



## Summary

The unifying concept that defines FICO and its substantial technology and solutions stack is Decision Management. This term has not yet become mainstream - but it will. All business analytics activities are performed with the single aim of improving the accuracy and efficiency of business decisions. This applies to business intelligence, data visualization, data mining, business rules management, and many other forms of analysis. Unifying these activities under a single discipline means that currently fragmented analytical efforts can be combined into a single whole, with benefits that will be discussed in this review.

FICO supports the complete analysis lifecycle - from data management through to data discovery and exploration, and then on to analytic model development and testing, and finally deployment and performance monitoring. The technology stack supports all major forms of analytic activity with the exception of operational business intelligence, where FICO partners with Birst.

Most businesses spend considerable time managing and automating their transactional activity and business processes, and decision management is a next logical step in realizing improved efficiency and greater efficacy. Only a handful of suppliers are equipped to offer an enterprise decision management platform, and FICO happens to be one of them.

What is particularly interesting about FICO is its long history. Since 1956 it has employed contemporary technologies to help firms in banking and insurance make more effective decisions. The ubiquitous FICO Score, a widely used credit rating service, is a testament to the skill and experience the company has acquired since its early days. Today it addresses a much broader range of industries, and while FICO technology and solutions platforms are challenged by the likes of IBM and SAS, its experience is certainly not challenged by any other supplier.

The complete decision management offering from FICO is embraced in its Decision Management Suite. This is a large and complex set of products and accompanying architecture. So just to break the ice I'll list the various layers.

- Data - tools for data integration, access, preparation, discovery, and data streaming.
- Visualization and exploration - a number of tools to explore data, pick out important features and visualize.
- Model building - statistical, machine learning, text analytics, optimization and interfaces to other analytical tools.
- Applications - an integrated development environment for web and mobile decision based applications.
- Model deployment - very sophisticated run-time architecture (FICO Analytic Cloud)



August 2015

including the use of open standards based Linux containers. Model library, business rules, agile development environment, support for PMML. SAS and R models also supported.

- Model management and monitoring - tools to aid model developers and for business managers to monitor model performance.
- Full lifecycle management with tools to automatically and manually modify prescriptive rules as business conditions change.

The commercial reality behind decision management is that it allows businesses to execute decisions of various types with greater efficiency and accuracy. Decisions are as ubiquitous as transactions and process instances. Almost every activity within a business is laden with decisions - credit limits, discount rates, upsell offers, supplier approvals - and so on. If these are automated, either fully or partially, the effect on both top and bottom lines can be significant. Realizing this goal however requires a coordinated, integrated effort. Right now many analytical efforts are fragmented across departments and technologies. This leads to increased cost, greater opportunity for error, lack of transparency, ambiguity and difficulty evaluating benefits. An integrated Decision Management environment addresses many of these issues, although it has to be said that external constraints are usually the drivers for adoption of a strategy of this nature. In financial services the external constraint is the regulator, and platforms such as the one offered by FICO are widely adopted in these industries. Eventually however, the simple weight of analytical activity and associated proliferating complexity will force some level of integration.

Most of FICO's technology can be deployed on-premises or accessed in the FICO Analytic Cloud. This latter is not only an analytics platform, but serves as a marketplace for analytic solutions. Somewhat confusingly, different names are used for similar components in the cloud and on-premises implementations.

## FICO Decision Management Platform

It will help matters to distinguish between FICO's Decision Management Suite and the Decision Management Platform.

The Decision Management Suite is basically the complete collection of components offered by FICO for handling data, creating predictive models, optimization, deployment, monitoring, application development - and so on. The Decision Management Platform, is a piece of software that provides a unified data mart and the APIs to connect the various components of the Decision Management Suite. It also provides the execution mechanism for decision, analytic or optimization model services. DMP is a component of the Decision Management Suite. It can be purchased, used or, if an on premises implementation, it can be installed.

It uses a modular approach to deployment and scaling of decision management applications. Containers (effectively self-contained operating systems) are used for scalability and flexibility in the FICO Analytic Cloud. Redhat OpenShift is currently used, but others, including Docker,



August 2015

Spark and FICO's Decision Management Integration Platform will be used in the future. It's an architecture that ensures the Decision Management platform can scale to meet the most demanding of requirements and preempts the need to process large volumes of streaming data as devices, sensors and other streaming data sources become more widely used (the Internet of Things).

