Quick Answer: Are Business Rule Engines Obsolete?

Published 7 October 2021 - ID G00757550 - 5 min read

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Initiatives: Artificial Intelligence

Business rules are an essential part of applications that make decisions or help people make decisions. However, vendors have changed the way they package rule processing software. Data and analytics leaders must understand the evolution of decision intelligence to pick the right product.

Quick Answer

Are business rule engines obsolete?

- Traditional forward-chaining business rule engines (BREs) are irrelevant for almost all new applications and thus are obsolete. However, rule engines that are part of decision management suites (DMSs; also called business rule management systems [BRMSs]) are useful and important for many contemporary applications so they are not obsolete.

- Develop applications that automate or augment human decisions that are partly or entirely determined by laws, regulations, business policies or subject-matter expert judgment by using business rules.

- Use a DMS in preference to a plain BRE or rule processing bundled into other tools to implement decision intelligence solutions that include many rules.

More Detail

Many business decisions are determined in whole or in part by formal directives or insights from subject matter experts.

Rules may implement “if-then” directive business logic from laws, regulations or internal corporate policies such as:
Other business rules are heuristics based on the knowledge, experience or common sense of subject matter experts. For example:

- If a customer has declined an offer more than three times, do not present it again for six months.

Business rules:

- Can implement complicated decisions with dozens or thousands or more if-then conditions and options
- Can be developed relatively quickly because they are based on preexisting insights found in relevant laws or policy manuals or extracted from interviews with knowledgeable experts
- Do not require data scientists to collect and prepare training data, build machine learning (ML) models or conduct experiments
- Can be used in unfamiliar situations where the organization does not have historical data that could be used to train ML models
- Can be modified quickly without rebuilding or retraining models when circumstances change
- Are inherently transparent and explainable so that everyone can see how decisions are made
Many business decisions should be made entirely using rules. However, rules are only as good as the directives or experts’ judgments that were used to develop them. Some decisions are better if ML is used in conjunction with a rule or a set of many rules (see Figure 1). If an organization has relevant data and the time to build an ML model, it may be beneficial to use the results of ML models at development time to design a better set of rules (i.e., some rules are derived directly from offline ML models or optimization analytics). Or it may improve the accuracy and effectiveness of a decision by executing an ML model (i.e., "scoring" new data) in conjunction with rules at runtime in a multistep, composite AI decision flow. In other situations, optimization or other mathematical techniques are used, sometimes in conjunction with ML or some form of rule processing.

**Figure 1: Rules and Analytics in Decision-Making**
The software used to implement business rules has evolved considerably over the past 30 years (see Figure 2). Expert systems from the 1980s and 1990s often used BREs with forward or backward chaining logic. In the early 2000s, some BRE products disappeared, while others grew into BRMSs by adding better tools for application authoring (rule encoding), simulation and testing, version control, decision logging, and monitoring. More recently, vendors added decision modeling capabilities and enhanced support for embedding ML logic, resulting in products called DMSs, which are sometimes still called BRMSs. A DMS is more effective and easier to use than a traditional BRE because of its enhanced development, management and analytical capabilities. A DMS includes some form of BRE, typically implemented as a code generator. However, it usually makes little or no use of forward and backward chaining. Rules remain essential in decision-making, but DMSs make traditional plain BREs obsolete.

Figure 2: DMSs Evolved from BREs and BRMSs

DMSs are overkill for business processes with simple decisions that have few rules and rules that don't change frequently. Low-code application platforms (LCAP), BPM platforms and robotic process automation (RPA) tools have facilities for implementing these simple rule-based applications without DMSs. However, some hyperautomation tool suites combine full-blown DMSs with LCAP, BPM or RPA tools to handle demanding applications.
DMSs are irrelevant for ML-based decision solutions unless the decision algorithm involves a complicated set of rules along with the ML predictions.

Finally, decisions that call for management science/operations research optimization techniques generally don’t require a DMS. However, DMSs are used in conjunction with optimization for some powerful composite AI solutions.

DMSs foster decision engineering — a systematic approach to the design, development and deployment of decision intelligence solutions. Decision engineering is the product of "decision thinking." It focuses explicit attention on the decision process rather than treating decisions as an accessory in business process design, data modeling or analytics. Analysts work with business stakeholders to identify business objectives, discover the decisions to be made, and break decisions into their component parts (subdecisions). They sometimes use a functional decision modelling approach, such as Decision Model and Notation (DMN), or a procedural modeling approach that outlines multistep, sequential decision flows. Decision models identify if, where and how rules, ML, optimization and other AI techniques should be applied.

Decision engineering disentangles decision logic from the rest of the application and often puts the logic in a separate decision service for several reasons:

- Web-based DMS authoring studios make it practical to have businesspeople encode and maintain rules independently from the rest of the application logic. The responsibility for decision accuracy stays within the business department that owns the process. This also reduces the time required to get a solution into production.

- Decision logic typically needs to change more frequently than other aspects of a system. Algorithms change when laws, regulations, business policies or business conditions change, and as the organization collects new data. By isolating decision logic in a discrete decision component, businesspeople or developers can modify the algorithm independently, providing continuous decision improvement without disrupting the rest of the application.

- Decisions and subdecisions that are implemented in a modular decision service can be shared among multiple composable applications where appropriate. This avoids having multiple, potentially incompatible, implementations of a “lifetime customer value” calculation, for example.
Recommended by the Authors

Decision Intelligence Is the Near Future of Decision Making

Applying AI — Techniques and Infrastructure

Should Your Project Use a Decision Management Suite?

How to Use Machine Learning, Business Rules and Optimization in Decision Management

Develop Good Decision Models to Succeed at Decision Management

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