AN INTEGRATIVE MANAGEMENT APPROACH TO DEVELOPING KNOWLEDGE-BASED SYSTEMS FOR MANAGEMENT DECISION MAKING

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As knowledge-based systems technology is extended further into the management decision-making area, researchers and practitioners are finding that the complexity of many management decision areas dictates using a more systematically focused approach. In addition, it is proving useful to use approaches that more exactly mimic the way an expert acquires expertise on the job. This article describes a conceptual framework for structuring knowledge-based management decision-making systems projects in a way that promotes a more realistic and focused approach to such systems development within the context of larger, longer-term system development. The approach achieves three objectives: It facilitates development of many smaller useful, working knowledge-based systems today; at the same time, it builds a structure and base for developing larger and more complex systems for management decision making over a longer term and for future research; and, it provides an approach that more closely replicates the process by which many human experts actually develop expertise, helping to facilitate the knowledge acquisition and improve the quality of the knowledge representation.

Introduction

A key problem inhibiting rapid development of knowledge-based systems for management decision making is that considerable work still needs to be done in defining in precise detail how the thousands of management decisions occurring daily in business are made. Solving this problem is difficult largely because a sufficient number of business managers do not have the time or financial incentive to do this work.

Yet, as with other types of decision support systems, input from these managers about the cognitive processes involved in their decision making is an extremely important ingredient in knowledge-based system development for management decision making (Cupello & Mishelevicksy 1988; DeLong & Rockart, 1986; Keen, 1981; Leonard-Barton, 1987; and Morton, 1971). This detailed decision definition work needs to be done before larger, more complex and
comprehensive management decision support systems can be developed, as has been pointed out by artificial intelligence researchers such as Daniel Dennett of Tufts University (Linden, 1988, p. 63).

In light of these problems, many working in the management decision area believe that the most productive approach is to concentrate on developing a wide range of fairly limited working systems (Feigenbaum, 1986, Linden, 1988; Mockler, 1989). In this way, not only will more useful applications be built more quickly, stimulating their growth and acceptance among business managers, but this approach will also help build the base of in-depth management decision-making definition needed to eventually develop much larger systems. Such a base can be built, however, only if these smaller working systems are developed within a framework that integrates the individual systems within the context of the larger, more complex systems under development.

This article describes such a conceptual framework approach for structuring knowledge-based system development projects for business in ways that enable the development of many useful working systems and build a base for developing larger and more complex systems for management decision making. This framework has also proved to be a useful tool for guiding research projects in knowledge-based system development. An additional advantage of this approach is that it in many ways replicates the way a human expert acquires expertise on the job. This facilitates knowledge acquisition and helps insure the quality of the expertise replication in the system.

**Figure 1: An Approach to Developing Marketing Strategies**

<table>
<thead>
<tr>
<th><strong>External</strong></th>
<th><strong>Competitor Factors Forces</strong></th>
<th><strong>Internal</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer/Consumer</td>
<td>Competitive Market Factors</td>
<td>Overall company strategic objectives and plans</td>
</tr>
<tr>
<td>Size</td>
<td>Relevant industry trends</td>
<td>Resource identification</td>
</tr>
<tr>
<td>Growth rate</td>
<td>Market structure</td>
<td>Relevant market/competitor industry position</td>
</tr>
<tr>
<td>Demographics</td>
<td>Suppliers</td>
<td>Other factors:</td>
</tr>
<tr>
<td>Attitudes</td>
<td>Media</td>
<td>• Relationships with other departments</td>
</tr>
<tr>
<td>Behavior</td>
<td>Distribution channels</td>
<td>• Managers involved</td>
</tr>
<tr>
<td>Buying habits</td>
<td>Etc.</td>
<td>• Department characters and functions</td>
</tr>
</tbody>
</table>

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