## Data Management and Processing

It all starts with data, and analytical activities adhere strongly to the garbage-in, garbage-out paradigm. So that we don't get erroneous analytic models, FICO provides two platforms for the management and manipulation of data, to make it fit for purpose.

The first of these is the Data Orchestrator platform. This is essentially a data gateway with connectors to corporate and public information services, and the ability to add connectors to pretty well any other data source. It acts as a service oriented data-hub with facilities for data transformation (generate new features for example). Data access duplication is avoided through this single gateway, and it also addresses issues such as security. Based on open source software (from Apache and other third parties) it is platform agnostic and does not incur vendor lock-in.

The FICO Data Management Integration Platform provides greater data handling sophistication and particularly for streaming data. It provides a large number of connectors for diverse data sources, including both batch and streaming Big Data. In essence it provides a platform to handle data in real-time, with streaming data visualization, indexing and search, pre-processing for persistent storage, and the handling of data stream events via pre-defined rules.

While Data Orchestrator acts as a data gateway, enables pre-processing and data connection, it is largely passive, in the sense that it prepares data for other services. The Data Management Integration Platform however is an active component capable of supporting real-time decisioning using streaming data sources. It comes with a SDK and the tools to build streaming analytics applications.

## Analysis

FICO provides an extensive suite of products that support the creation of analytical models. These range from data exploration through to machine learning, text analytics, statistical methods and optimization.

**FICO Big Data Analyzer** serves to enable users of varying skills to explore and visualize big data, while hiding much of the complexity. It also comes with a number of applications targeted at customer and operational analytics. The user interface supports SQL-like queries and a graphical interface for business users. Virtually all variations of the Hadoop platform are supported including Hive, HCAT, YARN, HDFS, and comes with out-of-the-box support for Cloudera and Hortonworks. Collaboration features strongly, with the Analytics Hub facilitating



August 2015

the storage, sharing and reuse of various analytical assets. This is largely a qualitative analysis platform that can be used with other FICO tools to create analytical models.

**Analytic Modeler** is an umbrella term for several discrete modeling tools. These include:

**FICO Analytic Modeler - Decision Tree Professional.** Decision trees tend to be popular because of their transparency, and the ease with which resulting rules can be deployed into production. Generally speaking decision trees can be created manually, using collective domain knowledge, or automatically using decision tree algorithms. The ideal of course is to merge both approaches, and this is exactly what Decision Tree Professional supports. It is also possible to simultaneously support multiple objectives. Trees can easily be exported to other environments, and actions can be assigned to each node in a tree, which can then be integrated into workflows.

**FICO Analytic Modeler - Scorecard Professional.** This is a hosted predictive analytics solution that supports model creation by skilled business users. Scorecards essentially provide a mechanism for aggregating multiple predictive characteristics into a single score. Problems can arise with imperfect data and competing objectives (minimize risk while maximize revenue for example). Scorecard Professional provides ample mechanisms to deal with these issues. As with decision trees, scorecards are ideal when the decision mechanisms needs to be transparent.

**FICO Analytic Modeler for R.** This supports the development of descriptive and predictive models built in R to be integrated into the FICO Decision Management environment. It uses RStudio (much loved by many R users) as the platform for R development and testing.

Finally, **FICO Text Analyzer** will support tasks such as sentiment analysis and the extraction of useful features from text data.

## Decision Execution

There is a common misconception that all one needs to create and deploy decision models are data, an algorithm and a programming language such as Java to deploy the resulting model. In reality this is about ten per cent of the story. The deployment and execution of decision models is where most of the problems occur - something that FICO is keenly aware of. To ameliorate many of these issues FICO provides a number of crucial components in the Decision Management environment they provide.

**FICO Decision Modeler** employs FICO's Blaze Advisor decision rules management system to implement appropriate decision models (decision trees and tables for example). It is a hosted facility within the FICO Analytic Cloud, capable of servicing very high levels of decision traffic. Blaze Advisor is considered by many to be the premier business rules management system, and incorporates not only an execution platform, but the tools necessary for rule creation, modification, monitoring and reporting. The interface is drag-and-drop for ease-of-use, and resulting rules can be executed via the FICO Decision Management Platform or downloaded



August 2015

to execute on an on-premises server. Decision Modeler is a core component in the FICO architecture and interfaces with optimization and application development tools.

