: What is the relationship of expert systems and business decision support?

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Both expert systems and decision support systems attempt to use software to improve decision making. Expert systems were first developed by computer scientists; decision support systems by management researchers. Using a business decision support system is still looked upon skeptically by some managers. Using an "expert system" seems almost insulting to those managers. Hence it is easy for some to dismiss business expert systems as unnecessary, impractical, unreliable and even disrepectful. "Smart" computers are not and should not replace "smart" decision makers, but the technologies of "expert systems" can be useful in supporting decision makers.

Most sources view an expert system as a category of software that "attempts to reproduce the performance of one or more human experts, most commonly in a specific problem domain." Expert systems is a traditional subfield of Artificial Intelligence research in Computer Science.

A common question of students and managers is the relationship between DSS and Expert Systems (cf., Power, 2000). Both systems can help managers. Expert Systems provide one source of technologies for building Decision Support Systems -- I call those systems Knowledge-driven DSS. A Knowledge-driven DSS may still be a "scary" thought, but it seems somehow less intimidating and insulting. Integration of expert system technologies may occur in some other types of DSS.

What are the difference between the two?

DSS is a broad category -- Data-Driven, Model-Driven, Communication-Driven, Document-Driven and Knowledge-Driven DSS. Expert systems is a narrow category focused on specialized software tools.

Will the evolution of DSS end up in Expert Systems?

No, I don't think so. -- BUT Knowledge-Driven DSS or Suggestion DSS will become more common and more powerful. The tools are getting better. A good reference on integrating DSS and Expert Systems is El-Najdawi and Stylianou (1993).

According to El-Najdawi and Stylianou, DSS and Expert Systems "can be used to facilitate and improve the quality of decision making by reducing information overload and by augmenting the cognitive limitations and rationality bounds of decision makers." They concluded "A small number of systems have adopted the idea of DSS/ES integration."
A major contribution is that El-Najdawi and Stylianou identify several forms of integration that have been discussed in the literature. The major approaches to integration are:

* Expert System integration into various DSS components,

* Expert System integration as a separate component of the DSS,

* DSS models and data access as a component of an Expert System.

Advantages of using expert systems technologies to support decision making include: 1) providing consistent answers for repetitive decisions, processes and tasks, 2) organizing and maintaining a significant amount of domain specific information, 3) encouraging managers to clarify the logic of their decision-making, and 4) remembering to ask all relevant questions.

Disadvantages of expert systems listed in Wikipedia include: 1) lacks common sense needed in some decision making, 2) cannot make creative responses as human expert would in unusual circumstances, 3) domain experts not always able to explain their logic and reasoning, 4) errors may occur in the knowledge base, and lead to wrong decisions, and 5) cannot adapt to changing environments, unless knowledge base is changed. Overall these five disadvantages are limitations rather than reasons not to use the technologies.

Expert systems and decision support systems were both conceived of as technology tools to help people make better decisions. Neither was or is intended to replace human decision makers. A broader tool set is used for DSS and business oriented expert systems may be classified as DSS, Knowledge-driven DSS.

References

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