

Enterprise Value Creation Landscape

Overview

The goal of a public corporation is to maximize shareholder value. Information from internal and external sources is used to make decisions, which create shareholder value upon execution. These actions often create new information, such as sales data, which can then be used to make decisions at a later time. The enterprise value creation landscape includes processes of creating value through information, decisions, and actions.

Information technology (IT) plays a growing role in the value creation process. In 2007, worldwide IT spending topped \$3 trillion, and is projected to continue growing at a compound annual growth rate (CAGR) of between 5% and 8%. Software plays key roles in each step of the value creation process: gathering, storing, and analysis of structured and unstructured data; analysis of that data and other information to support decisions; and systems for efficient execution of actions based on those decisions. Consulting also plays a major part by providing on-demand expertise for improving operational processes and for identifying key information and strategies.

In this document, we will briefly review the existing value creation landscape, and then explore some trends pointing to the future. Our review is not intended to be comprehensive, but rather provide some indication of the major pieces, processes, and vendors.

Software

It would be difficult to cover the full scope of software tools and associated methodologies used to support the creation of shareholder value. The landscape is vast and constantly changing, continuing to evolve from a focus on personal productivity software (such as spreadsheets) to enterprise-wide systems. The main driver for this shift is the recognition that software applications and their associated data represent key knowledge for the corporation, knowledge that has intrinsic value to the enterprise. As such, this knowledge and data must be controlled at the enterprise level to ensure accountability, validity, transparency, and alignment.

Shadow IT

The term “shadow IT” was coined to describe the use of data and software at the individual or departmental level without enterprise coordination and oversight. A good example is the widespread use of Microsoft Excel. In 2007, Microsoft estimated that its Office suite (which includes Excel) was deployed on 450 million desktops worldwide¹, accounting for \$11 billion in revenue². Spreadsheets are clearly valuable tools, yet their use for analyzing information and estimating the value of strategies creates a new set of problems. A 2007 article in CIO.com summed up the situation³:

¹ http://cio.com/article/131500/Eight_of_the_Worst_Spreadsheet_Blunders/4

² http://www.microsoft.com/msft/reports/ar06/staticversion/10k_fr_dis.html

³ http://cio.com/article/131500/Eight_of_the_Worst_Spreadsheet_Blunders

One project found that 80 percent of spreadsheets contain significant errors. "That means that of every five spreadsheets, at most one will give the correct results," writes Louise Pryor⁴, an actuary and consultant who specializes in software risk management. . .

Uncontrolled and untested spreadsheet models therefore pose significant business risks. These risks include: lost revenue and profits; mispricing and poor decision making due to prevalent but undetected errors; fraud due to malicious tampering; and difficulties in demonstrating fiduciary and regulatory compliance.

Clearly, while the spreadsheet enables the creation of shareholder value, their actual use leaks considerable value due to errors and other problems. Provisdom has witnessed these problems first-hand during field-testing of our decision platform. One test-case began with a spreadsheet analyzing different strategies for data center server upgrades. Errors were discovered which accounted for discrepancies of between \$119 million and \$172 million in NPV. In another example, the analyst was building an Excel spreadsheet model to optimize DRAM purchasing as a function of fluctuating price. The analyst included custom Visual Basic code to perform a sophisticated numerical optimization not supported by Excel. However, this code had no published specifications, did not undergo design or code review, and was not subject to software quality assurance (SQA) or regression testing. Not only was this application likely to contain errors, it was completely opaque to everyone but the analyst. Were the analyst to leave the company, this knowledge and its associated value would be effectively lost.

Similar scenarios play out at departmental or divisional levels, i.e. HR might develop their own application, as would manufacturing, finance, etc. But these scenarios lack visibility across the enterprise, often resulting in duplication of effort, multiple and possibly differing copies of data, and little or no capability to communicate across functional silos or up the management chain.

Decision Modeling Software

There have been several attempts at creating software tools that provide greater structure, consistency, and transparency than Excel analyses. These tools use decision-modeling techniques such as Decision Analysis (DA) and Real Options and are focused directly on the use of information and decisions to create value. Standalone tools have gained relatively little traction, likely due to the high degree of technical and mathematical sophistication required, combined with limited applicability to corporate decisions. DA, for instance, does not deal with shareholder value directly, rather approximating risk-aversion through a utility function. Real Options only admits certain variable types and implementations usually only allow up to two variables. The technical capability required to build and understand models in either framework make them effectively "black boxes" to most decision makers. In the end, while providing greater mathematical rigor, the use of such tools effectively creates more "shadow IT".

Despite limited traction and growth, these tools have gained a small but dedicated group of technically advanced users, often analysts in major corporations such as General Electric, Chevron, and Microsoft. Indeed, Lumina Decision Systems boasts that 85% of Fortune 500 companies use their Analytica product (a sort of "super spreadsheet" for building Decision Analysis models). Yet even the largest of these

⁴ <http://www.louisepryor.com/>

companies has shown nowhere near the growth of large enterprise software providers, such as Oracle and SAP. Correspondingly, none of these large vendors have seen fit to acquire the technology provided by these more general purpose vendors, or to develop similar general capability in-house; however the approaches have been adapted for niche applications. Oracle Retail Price Management, for instance, is a dedicated software module to aid in product pricing decisions, which, amongst other things, allows “analysis to understand the impact of the change on the financial, competitive, and inventory positions via a decision analysis tool”

Enterprise Software

The essential concept of enterprise software is to standardize data and applications across the enterprise. Business application logic would then be centrally controlled, ensuring a greater degree of compliance, alignment, and validation. Similarly, corporate data would be centrally warehoused, ensuring a single version of “truth” and greater efficiencies (e.g. instead of asking HR for a quarterly payroll report, corporate finance could directly include payroll data in their own analysis and reporting). It is clear that corporations have recognized the value of this approach, as enterprise software revenues were \$176.3 billion worldwide in 2007 and are expected to grow 8% to \$190.3 billion in 2008 despite the economic downturn⁵.