**FICO Optimization Modeler** will find the best solution for a resource problem given variables, constraints and an objective (usually profit or revenue). How to deploy a large team of customer facing operatives given product profitability, sales volumes, bundled offers, business rules and so on, is one such example. The underlying engine comes from FICO's Xpress Optimization Suite, capable of very high levels of performance, and various modes of optimization (linear, non-linear, stochastic, discrete and others). Optimization Modeler can be used stand-alone, but is more potent when combined with business rules and predictive models. In this way it is possible to optimize which rules and models should be used in which circumstances. FICO's optimization technology is used in some of the largest and most complex business optimization problems.

**FICO Decision Modeling Notation** leverages on the recently ratified Decision Model and Notation (DMN) standard from the OMG. It provides the vital link between decision logic and business processes. Since all business processes contain decision logic, it makes sense to separate the two, so that logic can be changed without changing processes. DMN is an executable notation that can be executed within a business process context.

The FICO Decision Management Suite generates a number of components (business rules, predictive models etc.) that need to be formed into a working application. To this end **FICO Application Studio** allows developers to utilize these components to create web and mobile applications. The environment is fully integrated, meaning that all components and their interdependencies are known to the platform. A WYSIWYG visual editor accelerates the development process, and applications are built on contemporary standards such as HTML5, JavaScript and CSS3.

## Governance, Management and Monitoring

Most organizations are plagued by fragmented analytics efforts. Each line of business may well be doing its own thing, using different technologies and methods. This is the way all new technologies are adopted, but sooner or later the weight and complexity of analytical efforts force some level of integration. Certainly in some heavily regulated industries it simply isn't enough to have poorly documented, fragmented decision models. To address these issues FICO offers its **Model Central** platform. This provides an environment for both managers and developers to ensure models are adequately documented, that an audit trail of changes is created, that standards are adopted and that model development productivity is enhanced. It incorporates end-to-end processes for model development, deployment, retirement and modification. For organizations that need to comply with regulatory requirements, Model Central provide various mechanisms to automate the compliance process. This includes workflows to capture required documentation, reviews and approvals. It also provides access to model performance results. Overall it offers a centralized model repository, which is really not optional for large scale decision model creation and deployment.



August 2015

Once decision models have been developed and deployed, there is an obvious need to monitor them and modify when necessary. To this end FICO provides its **Visual Insights Studio**. It is in effect a BI platform with good data visualization capabilities. However its real strength comes from the fact that it is integrated into the overall Decision Management Platform Architecture.

The overall capability of Visual Insights Studio includes data modeling, data preparation (ETL type functionality), dashboards and charts, self-service ad-hoc analysis, data discovery and visualization, and an advanced report designer. This is a tool for monitoring performance and gaining insights into data, which can then act as a catalyst for improvements in production decision models.

## Competition

Only a handful of suppliers approach the level of sophistication offered by FICO. Certainly IBM and SAS provide many of the components listed above, but each has its advantages and disadvantages.

- IBM is primarily an infrastructure and services company, and buying into IBM's analytics technologies does imply to some extent buying in to a wider set of technologies and services.
- SAS has offered analytical platforms for several decades, and started life with its statistical analysis tools. The technology is widely used, but it is not specifically a platform for decision management.
- Angoss could be seen as a player in this space, and offers some similar technology to FICO. But it certainly is not as broad or mature as the FICO offering.
- Oracle offers some level of decision management capability, but as with IBM, it is only existing Oracle users who might consider such a platform.

While the selection of the technology platform is one issue, the selection of a supplier is a wholly different one. As mentioned previously, FICO is undeniably the most experienced company in this space, and possesses the collective acquired experience to turn intention into a solution. It knows the potholes and where the greatest benefits are likely to be found in the practical application of analytics technology. Organizations with a large existing investment in IBM or SAS may choose to use these platforms for integration purposes. Organizations without such a bias would be remiss not to give serious consideration of FICO's decision management technologies and skills.



