



Chapter 3

End Users as Expert System Developers?

Christian Wagner
City University of Hong Kong

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 article 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.

BACKGROUND

Growing Need for Knowledge-Based Systems

Knowledge is gaining widespread attention as a strategic tool for the competitiveness of firms, both in the management literature and the popular press, e.g., Nonaka and Takeuchi (1995) and “In Praise of Knowledge” (Economist, May 27, 1995, p. 20). However, knowledge creation and management is not simply the capture and storage of information. It also requires the storage and processing of associations (rules) through which meaning can be derived from the

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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 and 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 engineers (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, DuPont (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 U.S. Navy (Griesser and Tubalkain, 1992). The number of applications ranged from a few tens (U.S. 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 (*ISAnalyzer*, 34(3), 1995, pp. 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. World wide sales for these desktop AI tools amounted to US\$4 million in 1995, with annual growth rates exceeding \$500k ever since 1991 (*Intelligent Software Strategies*, XII(2), 1996, p. 4). These trends are paralleled by numerous university curricula offering courses on expert systems to their business (!) students, who are likely not going to be professional developers.

Clearly, end user expert systems development enjoys at least a successful niche presence. Yet a recent survey on end user computing sophistication (Blili et al., 1996) did not even consider to ask participants about the use of fifth generation expert system tools. Hence it seems that most companies do not even consider this approach, while those who do are successful (or at least claim success). Will therefore those companies who embrace user developed expert systems become knowledge-based firms, while the many others will not? And, what are the limits to end user developed systems? Accounts of successes, such as those of DuPont,

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