uncertainty will increase; there will be requirements for more diversity and higher quality in the organization's products or services; and external politics and legislative reform will increase in complexity. Each of these changes will provoke responses from the organization in its structure and relationships with employees and customers.

Technological change will force changes in basic managerial functions. There will be increased responsibility on management for organization outcomes leading to added emphasis on planning, decision making, control, and coordination. These will often rely on computer-based management science techniques which demand a higher intellectual capability of managers. This will produce strain on managers and other individuals, potentially affecting morale, productivity, and output.

Technological change can positively affect individual values leading to increased time for consideration of both the heart and the brain in decision making. This may lead to greater moral sensitivity and more tolerance and compassion for others, all coupled with a more rational approach to decision making. A possible effect of technological change may be increased loyalty to one's profession rather than to one's organization. The effect of technological change on the manager's quest for self-actualization is still debatable.

The net result of technological change for all organizations is a greater requirement for strategic planning. All of us must continually ask the question "What do we have to do now to attain our objective tomorrow?" Through this process we can anticipate changes, including those brought about by technology, evaluate the various alternatives available to us to cope with those changes, and be prepared for the future as it arrives.

Introduction

Few, if any, areas of our lives are not touched daily by some aspect of technological change. I had not realized until recently how ingrained our perception of the value of technology really was. The incident that convinced me of our preoccupation with technology was a radio commercial promoting a new kind of hot dog solely on the basis of its being a "technological break-through".

It is important, then, for us to review technological change and try to understand just how it is affecting our lives. It is particularly important for those of us who are the agents of technological change to understand how we are affecting the organizations in which we work and those people with whom we associate; and, indeed, how our own lives are being changed through technology.

Organizational Environment

The books Future Shock¹ and The Limits to Growth² have vividly portrayed the effects of exponential growth on our daily lives and our environment. This rapid growth has similarly affected the organizational environment. The organization and the organizational structure of years past can no longer effectively respond to the pressures of today. We must have a new type of managerial, diplomatic, and social skill in today's managers. More fundamentally, though, the decision-making process itself, the very heart of management, is changing.

It is not that it would be "helpful" for modern organizations to change their management process: it is a necessity for them if they hope to continue their existence. T. Vincent Learson, when he was president of IBM in 1968, said, "If we can agree that the velocity of change is the hallmark of today's business environment, we must also conclude that the management of change is the secret of corporate survival".³ IBM has certainly survived; and indeed, has prospered.

Paul Gross and Robert D. Smith looked at some broad effects of technological/social change on organization environment.⁴ They isolated three effects which I would like to discuss in detail.

There will be increasing market competition and uncertainty as a result of technological change. Competition is the name of the game. Today, more than ever before, there are virtually no public companies which have a stranglehold on competition in their market. Technological change is so rapid that the market cannot stabilize. Look at the computer market. IBM dominated the large computer market for years. Then Digital Equipment Corporation developed and dominated the mini-computer market. Now we are in the middle of a battle for both these markets plus a growing micro-computer market. We need only look for current models of computers bearing the name of General Electric or RCA to understand the realities of uncertainty in a time of technological change.

Organizations will respond to increasing market competition and uncertainty in several ways. They will be forced to develop more rules and regulations for their activities, and then be forced to increase their organizational complexity to enforce and monitor the enforcement of those rules and regulations.

They will have a greater tendency toward collusion and monopolistic practices. Trade groups and professional associations will take on new values. Having a broad-based board of directors will become increasingly important. Cooperative efforts will become more common, prompted by the desire of companies with similar interests to band together in opposition to other companies who do not share their exact interests. I often hear bankers saying to each other that we must cooperate in certain ways to help defend us all against those savings and loan associations and credit unions. Bankers do not like each other any better today than they did years ago; but, they are more aware of technological change and its possibilities for threatening their collective way of life than they are scared of each other.

All organizations will use staff specialists and categorize their activities more. The organizational chart for major corporations today has an increasing number of staff positions, many of which are just as critical to efficient operation as are any line positions. Many corporations go so far as to divide their organization along product lines with complete support staffs for each line. The problems of coordination and communication within the corporation often themselves require the creation of additional staff positions for internal communications.

The second broad effect of technological change in the organizational environment is the more rapid change of the basic characteristics of the organization's product or service mix. Consider, for example, the growing complexity of the consumer goods industries. Next time you visit a supermarket or drug store look at the incredible variety of brands and types of products you have to choose from. Then, think how many brand managers those consumer goods companies have and how complex their organization must be to give you all those choices.

As you visit that grocery store or drug store notice how many new brand names and new products you see each week. You should also notice how many old names and brands are no longer there. The product life cycle today is often measured in months, or even weeks, instead of years. Organizations cannot run on the inertia of what they are doing today for very long. They must commit significant resources to planning for tomorrow.

It must also be pointed out that the public is very aware of quality in the products and service it uses. This further forces organizations to develop specialized and costly quality control procedures.

A fundamental point to remember is that technological change in the form of abilities to rapidly and economically develop new production techniques is the key that makes this product and service diversity possible. Unless technological innovations continue, it is very possible we may become unable to continue to support this public demand for novelty. The attempt to do so will increase the strain on organizations and force them to use technology even more to both their benefit and that of the public.

Increasingly complex political activity outside the organization is a third broad effect of technological change. Technology has brought us legislation in increasing amounts and increasing complexity. Organizations are increasingly relying on their legal staffs to cope with the political, legislative, and judicial process as a major activity of the organization.

Where direct legal action is not successful as a means of reaching desired goals the more subtle persuasion of paid lobbyists and out-and-out bribes are sometimes used.

Certainly, not all organizational activities in response to more complex political and legislative environments are bad. Many organizations are carefully reviewing their relationships with society and making extensive commitments to actively work for social goals that are mutually beneficial for the organization and the community.

