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COMPUTERIZATION VIEWED AS ORGANIZATIONAL TECHNOLOGY: ITS
IMPACT ON THE STRUCTURE OF NEWSPAPER ORGANIZATIONS

The University of Nebraska - Lincoln

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PREVIEW

COMPUTERIZATION VIEWED AS ORGANIZATIONAL TECHNOLOGY:
ITS IMPACT ON THE STRUCTURE OF NEWSPAPER ORGANIZATIONS

by

Nancy Hoerle Carter

A DISSERTATION

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Under the Supervision of Professor John B. Cullen

Lincoln, Nebraska

May, 1981

TITLE

COMPUTERIZATION VIEWED AS ORGANIZATIONAL TECHNOLOGY:
ITS IMPACT ON THE STRUCTURE OF NEWSPAPER ORGANIZATIONS

BY

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provided me with unfailing encouragement, assistance and guidance; and who unselfishly gave of their time.

PREVIEW

Chapter 1

INTRODUCTION

Research which has sought to explain the variations in formal organizations by examining structural characteristics has increasingly viewed structure as a dependent variable. Many of these research efforts have focused on structural variations resulting from differences in the technical processes an organization utilizes to change inputs into outputs. The rapidity of advancements these technological processes have undergone in the past 15 years makes the study of this variable essential for understanding and predicting organizational structure.

While significant contributions to the understanding of the relationship between technology and small groups within the organization were being made in the early 1950's (Trist and Bamforth, 1951), it wasn't until Woodward's (1958) study that structural relationships were systematically explored across comparatively large samples, using the organization as the unit of analysis. Since this landmark study, comparative organizational studies have continued to investigate, with varying results, the relationships between structural characteristics and technology. Several studies have found that technology is second in importance to organizational size in directly determining

the structure of organizations, however, the direction of that relationship, along with the precise role technology plays in influencing other structural characteristics is less certain. For example, Hickson, Pugh and Pheysey (1969) contended that "operations technology" affects only those structural variables immediately impinged upon by the workflow, and, therefore, the structure of small organizations (or the operations sub-units within large organizations), is most affected by the technology. Blau, Falbe, McKinley and Tracy (1976), while generally supporting these contentions, stated that advances in production technology do not have linear relationships with various aspects of plant structure, size included.

Attempting to explain the inconsistencies in these research findings, Rousseau (1979) criticized previous efforts for using what she termed a traditional closed systems approach to study different phases of the same transformation process in which organizational inputs are changed into product outputs. Instead she maintained, technology is a multiphasic, multilevel input/output mechanism that is interdependent with its environment. Essentially, Rousseau's comments contended that studies of technology have relied too heavily on analyzing only the operations technology of organizations rather than examining the overall technology. Many of these studies have focused on the impact of automating operations technology or the

introduction of computerization (Blau et al., 1976; Whisler, 1970; Meyer, 1968; and Klatzky, 1970). This emphasis is not surprising since by 1975 more than 200,000 computers had been installed nationwide and as much as 10% of the budgets of large firms was being devoted to computing activities (Kling, 1978). However, the findings from these studies, if viewed within the context of technology's impact on organization structure, have been disappointing. Essentially this disappointment stems from the fact that the computer applications have focused upon, "computing or information technologies which focus on some specialized technical area (e.g., recordkeeping practices, analytical methods, communication systems,"¹ rather than on integrating the computer throughout the organization. For example, Blau et al. (1976:31) found:

Even factories that have an in-house computer rarely use it to automate the production process itself. For example, only five of the plants in the sample had any computer-controlled production equipment (Amber level 5) in 1973, and none of the machinery basic to the manufacturing operation--the core technology--was computerized. . . . Although computers are used very little in direct control of manufacturing equipment, they are employed widely in administrative support of production as well as in marketing and distribution. The functions which are most frequently automated are accounting, billing and paying, inventory control and sales.

¹Kling, Bob, "Social Issues and Impacts of Computing: A Survey of North American Research," Presented: Conference on the Social Impacts of Information Technology, Nov. 1973, p. 6.

Regardless of the general tone of research findings to date which have come from studies in which computer use-age was considered a measure of organizational technology, Child (1977:185) maintained that computers and automation, despite the more conservative view that is now taken of their potential, introduced the most far-reaching pressures for re-organization (of the structure) out of the whole gamut of technological changes. Indeed, Bell (1979:20) has viewed computer utilization as the major impetus which has led to, what he terms, the present "post-industrial" society.

