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WORK, ORGANIZATIONS, AND TECHNOLOGICAL CHANGE

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Published in cooperation with NATO Scientific Affairs Division

PLENUM PRESS · NEW YORK AND LONDON

Library of Congress Cataloging in Publication Data

Main entry under title:

Work, organizations, and technological change.

(NATO conference series. II. Systems science; v. 11) "Proceedings of a NATO Conference on Work, Organizations, and Technological Change, held June 14–19, 1981, in Garmisch-Partenkirchen, Federal Republic of Germany"—T.p. verso.

"Sponsored by the Special Panel on Systems Sciences of the NATO Scientific Affairs Division"—Pref.

Includes bibliographical references and index.

1. Technological innovations—Congresses. 2. Machinery in industry—Congresses. 3. Manpower planning—Congresses. I. Mensch, Gerhard. II. Niehaus, Richard J. III. NATO Conference on Work, Organizations, and Technological Change (1981: Garmisch-Partenkirchen, Germany) IV. North Atlantic Treaty Organization. Division of Scientific Affairs. Special Panel on Systems Sciences. V. Series.

HD45.W67 658.3 82-3751

ISBN 0-306-40993-3 AACR2

Proceedings of a NATO Conference on Work, Organizations, and Technological Change, held June 14–19, 1981, in Garmisch-Partenkirchen, Federal Republic of Germany

© 1982 Plenum Press, New York
A Division of Plenum Publishing Corporation
233 Spring Street, New York, N.Y. 10013

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PREFACE

This volume is the proceedings of the Symposium entitled, "Work, Organizations and Technological Change" which was held in Garmisch-Partenkirchen, West Germany, 14-19 June 1981. The meeting was sponsored by the Special Panel on Systems Sciences of the NATO Scientific Affairs Division.

In proposing this meeting the Symposium Directors built upon several preceding NATO conferences in the general area of personnel systems, manpower modelling, and organization. The most recent NATO Conference, entitled "Manpower Planning and Organization Design," was held in Stresa, Italy in 1977. That meeting was organized to foster research on the interrelationships between programmatic approaches to personnel planning within organizations and behavioral science approachs to organization design. From that context of corporate planning the total internal organizational perspective was the MACRO view, and the selection, assignment, care and feeding of the people was the MICRO view. Conceptually, this meant that an integrated approach was needed if all the dimensions of such problems within private and public organizations were to come out correctly.

As with any meeting of that kind, the Stresa conference left many dangling ends suggesting that now even a more macro view was needed. Also during the intervening four years, the constrained views of corporate manpower planning and organization design have given way to the broader concept of human resource planning. Here, not only are internal organizational relationships important, but also more of the organization's relationships with the external world are felt to be needed to be included. Notably such dimensions as the impact of external labor market developments and the advance of technology need to be added. In this instance the relationships to the external world becomes the MACRO view and internal manpower planning and organization design the MICRO view. The purpose of the Garmisch meeting was to explore this broader view using the organization as the focal point.

In putting together the program, the Symposium Directors started with the larger picture, and then emphasized the important parts of the problem followed by a mixture of broad and specialized approaches to parts or all of the problem. Also, discussion was encouraged both during the formal sessions as well as during the social events. This served to develop better linkages between seemingly unrelated parts and to surface parts of the problem not completely covered by the prepared presentations. Perhaps the most important of these added dimensions was the need to include the interrelationships between human value system and technical human resource planning systems.

The organization of the symposium had to take into account the development of the meeting topic coupled with balance among contributions from different countries and research institutions. The selection of papers was difficult with so many worthwhile papers from many countries with a limited space on the program. The difficulty was resolved by allocating the papers to one or two types of presentations: plenary sessions for papers that appeared to fit into one of the five Symposium themes: and parallel presentations of special interest topics. In the event, following the keynote paper by Dean George Kosmetsky, Graduate School of Business, University of Texas at Austin, twenty-one papers were presented in the plenary sessions and eleven in the parallel sessions for a total of thirty-three papers. The session themes, together with the session chairperson(s) are listed below:

SESSION	CHAIRPERSON
•Technological Change and Human Resources	J.A. Sheridan (USA)
•Labor Market Impacts on Organizational Planning	W.L. Price (Canada)
•Methods and Studies (Parallel Sessions)	R.E. Boynton (USA); M. Rowe (USA); and C. Gaimon (USA)
•Social Impact on Personnel Policy Analysis	D. Sadowski (Germany)
•Technological Change and Work Organization	P. Miret (France)
•Quality of Organization Life	R. Pearson (UK)

The Symposium Directors would like to thank Dean Kozmetsky and the Session Chairpersons for a job well done.

The proceedings follow the Symposium program to some extent. However, the order of individual papers has been changed to produce a balanced publication geared towards the requirements of the general reader. Also, because of page limitations, a number of papers were included in the form of one page abstracts. The full text of those papers can be obtained by communication with the authors.

The formal and informal discussions at the Symposium shaped the final structure of the proceedings. This was coupled with the desire to move from the general to the specific with case examples in between. The Symposium Directors are thankful to Dr. Lisl Klein of the Tavistock Institute, London for striking a strong note for adding the dimension of human value systems beyond the needs of organizational technocrats. With the exception of the brief discussion of the final session provided below, the issues are left to the summaries at the beginning of each section and the papers themselves.