Managerial Functions

Technological change, particularly that associated with the computer, is bringing significant changes to how basic managerial functions are executed. These changes have had their most extensive effects in the form of providing better control and coordination of information systems as inputs for planning and decision making.

As better information has become available managers have increasingly turned to computer-based, management science techniques to aid in its analysis. Such techniques as simulation, mathematical programming, and game theory are being widely used today.

These technological aids to management have a potentially negative side effect in their demand for more sophisticated users. This prompts added requirements for specially trained, usually highly paid staff personnel who are skilled in using these new techniques. It must also be pointed out that the awesome computer power needed to provide some of these techniques is also costly. Managers have to continually check to make sure that the value of such new management aids is greater than the cost of providing them.

With such technological management tools the corporation's long-range planning ability is enhanced. "What if" questions can be asked, with the effects of many different answers quantified and evaluated. The organization without the ability to analyze internal and external environmental signals and adapt to them quickly will suffer potentially devastating effects on its earning abilities over time.

Anything which has such a profound effect on managerial functions cannot help but affect the manager himself. As more and more data is collected and is available to the manager for analysis he must struggle to refine his evaluation processes to know just exactly what data he needs and how he can best use it. There is a significant risk that a communication gap will form between the data gatherer and the data analyzer.

There is continual pressure on the manager to keep up with technological change and to know how to use it to his advantage, or to be challenged and eventually passed over by younger, more sophisticated managers who grew up with the computer and who consider it an integral part of their everyday life.

There is also a challenge to the very concept of the general manager. Is the senior manager the decision maker or a coordinator of a group of specialists who collectively make decisions? It is not uncommon today to have

several people share the top decision making responsibilities in a large corporation. Some even have gone so far as to have an "office of the president" with two or three members explicitly designated as sharing that top office.

Individual Values

It is easy to think of the manager as a cog in the corporate wheel or one box out of many on the organization chart. But above all else the manager is an individual with his own set of values. When those values are challenged there is a strain placed on the manager that threatens the morale, productivity, and output of the entire organization.

Technological change forces the individual manager to re-examine his values. Technological management aids tend to center on helping the manager address his environment in a logical, rational way. We look with disdain at the manager who makes decisions based on his "seat of the pants" feelings. The technically sophisticated manager can ultimately be led to the conclusion that things which cannot be quantified and fed into the computer for analysis have no justification for their consideration. Indeed, in a purely automated analysis system they cannot be considered.

Michael Maccoby in an article appearing in "Fortune" magazine states his concern over this preoccupation with the head over the heart of many managers. He says, "In the process [of becoming successful], executives must use their heads - to analyze demand, to design products, to fashion effective advertising, and so on. And at this, they are extremely adept. The trouble is that, in rising to the top, they sacrifice the capacity to develop values that go beyond winning the game. And the larger society, of which business is but a subsystem, depends for its greatness not only on the head but on the heart - the qualities of courage, compassion, generosity, idealism. If the most dynamic sector of society continues to select out these qualities, where will we find future leaders who possess the moral strength to know right from wrong and the courage to act on those convictions?" ⁵

Perhaps, though, technological change and particularly the computer can help reverse this trend of the manager's losing touch with his heart. We must concentrate on using technology to automate the more mundane aspects of our work. Then, we can use our time as managers to think, both with our minds and our hearts.

Through computer simulation and modeling we can better predict the consequences of our future actions. This can give us a greater moral sensitivity to the social costs of our corporate activities and allow us to work to minimize any undesirable consequences of them.

As computerized information systems help us sort through and make sense of the vast amounts of data we must review daily we can have more time to analyze our feelings and temper our actions accordingly. This may allow us to become more tolerant of a variety of management styles ranging from the conventional to that of the "corporate wild man". It should also have the effect of leaving us more time to communicate with each other. This can be important both for our personal development and for our ability to relate to the publics of our organization, including our employees, customers, and shareholders.

One possible result of this enhanced communication is the conclusion among employees that they have more in common with others in their particular profession than in their organization. We must be careful as managers to remember to do those things that are necessary to create loyalty among our personnel to enhance our continued success.

The effect of technological change on an individual manager's quest to reach self-actualization is still debatable. It is possible that the projected complexities of organizational decision making, the increased work load and length of the managerial working day, and the continued need to learn new "tricks" to cope with all this will conspire to frustrate the manager and leave little time for even contemplating self-actualization.

On the other hand, the manager who is trained in using technology as a tool and who knows exactly when and how to use this tool may be able to remove himself from the morass of details and address the basic issues of the organization with a combination of the mind and the heart. Through this process the manager will also have more time to address the other aspects of his life as well. The manager who follows this path may come closer to being able to reach self-actualization than ever before.

Strategic Planning

The net result of technological change for all organizations is an increasing requirement for strategic planning. Peter Drucker defines strategic planning as: "the continuous process of making present entrepreneurial (risk-taking) decisions systematically and with the greater knowledge of their futurity; organizing systematically the efforts needed to carry out these decisions; and measuring the results of these decisions against the expectations through organized, systematic feedback."⁶

As technological change propels us into the future at an increasing rate of speed we must continually ask the question, "What do we have to do now to attain our objective tomorrow?" Through this process we can anticipate changes, including those brought by technology, evaluate the various alternatives available to us to cope with those changes, and be prepared for the future as it arrives.

Summary

Technological change is inevitable. It will affect both the internal and external environments of organizations, basic managerial functions, and individual values of managers themselves. The net result of this technological change will be an increased requirement for the organization to plan for the future.

Technological change itself is neither good nor bad. Its impact on organization management and society itself depends on the actions of each of us who are the agents of technological change.

References

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