August 2015

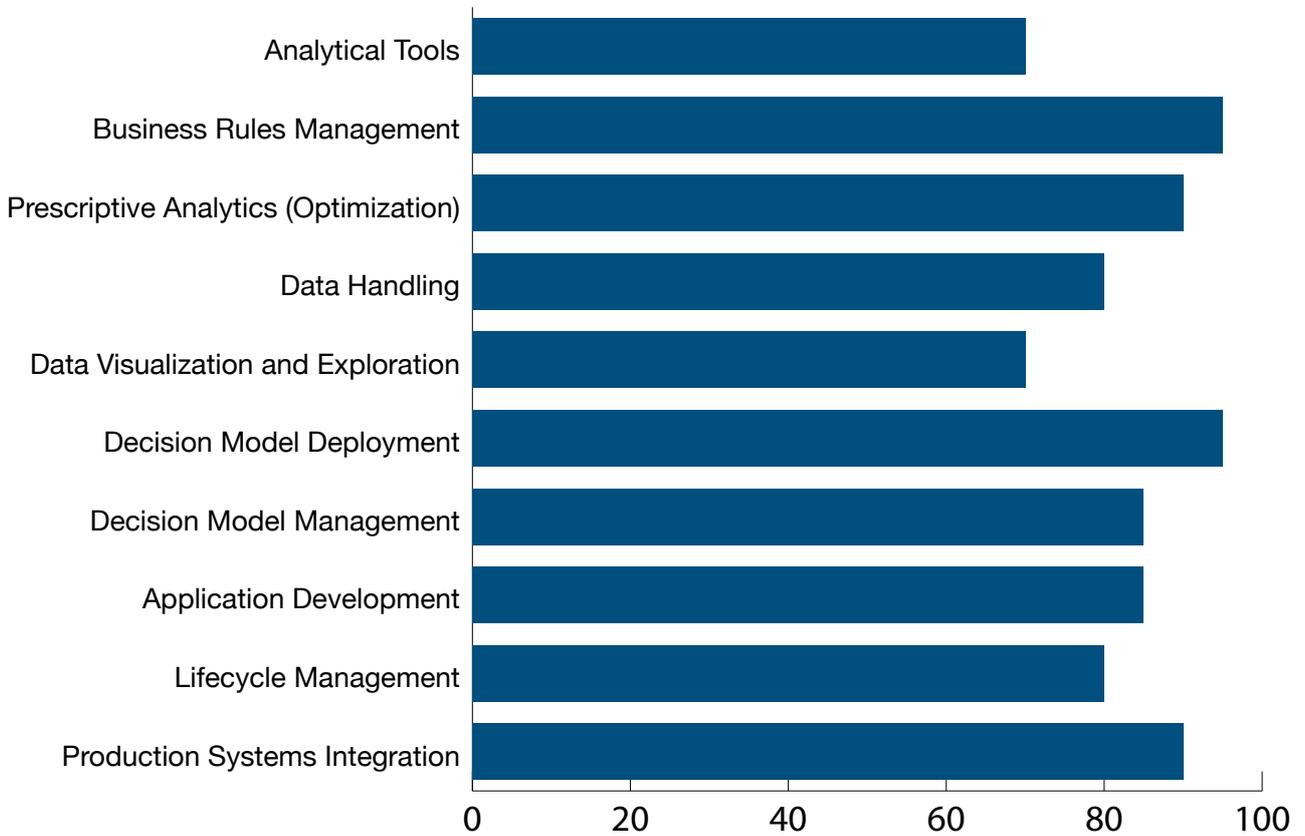
### Ratings

It is important to understand that these ratings score FICO Decision Management Suite for what it does, and not what it doesn't do (production BI for example). The other thing to consider is that 50% is average. Anything above that is above average - and clearly desirable.

The ratings decide the tier a product is placed in. 0 - 25% tier 4, 25 - 50% tier 3, 50 - 75% tier 2 and 75 - 100% tier 1



FICO Decision Management Suite - Tier 1



Rating Average for FICO Decision Management Suite 84%



### About Butler Analytics

Butler Analytics is a boutique IT analyst firm specializing in business analytics technologies and methods. It was founded by Martin Butler, best known as founder of Butler Group which, prior to its acquisition, was Europe's largest indigenous IT analyst firm.

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