

IMPACT OF INFORMATION TECHNOLOGY ON ORGANIZATION & ITS EFFECTIVENESS

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ABSTRACT

Information Technology has completely changed the model of Business & its impacts are comprehensively felt in the form Organization Structure, Operational efficiency, coordination, HRD & Organizational effectiveness. Information technology interacts with organizations and it has huge impact in the form of structure & the way of operational efficiency to cope with technological advancement. It can be used to change the structure of the organization and/or its subunits. One desirable impact of IT is when technology contributes to organizational flexibility. Older legacy systems were often performing critical tasks for the firm. These systems usually run on mainframe computers and are very large and complex. One management problem is deciding if and when to make massive investments to migrate these systems to up-to-date technology. There are a variety of organization structures; some important considerations in studying organizations are uncertainty, specialization, coordination, and interdependence.

KEYWORDS: *Organizational Effectiveness, Operational Efficiency, Organizational Structure, Uncertainty, Interdependence.*

Introduction

In this research paper we will see how technology can be used to dramatically restructure organizations & its effectiveness, permanently changing the way they do business. In particular, note how technology has contributed to flexibility when looking at the organization as a whole, even though users may consider individual applications to be inflexible. The information technology variables have the greatest potential for transforming the organization because they provide a way to significantly change the structure of an existing organization or design an entirely new nontraditional one. Over the next few years, the ability to use technology to create novel organizational structures may turn out to be IT's most significant contribution yet.

Information systems exist in the context of an organization; they do not operate in isolation. There are a number of definitions of organizations. For our purposes, an organization is a rational coordination of activities of a group of people for the purpose of achieving some goal. The activities of the group of people are coordinated; that is, there is a joint effort. In most organizations some division of labor and a management layer provide for the rational coordination of activities. The definition also contains the goals of the organization; there are many different types of organizations with different kinds of goals.

There are many factors that influence the Organizational effectiveness in the form of structure and design of modern organizations. New information technology also offers opportunities to create exciting new forms of organizations.

Uncertainty

One of the major factors influencing organizations is uncertainty. Many researchers & authors suggest that managers try to eliminate or reduce uncertainty. An organization and its managers confront many different types of uncertainty. There are frequently technical uncertainties about whether a new product can be manufactured or whether it will work. Market uncertainties exist when the firm does not

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know how a product will be received, potential demand, response from competitors, and so on. The internal management of an organization also creates uncertainty. Key personnel may leave or individuals may not adequately perform their assigned tasks. Thus, the organization and its managers face many different types and degrees of uncertainty.

Coordination

When there is specialization, one task of management is to coordinate the diverse specialties to achieve the goals of the organization. Management must balance differing orientations and resolve disputes between specialized subunits. For example, the marketing department may want to produce a particular item in each style and color for every warehouse. This plan is best for reducing uncertainty and providing good customer service. On the other hand, manufacturing may want to make products of the same color and model because this procedure reduces the uncertainties in production; that is, there are fewer setups and smoother production runs.

Management must resolve these differences and coordinate the specialists. There are a number of integrating mechanisms to reduce the effects of differentiation or specialization. Sometimes organizations create special liaison positions or even departments to foster coordination. A major advertising agency has a group of expeditors who see that the details of purchasing advertising time and space are organized and that the ads appear in the right place at the right time. We shall see later how information technology can also be used to help managers coordinate groups in the organization.

Interdependence

The last factor we shall consider in organizational structure is interdependence; that is, how do the different departments or subunits within the organization depend on each other? Thompson (1967) has described three types of mutual dependence.

- **Pooled Interdependence** occurs when two organizations depend on each other because they are all components of a larger organization; one unit does not depend directly on another. For example, the different divisions of a conglomerate exhibit pooled interdependence.
- **Sequential Interdependence** occurs when the output of one unit is the input to another. For example, the painting and finishing department depends on outputs from component assembly. We can view each succeeding station on an assembly line as an example of sequential interdependence.
- **Reciprocal Interdependence** occurs when the output of each unit becomes the input for the other. For example, a student depends on the professor to explain concepts in class so that she can do her assignment and the professor depends on students to prepare for class.

Interdependence is an important consideration in organizational design. The type of interdependence affects the amount of power one unit has in the organization. In designing an organization or modifying the design (for example, through the development of a new information system), various interdependencies must be coordinated. The easiest type of interdependence to handle is pooled, the next hardest is sequential, and the most difficult is reciprocal.

What Is Organizational Flexibility?

Flexibility is the ability to adapt when confronted with new circumstances. A flexible organization defends quickly against threats and moves rapidly to take advantage of opportunities. Flexibility provides the organization with the ability to adapt to change and respond quickly to market forces and uncertainty in its environment.