Operational software and associated data management technologies have perhaps had the greatest success, fueling growth of such companies as SAP and Oracle. *Enterprise Resource Planning* (ERP) software forms a large piece of enterprise software deployment, with projected 2008 revenues of \$22.4 billion worldwide⁶. ERP applications handle various operational functions such as manufacturing, supply chain management, human resources, etc. ERP is driven by a central data warehouse, exposing various interfaces for suppliers, customers, and employees. ERP and similar applications largely deal with actions and information (as opposed to decisions) in the value creation cycle. Major vendors in the ERP space include SAP, Oracle, the Sage Group, and Microsoft.

Business Analytics (BA) refers to a segment of enterprise software concerned with improving decisions based on information. An IDC report estimates worldwide 2006 revenues of \$19.3 billion in the BA segment⁷. IDC further broke down the BA segment into *Data Warehousing* (database, OLAP, document warehouses, etc.) and *Performance Management* (PM) Applications and Tools. PM includes such applications as Customer Relationship Management (CRM), financial performance and strategy applications, business intelligence (BI), and spatial data management tools (e.g. GIS). PM applications often support methodologies such as Balanced Scorecard, which in turn indicates a number of Key Performance Indicators (KPIs), which are “analytics” driven by near real-time data and monitored by decision makers via electronic dashboard applications. Another fast-growing category of tools, termed *Predictive Analytics*, are used in an attempt to analyze risks associated with future uncertainty. The PM space has been changing rapidly, with major vendors such as SAP, Oracle, and IBM acquiring other

⁵ <http://www.gartner.com/it/page.jsp?id=600614>

⁶ http://www.gartner.com/DisplayDocument?ref=g_search&id=626007&subref=simplesearch

⁷ http://www.oracle.com/corporate/analyst/reports/infrastructure/bi_dw/208699e.pdf

players like Cognos, Hyperion, Decisioneering, and Business Objects. SAS is also a strong player in the analytics segment.

Enterprise Decision Management (EDM) represents a growing segment of enterprise software that is attempting to focus on the Decisions portion of the value creation cycle. The focus, however, is really on the management of decisions as an enterprise asset, rather than on identifying optimal choices. EDM is usually applied to high-volume operational decisions amenable to automation. Current examples are often customer-facing, such as credit approval. Rather than have a human monitor KPIs and manually take actions, analytics are used to develop a set of business rules. These in turn are encoded in a Business Rules Management System (BRMS), which provides a high-level of abstraction and agility for encoding and changing business logic. The BRMS exposes a Decision Service, a software component fed by various information sources. When rule conditions are satisfied by the available information, the rule “fires”, generally triggering some action by BPM software. Gartner, IDC, and Fair Isaac reported the global EDM market to be \$22 billion to \$25 billion in 2006⁸.

Consulting

Significant spending also occurs for consulting services. Consulting covers a variety of areas, from IT infrastructure, to application development, to strategy development. Of particular interest is Risk Management Consulting, which was a \$28.6 billion market in 2006 and is projected to grow at a CAGR of 17.2% through 2011⁹

Trends

Some clear trends are emerging from our examination of the value creation landscape:

Corporations are recognizing the need to connect information to actions through good decisions.

This includes gathering more data, both structured and unstructured, and trying to understand the effects of uncertainty and risk on strategy. There is clearly a “pull” for decision-modeling methods such as DA and Real Options that connect information to value and directly account for future uncertainty and choices. Penetration of such tools has been hampered by their limited capability and transparency as well as their requirement for a high-level of technical sophistication of end-users. Enterprise analytics tools are often focused on increasing understanding of information, leaving decisions to people, but the volume of relevant information and choices exceeds the processing capability of the human brain. Information volume currently doubles yearly; by 2011, it is estimated information volume will double every 11 hours.

Greater emphasis is being placed on the management of knowledge as an enterprise asset.

⁸ <http://library.corporate-ir.net/library/67/675/67528/items/246139/AnalystDayNF051507.pdf>

⁹ <http://www.consultingcentral.com/research/riskmanagement?C=OPJo2gDaDodGY>

This includes centralized warehousing and dissemination of data, documents, and associated knowledge. Greater transparency is desired to allow communication across functional silos and management levels.

Software tools continue to move away from isolated applications developed by technically skilled employees (e.g., spreadsheets) to more abstract representations of corporate knowledge and business logic (e.g., the use of business rules) that are accessible across the enterprise.

This means greater participation by workers and decision makers who may have valuable business knowledge or strategic input but who lack specific software or mathematical skills. It is also essential in the move toward the management of knowledge as an enterprise asset.