Financial decision-making problems represent an important new set of applications for expert systems. While these problems share certain similarities with the scientific and engineering domains that have historically been the focus of expert system research and development, they have their own special characteristics. What distinguishes financial applications? What demands do they place on expert system technology? What research opportunities do they suggest?

Most applications of expert systems in finance center on computing an assessment of the risks and rewards associated with alternative courses of action. These assessments, though they may involve the analysis of large amounts of data, nonetheless typically involve a great deal of uncertainty. A banker considering making a loan, or a corporate officer considering building a new factory, cannot have complete knowledge about the myriad of events that over time govern the outcome of a financial decision. Private individuals planning their financial futures face analogous problems.

A designer of expert systems for financial applications is confronted by several challenges. First, as with any expert system problem, the knowledge representation and inference procedures selected must be well-matched to the structure of the domain. Second, the design of the user interface must reflect the fact that the system will be used daily by a large population of business-oriented people. Third, for many applications the system must be embedded in a larger hardware and software environment that may not include the machines, operating systems and languages that are typical of AI research organizations.

An obvious characteristic of financial problems is the mixture of numerical and symbolic reasoning that they demand. In contrast, domains like medicine and geology place few demands on reasoning quantitatively.

A second characteristic of financial problems is the absence of strong underlying causality models of the domain. While there may be simple algebraic models (such as net present value calculations) for certain components of an analysis, there are few problems where a global model is available. This stands in sharp contrast to certain engineering problems, such as trouble-shooting digital systems, where excellent multi-level causal models exist. The availability of deep models in engineering problems is useful even when they are not represented explicitly, since they inform the knowledge engineering process that produces surface models. The absence of deep models increases the difficulty of knowledge engineering in financial domains.

A third characteristic of many financial problems is the apparent emphasis by experts on non-procedural decision-making knowledge. This may reflect the difficulty of constructing accurate deep models, or it may reflect the fact that complete case data is virtually never available in practice.