Technology changes the pace of work. It has speeded up order routing and processing on the stock exchange. Technology has made it much faster to search a library book catalog, to communicate with someone at a remote location, and to perform a number of tasks. Technology can also be used to shorten product development cycles. In general, technology speeds up the pace of work and increases the capacity of the organization to process information.

Information technology also alters the space and time boundaries of work. Using electronic mail and computer conferencing, colleagues working on a project do not have to be in the same physical location. Even people who work together in the same office can communicate easily if traveling. With a portable computer and modem, you can conduct some kinds of business from virtually any location at any time of the day or night.

Thus, we see that technology has the ability to change the pace of work and to alter time and space boundaries for work. These impacts of technology can be viewed as increasing organizational flexibility. With properly designed systems the organization can increase its ability to respond to customers, competitors, and the environment in general.

Impact on Flexibility

Here I describe the history and impact of technology in the airline and securities industries. Information Technology Runs the Airline In the early days of airline travel, few people ventured forth on the relatively small propeller aircraft. If you wanted to make a reservation, everything was done manually, and there was no actual record associating your name with your flight. The airline allocated a number of seats to the departure city and to a few other cities. When the number of available seats began to dwindle, a reservations office would have to call a central location to be sure it could sell a seat. One never knew for sure if he or she had a reservation because a name was never associated with a reservations record.

In the late 1990s, Indian Air services realized that its manual reservation process could not keep up with the expected growth in travel. At this time almost all civilian information systems ran in batch mode; that is, all data were collected at once, key punched, and used to update computer files at a later point in time.

The computerized airline reservation systems maintain a large database that contains the names of passengers associated with their flights. In the early days these systems were known as passenger name reservation (PNR) systems because the idea of keeping a name with a flight was so novel. The difference in service is incredible when the computerized reservation systems (CRSs) are compared with their predecessor manual system. What was the initial impact of the airline reservation systems? They removed the limitation of a manual, centralized reservations group. In terms of time and space, you could make a reservation anytime of the day or night from virtually any place in the world.

In addition, in recent years the airlines developed yield management systems; these programs look at future flights and dynamically adjust the number of special fare seats depending on the number of reservations so far. Indigo felt that the airlines could use their systems to target People's flights, and competitors could selectively lower their fares on competing routes and still keep up their margins on other routes.

The airline CRSs provide flexibility for the airlines, travel agents, and travelers. Technology has affected the booking of flights and managing of passengers from reservation to flight completion. Service is speeded up and is more convenient. The boundaries in time and space in making a reservation have changed as has the entire process of booking a flight and boarding a plane. Not only is the airline CRS an example of flexibility, it also illustrates the first-, second-, and third-order impacts of information technology.

Structural Impacts

- **Virtual Components:** The organization can use IT to create components that do not exist in conventional form. For example, some manufacturers want parts suppliers to "substitute" for their inventory. The supplier is linked through electronic data interchange with the manufacturer. Using overnight delivery, the supplier provides parts to the manufacturer just as they are needed for production. The manufacturer now has a virtual raw materials inventory owned by the supplier until it arrives for production. Electronic linking: Through electronic mail, electronic or video conferencing, and fax, it is possible to form links within and across all organizational boundaries. New workgroups form quickly and easily. Electronic linking also facilitates monitoring and coordination, especially from remote locations.
- **Technological Leveling:** IT can substitute for layers of management and for a number of management tasks. In some bureaucratic organizations, layers of management exist to look at, edit, and approve messages that flow from the layer below them to the level above. Electronic communications can eliminate some of these layers. In addition, a manager's span of control can be increased since electronic communications can be more efficient than phone or personal contact for certain kinds of tasks, particularly those dealing with administrative matters. Technology makes it possible to increase the span of control and possibly eliminate layers in the organization, leveling it in the process.

Work Process

Production automation: The use of technology to automate manufacturing processes is well documented in magazines and newspapers. IT is also used extensively for automating information processing and assembly line tasks in the financial industry. In cases where the product of a firm is information, IT is the factory. For white collar workers, intelligent electronic agents that roam networks provide one type of automation. Electronic workflows: Interest in process reengineering has led to the development of workflow languages and systems. As organizations eliminate paper and perform most of their processing using electronic forms and images, workflow languages will be used to route documents electronically to individuals and workgroups that need access to them. Agents that can traverse networks to find information and carry messages will facilitate electronic workflows. Electronic workflows also contribute to the monitoring and coordination of work.