Statement of Purpose

It was the purpose of this study to contribute to the development of organizational theory by furthering the understanding of the relationship between organizational structure and technology by investigating the relative impact of computerization as technology. This conceptualization of computer useage was not limited to simply information processing and storage activities, but rather as organizational technology which potentially affects the entire work-flow process. Examining the use of the computer in this way facilitates the building of a general theory of organizations, by allowing direct comparisons to be made between the findings of this "computer" study and other efforts which have analyzed the relationships between the

traditional notion of organizational technology and structure--comparisons not appropriate for the majority of existing computer studies.

Hence, the general research question addressed in this dissertation can be stated as:

What is the relative effect of the computer as organizational technology on the structure of organizations?

The Industry Being Studied

The proliferation of computer applications has become increasingly evident in our society. Data processing networks, facsimile systems and interactive on-line computer networks are just a few of the examples of computerization encountered by many of us daily. Perhaps nowhere has the effect of computerization been more evident than in the area of communications. Bell (1979:28) commenting on the revolutionary developments which are linking communication devices to computers, stated:

In many respects, the new information technology becomes the basis of a new intellectual technology, in which theoretical knowledge and its new techniques (such as systems analysis, linear programming, and probability theory), hitched to the computer, become decisive for industrial and military innovation.

One industry which has most visibly been caught up in this revolution of information technology is the newspaper industry.

While the presence of computerized equipment in newspaper organizations spans a 20 year period, the phenomenal progress which has occurred during the past 5 years becomes diminished in importance only by the potential of the next 5 years. The adaptation of computer technology to the newspaper industry began in the printing function, or "back-shop" of newspapers during the early to mid-1960's. Computerized typesetting and justification as well as computerized billing and data control were heralded as major innovative advancements.

As computer hardware became more sophisticated and software packages, along with photo-composition were adopted, the production aspects of newspapers changed radically. What was a labor-intensive process, cumbersome, dirty, time-consuming and above all costly, became an automated system, cost-efficient both in terms of time and money (Winsbury, 1975:15). Many of these changes are illustrated in Winsbury's (1975) comparison of old versus new production processes (Figure 1-1).

The technological advancements of the composing/production departments, radical as they were, simply hinted at what was to come. Indeed, the computer was not to be kept in the "back-shop" or in data-processing activities, but it was to permeate the entire newspaper organization and invade even the final bastion--the newsroom. The impetus of this permeation was the cathode ray tube (CRT)

