

Transforming Coordination: The Promise and Problems of Information Technology in Manufacturing Coordination

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Abstract

The Advanced Integrated Manufacturing Environments (AIME) project has been a multi-year study of coordination changes in US manufacturing firms implementing new information technologies. AIME project research has confirmed the need for a behavioral view of coordination, using theories from organizational sociology and institutional economics. IT can be used to solve many existing coordination problems, especially when the problems and technologies are simple and straightforward. When the coordination problems become more complex and interdependent, so do the information technologies intended to solve them. The new coordination dilemmas raised by IT use can be addressed by new design techniques for organizational usability.

Project Overview

The Advanced Integrated Manufacturing Environments (AIME) project has been a multi-year study of coordination changes in US manufacturing firms implementing new information technologies. AIME project research has confirmed the need for a *behavioral* as well as an *information-processing* view of how IT changes coordination in practice. Information-processing views of coordination change show how inherent attributes of IT directly improve organizational performance by solving key coordination

problems of scheduling, synchronizing, and allocating. This information-processing view, however, gives us an incomplete understanding of how to cope with the chronic organizational problems involved in changing coordination practice within a world of powerful social and economic logics.

The AIME project has used behavioral theories from organizational sociology and institutional economics to create an understanding of IT as a shifter of potentials and constraints in a world of existing economic and social coordination processes. IT can be used to solve many existing coordination problems without any substantial side effects. This is especially the case when the problems and technologies are simple and straightforward. But as the coordination problems become more complex and interdependent, so often do the information technologies intended to solve them. In such instances, it is more accurate to speak of the use of IT as *transforming* one set of coordination problems into another set of coordination problems. The new set of coordination problems may be more or less tractable for the organization. The "irony" of IT and coordination is that the new kinds of interdependencies created by the sustained use of IT may, in some circumstances, be more difficult to coordinate than the original problems IT use was supposed to address. Much of the difficulty is due to the relative inexperience organizations have in dealing with these new coordination problems. New design techniques and new institutional arrangements for organizational usability have the potential to make these coordination problems much less severe.

These results have the following implications for manufacturing practice:

1. *Efforts to implement IT for coordination are more likely to succeed if they consider social and economic aspects.*
2. *The less the degree of change required by the implementation of new information technologies, the greater the likelihood of successful implementation of the technology.*
3. *The key to success in implementing more advanced IT for coordination is to plan for the greater complexity and organizational impacts brought about by the technology, and to provide social and institutional supports that facilitate the organization's adaptation to these changes.*

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