Communications

- **Electronic Communications:** Electronic mail, electronic bulletin boards, and fax all offer alternatives to formal channels of communications.
- **Technological Matrixing:** Through the use of e-mail, video and electronic conferencing, and fax, matrix organizations can be created at will. For example, a company could form a temporary task force from marketing, sales, and production using e-mail and groupware to prepare for a trade show; participants would report electronically to their departmental supervisors and to the team leader for the show, creating a matrix organization based on technology.

Inter Organizational Relations

Electronic customer/supplier relationships: Companies and industries are rapidly adopting electronic data interchange (EDI), Internet, and Intranet technologies to speed the ordering process and improve accuracy. These technologies help the organization monitor and coordinate relationships with other organizations, for example, firms acting as virtual components. It is interesting to note that there is no specific IT variable next to the traditional variable "control mechanisms." Firms have used information systems to provide control after the organization has been designed. Examples include budgets, project management applications, and similar monitoring systems. For example, Mrs. Fields Cookies uses a variety of traditional and IT variables in creating an organization with extensive controls. However, even in this case, there is no one IT control variable in the design.

Adding People to the Design

One reaction to the discussion so far may be that it is a bit sterile-that is, where are the people? When do we consider how individuals relate to one another, how they are rewarded, and what is the nature of the tasks they perform? Where are organization politics? For the most part, politics and emotions in organizations are not of concern in IT-enabled organizations; they are no different here than in conventional organizations! Politics and the beliefs of senior managers are likely to determine the direction of the firm, its strategy, and how resources are allocated. The design remains neutral as its focus is on creating an efficient and competitive organization. While politics and emotion are not unique to IT-enabled firms, people and tasks are an important component of any organization.

As some of the examples show, it may be difficult to change an organization if one only attempts to alter its structure. People and tasks may create the greatest challenge for the manager who wants to change the organization.

In a rigidly hierarchical organization, tasks are separated and decision making is done within strict guidelines. Tasks are defined by rules and practice to avoid risk. Bureaucracies assume employees need to be motivated so they provide elaborate standards and procedures to tell them how to do a job. A professional services firm, on the other hand, is based on trust and professional conduct. For example, members of law and consulting firms tend to define their own tasks.

The virtual organization has to be based on trust and minimal supervision. We expect that this type of organization will be more common in the future as a number of forces, from child care to clean air, argue for fewer, centralized workplaces to eliminate unnecessary commuting. In a negotiated organization, one must trust employees who are in allied companies. An agreement may specify the required output or level of service, but it will be up to each member of the alliance to accomplish its tasks as it sees fit. The traditional firm with electronic components tends to be large and will treat its employees

in a variety of ways. Technology can be used to distribute responsibility to lower-level managers or to centralize control over the organization. This structure depends on the firm's assumptions about employees and how it defines tasks, especially decision making. The vertically integrated electronic conglomerate is very control-oriented as it drives the systems of a different organization; it avoids the expense, the need for, and the risks of traditional vertical integration. As a result, it tends to specify clearly how the firms connected to it electronically must operate.

Conclusion

Information technology interacts with organizations and can be used to change the structure of the organization and/or its subunits. One desirable impact of IT is when technology contributes to organizational flexibility. These systems usually run on mainframe computers and are very large and complex. One management problem is deciding if and when to make massive investments to migrate these systems to up-to-date technology. There are a variety of organization structures; some important considerations in studying organizations are uncertainty, specialization, coordination, and interdependence. There are a number of IT-enabled variables that you can use to design organizations. They supplement and sometimes replace traditional organization design variables. These variables can be used to create the T-Form structure or applied to produce a range of structures including virtual organizations, negotiated organizations, and vertically integrated conglomerates. The variables may also be used in subunits of traditional firms. It is important to remember that organizations and people play an extremely important role in the development and success of technology.

Information technology's role as moderator can also be analyzed by looking at its interaction with a predictor variable, i.e. in the form of a joint, multiplicative effect. Thus, according to the interaction perspective, the products of environment, strategy and structure with IT should have an effect on performance. Three "fit variables" corresponding to these products were thus computed and correlated with performance, after partialing out the linear and quadratic effects of their two components to establish the presence of multiplicative effects.

Another important conclusion, given the findings that pre-change role confusion was negatively related to reactions to technology changes, is that management should make efforts to identify the existence of role confusion prior to implementing technology changes could enhance the success of these implementation efforts. Based on this study, those who lead technology implementation must take time to interact with individuals to determine if there are salient reasons for individuals perceiving their roles as unclear. Perceptions of role confusion could be effectively addressed by making policies and job requirements clear to employees prior to making any changes

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