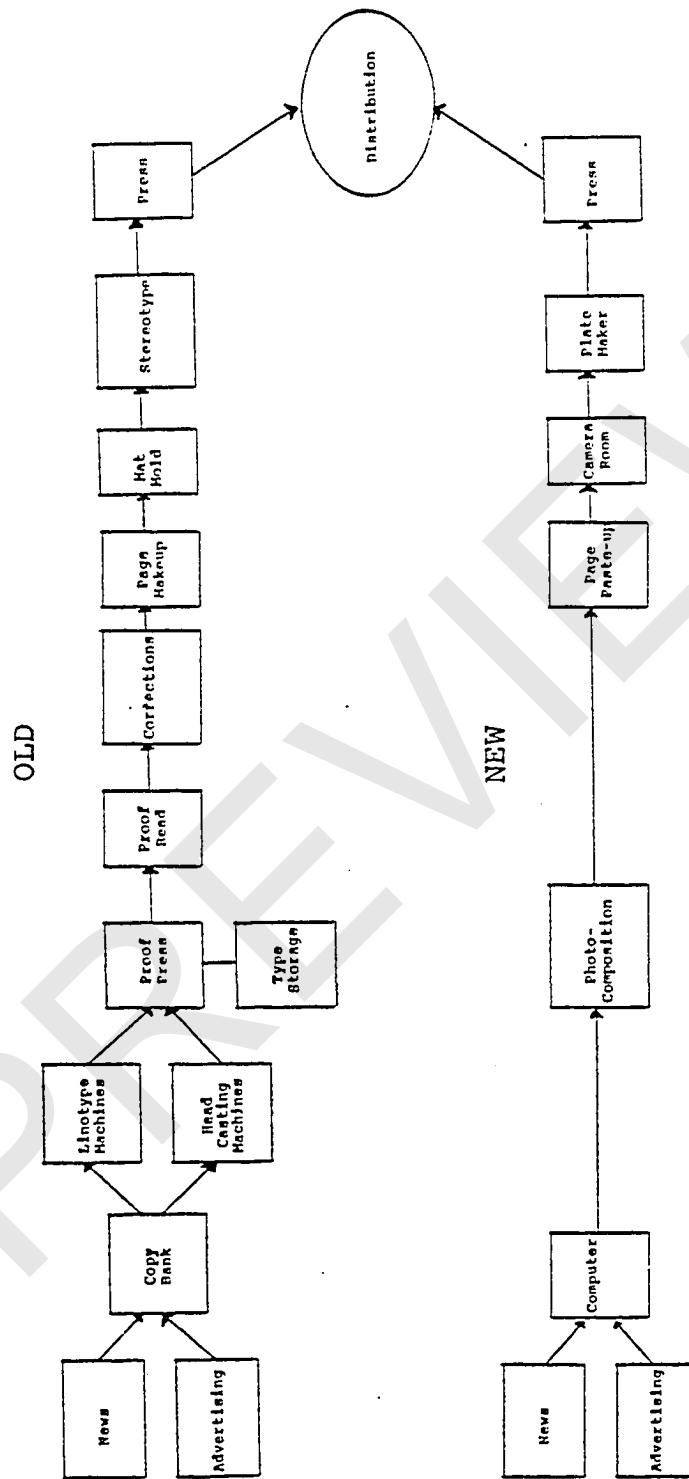


Figure 1-1
Producing a Newspaper
(From Winsbury, 1975)

or video display terminal (VDT) whose introduction was typified as, "the start of a chain reaction which would revolutionize newspaper production" (Bagdikian, 1973:7).

The rapidity of change brought about by the computer was clearly evidenced in Berg's (1975) comparison between present, future and ultimate system capabilities and features. Table 1-1 summarizes these comparisons. It is important to note that since Berg's research was published, a mere five years ago, most of the capabilities listed in the "Future" column have today already been realized and in many instances, used extensively.

Today's computerized newspaper can aptly be described as a complete inter-linking system. VDT's or CRT's, have replaced typewriters in the newsroom. They are used to input, edit, headline, summarize and assign layout. In the composing room, terminals are used to update classified ads, legal notices or other existing text. Additionally, they are used to proofread perforated text before it is typeset. The advertising department composes and lays out display as well as classified ads on-terminal. Administrative use of the system includes payroll, accounts payable, profit and loss statements, circulation and production statistics as well as computing daily advertising lineage.

The fervor of the controversy over what these changes, seen as radical to many, would mean for the future of the newspaper industry has matched the pace of the

Table 1-1
Present, Future and
Ultimate Features

Feature	Hardware	Present	Future	Ultimate
General Editing Procedure	OCR typewriter	Deletion symbols for OCR; type-written corrections	OCR will read some controlled handprint	OCR will read hand-written material
	On-line VDT	Index search; scroll text; move cursor	Index search; scroll text; move cursor automatically	Automatic placement of cursor
	Stand-alone VDT	Locate input tape; make new output tape	Make new output tape from old output tape	Automatic production of new output tape
Locating The Position To Make Edit Change	OCR typewriter	Locate sheet of paper	Use VDT (to call out from computer memory)	Use VDT (for automatic call-out)
	On-line VDT	Index in machine form	Index by contents	Index by automatic, associative search; cursor moved automatically
	Stand-alone VDT	Manual text scroll; cursor moved manually	Manual text scroll; cursor moved automatically	Automatic scroll; cursor moved automatically
Making Edit Changes				
Text and Typography	OCR typewriter	Leave space; move space; retype text or instructions	Use VDT	Use VDT
	On-line VDT	Insert, delete, move text block or character	(Text): insert delete, move block or character (Typography): make any change, see screen representation	(Text): insert, delete, move block or character; enter change, instructing computer to locate and make change (Typography): CRT screen facsimile of typesetter output; make any change, screen reflects change
Art and Graphics	OCR typewriter	Leave space	Use VDT	Use VDT

technological advancements. Dominique Wolton (1979:39) following a tour of newspapers in the United States and four European countries wrote:

Simultaneously I was being told that the new technology "changes everything" and that "it changes nothing." VDT editing, for example, is presented both as a revolution and as merely a supplementary tool that can be introduced without modifying the organization of work or intellectual context of the product.

One proponent of the new system, Fred Kinne, editor of the San Diego Tribune credited computerization as being largely responsible for that newspaper's winning the "Pulitzer Prize for Distinguished Example of General or Spot News Reporting." In late September, 1978, a mid-air collision between a jetliner and a small plane, designated one of the worst national aviation disasters, occurred little more than an hour before the newspaper's editorial deadline. Using the new system, the first edition was out with only a ten minute delay. Under normal circumstances the delay would have been at least 40 minutes, long enough for someone else to scoop them (Editor and Publisher, 1979:13).

The controversy over the dynamics of the changes brought about by the computer has further been fueled by the question of ultimate cost, not only in terms of dollars and cents, but in terms of human displacement. While the revolutionary technology has promised new opportunities and horizons, for many, the adoption of computerization