1981

Diffusion of Modern Software Practices: Influence of Organizational Process Variables

Robert W. Zmud
University of North Carolina

Diffusion of Modern Software Practices: Influence of Organizational Process Variables*

Robert W. Zmud
School of Business Administration
University of North Carolina

ABSTRACT

A number of modern software practices (MSP) have emerged over the last decade in response to the difficulties that have tended to accompany software development efforts. Recent studies of software development groups, however, indicate that these MSP are generally not being used.

Since software development is a labor-intensive, cognitive activity whose success is largely determined by individual initiative and discretion, the processes involved in software development would seem to have a high potential of being affected by organizational design variables--such as centralization and formalization--that enlarge or constrain individual influence or discretion. The aim of this study was to examine the influence of centralization and formalization on the diffusion of MSP.

Centralization and formalization have previously been employed in research designs investigating organizational innovation. The results, however, have been mixed. Three arguments can be raised toward explaining these inconsistent findings. First, innovation is a multi-phased process in which the influence of centralization and formalization could be expected to differ with each phase. A generally accepted phase sequence involves the initiation, adoption, and the implementation of an innovation. Second, innovations may be compatible or incompatible with the individual interests of organizational members. As incentives for individual initiative or discretion would vary depending on an innovation's compatibility, the expected influence of centralization and formalization should also vary. Third, organization innovations represent many vested interests, with an economical partitioning being the technical and administrative cores. As an innovation might possess significant or negligible meaning to such cores, the influence of centralization or formalization through individual behaviors would be expected to vary as well.

---

*This article is currently under consideration for publication in Management Science.

In this study, 49 software development groups responded to a questionnaire assessing the initiation, adoption, and implementation of six MSP, three of which were technical in nature and three of which were administrative. The technical MSP were viewed as being incompatible with the interests of the technical core, while the administrative MSP were viewed as being compatible with the administrative core. The following four hypotheses were examined:

H1 -- Centralization is positively associated with the initiation, adoption, and implementation of (incompatible) technical MSP.

H2 -- Formalization will be negatively associated with the initiation of (incompatible) technical MSP, but positively associated with the adoption and implementation of such innovations.

H3 -- Centralization will be positively associated with the initiation, adoption, and implementation of (compatible) administrative MSP.

H4 -- Formalization will be positively associated with the initiation, adoption, and implementation of (compatible) administrative MSP.

Organizational size, professionalism, and industry type were used as control.

While the associations obtained were low in absolute size, all were correctly directioned and most either approached or were significant. The findings, thus, are supportive of the arguments raised toward explaining the inconsistencies of related studies. The findings suggest two specific implications regarding MSP diffusions. First, it may prove beneficial to manage the diffusion process quite differently for technical MSP aimed at improving software development methods and for administrative MSP aimed at enabling greater control of the software development process. Second, as it is likely that analysts and programmers may view the introduction of technical MSP as a threat or inconvenience, the employment of mechanistic, i.e., centralized and formalized, organizational processes may prove most effective.