Chapter VIII

Knowledge Management through End User Developed Expert Systems: Potential and Limitations

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ABSTRACT

Knowledge is receiving recognition as a strategic force in organizations. Correspondingly, one form of knowledge capture and maintenance organizations are tempted to use is expert system design by end users. The chapter discusses difficulties associated with end-user development, both in terms of design quality and knowledge content. An analysis of 25 expert systems written by non-professional developers reveals significant quality and size limitations that indicate limited feasibility of end-user expert system development. Furthermore, the lack of design quality may not be easily compensated for by a “knowledge advantage” of the end users, as end users may have a performance advantage in using their knowledge, but not in “knowing” it. The chapter then offers suggestions for alternate forms of end-user oriented expert system development that considers end-user limitations and takes advantage of recent developments in information technology.
BACKGROUND

Growing Need for Knowledge Based Systems

*Knowledge* is enjoying widespread attention as a strategic tool for the competitiveness of firms. The topic has been widely covered, both in the management research literature, (e.g., Alavi & Leidner, 1999; Davenport et al., 1998; Zack 1999a, 1999b; Ruggles, 1999; Burns et al., 1999; Nonaka & Takeuchi, 1995) and the popular press, (e.g., Davenport & Marchand, 1999, “In Praise of Knowledge” *Economist*, May 27, 1995, 20). Several of these studies have emphasized that knowledge creation and management is not simply the capture and storage of information. Knowledge management also requires the storage and processing of associations (rules) through which meaning can be derived from the information. And, to follow the argument of Nonaka and Takeuchi, knowledge should be stored in explicit, observable form.

Presently, the pre-eminent information technology vehicle for the explicit representation of knowledge in managerial applications is the expert system (or knowledge based system). Thus, knowledge explication would require massive expert system development. Given the existing demands placed on the systems development function, the implication is that at least part of the expert system development effort will have to be completed by end users. This creates a dilemma. On one hand, the bottleneck in knowledge acquisition is well acknowledged (Holsapple & Raj, 1994). On the other hand, one of the truisms of expert systems development is that the domain expert should not be his or her own knowledge engineer (Hayes-Roth et al., 1983), a heuristic based on Johnson’s *paradox of expertise* (Johnson, 1983).

Despite common wisdom condemning end user expert system development, there are numerous accounts of successes with this development approach. For example, Du Pont (Feigenbaum et al., 1988; McNurlin, 1987) reported positive experiences with end-user created solutions 10 years ago when development tools were more primitive than today. So did Eastman Kodak (Huntington, 1989), and so did the US Navy (Griesser & Tubalkain, 1992). The number of applications ranged from a few tens (US Navy) to more than 1,000 (DuPont), the size per application from tens of rules to several hundred. Lubrizol has users participate in expert system development by letting them build the underlying decision tables (*I/S Analyzer*, 34, 3, March 1995, 12-15). In addition, several of today’s development “languages” have become much more user friendly, (e.g., visual design of trees as in Exsys’ Rulebook software) and are now targeting end user developers rather than professional developers. These trends are paralleled by a numerous university
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