In the final summary session, an attempt was made to find what consensus was present in the diversity of topics discussed. The discussion started with the issue that new technology would displace workers in a way that would also change the underlying interrelationships between the work place and society. It was pointed out that the issue of technological change was not new, but that new technology might have outstripped the graduate required to manage the desirable direction of innovation and maintain the necessary rate of innovation in a competitive world. Again, the theme arose that there was a need to do research on joint issues of technological development and cultural development. This brought about a spirited discussion of the problem of who determines which cultural values are important in democratic societies. Furthermore, from the institutionalist point of view, it was suggested that with very large private and public organizations existing in all sectors of industrial societies, there is no choice but to include the effects of regulated technological change in human resources planning. However, there are not absolute solutions. The process is open and moving, at an uneven pace. Some organizations, even large ones, are being pushed by rapid series of technological innovations, whereas in other organizations it takes years to introduce technological change. It was suggested that the best way may be to look at controllable systems and use them to develop policies that can guide the future, but that view was questioned by reason of rationality and legitimacy. The divided opinions indicated that additional study is needed, particularly on how to systematically place value systems into the human resources planning process either when both are being driven by technological change, or when both have become the major inertial factors in creating useful affirmative technological developments.

Thanks are in order for all who helped to contribute to the success of the meeting. Special mention is for the officials of Garmisch-Partenkirchen and the Kongresshaus for the facilities and smooth running of all the logistics of the meeting. Secretarial help was provided by Ms. Annie Knott and Ms. Loretta Orrock of the Office of the Assistant Secretary of the U.S. Navy (Manpower and Reserve Affairs), and by Mr. Margery Sperling of the Weatherhead School of Management of Case Western Reserve University. Also, help in reviewing the proceedings was provided by Dr. Carol Schreiber, General Electric Company, and Mr. Ed. Bres, OASN(M&RA). In addition, there were many others, including our wives, who had considerable part in the social program and the orchestratian of the informal international meetings that took place in and about Garmisch-Partenkirchen.

Finally, we would be remiss if we did not acknowledge the role of the NATO Scientific Affairs Division in supporting the Symposium. We owe a special debt to Dr. B. A. Bayraktar and the members of the Systems Sciences Panel who provided counsel and advice during the early stages of the Symposium preparation.

Gerhard O. Mensch

Richard J. Niehaus

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SECTION 1

KEYNOTE ADDRESS

Professor George Kozmetsky, Dean of the Graduate School of Business Administration, University of Texas at Austin, sees that we are in the midst of chronic and often unplanned technological change where the value of the new technologies is difficult to assess and the need to adapt to change is vital.

The allocation of human and technological resources takes place within an institutional setting. The personnel requirements for the technologies of the 80s will create a major societal displacement. Millions of workers who now do only repetitive jobs will need to acquire new skills. According to Dean Kozmetsky, technological change is likely to have three dramatic impacts on the general work force. First, machines will take over repetitive work tasks at an accelerated rate. Second, elementary decision making will become part of the mechanized process. Finally, human resources will be freed to supervise more complex machinery and assume a wider decision-making role. Kozmetsky asks: How should we approach these developments?

PERSPECTIVES ON THE HUMAN POTENTIAL

IN TECHNOLOGICAL CHANGE

George Kozmetsky
Dean
College of Business Administration
Graduate School of Business
The University of Texas at Austin

It seems to me that this NATO Symposium on "Work, Organizations and Technological Change" can be characterized as follows: First, technological change is the key influencing factor for all sessions; second, technology *per se* is not a primary focus; and third, your overall emphasis is on entity goal formulation which evaluates the effectiveness of incentives and advancements that enhance the efficiency and quality of life.

The forthcoming symposium sessions will examine technological change, considering its utilization by type of institution ranging from military to process controlled, batch controlled, automated and mechanized services institutions. In most cases the papers to be presented will analyze technology's impacts on the workforce, manpower planning and training. There are a number of provocative presentations that identify developments that are taking place and some that extend the current methodologies for manpower planning, control, and audits. These methods papers will encompass technological change in terms of institutional manpower planning and control, productivity, social impacts and restructuring of work organization.

You will be addressing a multiplicity of problems that require unique solutions for each of the nations and institutions represented at this conference. We will all learn from each other. We will be able hopefully to take away from these presentations and discussions relevant knowledge that is applicable to the solution of issues that face our own countries as well as our individual organizations.

In a broader context, this symposia is unique. The underlying theme deals with two very significant resources -- human and technological. This is the first meeting in which I have been privileged to participate where technological and human resources are linked. Most meetings would view these resources as separate and distinct.

The importance of this linkage is that it provides for each of us a way to deepen our scientific understanding of the process by which these resources are jointly developed, allocated, and utilized to meet institutional needs and selective missions. This linkage also permits us to determine individual worker objectives. to evaluate the choice mechanisms for selecting the alternative uses of technological and human resources, and finally to audit the effectiveness and efficiency of the transformation of these resources in meeting institutional goals. The sum total of the institutional goals will in a large measure determine the societal goals.

For the next five days, we will be involved with the overriding issue that faces us individually and collectively: How do we organize our human and technological resources between as well as within institutions while maintaining a high quality of life environment for most individuals?

I would like to focus my remarks on two broad themes. First, I will review technological change for the 1980s from a personal perspective. Second, I will discuss the role of professional schools in the education of human capital in the midst of conscious technological change.

The Consequences of Technological Developments

Any solutions for the problems that we will be addressing this week depend upon an understanding of the consequences of technological change. Our perception of those consequences will affect not only the way in which we link human and technological resources but also the manner in which we approach the decision-making process.

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