

Competing on Analytics

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Executive Summary

This report describes the emergence of a new form of competition based on the extensive use of analytics, data, and fact-based decision making. The analytics—quantitative or statistical models to analyze business problems—may be applied to a variety of business problems, including customer management, supply chains, and financial performance. The research assessed 32 firms with regard to their orientation to analytics; about one-third were classified as fully engaged in analytically oriented strategies. Both demand and supply factors for analytical competition are described. Of the two, demand factors are the more difficult to create. The presence of one or more committed senior executives is a primary driver of analytical competition.

About This Research

This research report is based on analysis of 32 organizations from a variety of industries (Figure 1) that are successful both in terms of their overall performance and in their use of business analytics. The research was undertaken to investigate and document how and why these companies not only use sophisticated analytics, but also make them the basis of their competitive strategies, and adopt or move toward an enterprise-level approach to business intelligence. Telephone or in-person interviews were conducted with either IT or business executives at 30 firms; three firms were analyzed solely on the basis of secondary research.

On What Basis Do Companies Compete Today?

In virtually every industry, many former strategic alternatives are no longer viable or likely to be successful. Today, there are few regulated monopolies, or companies with unique geographical access. Proprietary technologies are rapidly copied by competitors, and breakthrough innovation in either products or services is rare. Most of the competitive strategies organizations are employing today involve optimization of key business processes. Instead of serving all customers, they want to serve optimal customers—those with the highest level of profitability and lifetime value. Instead of receiving goods and services whenever they happen to arrive, they attempt to optimize supply chains to minimize disruptions and in-process inventory. Instead of looking backward at their

business performance and making *ex post facto* adjustments, they seek to understand how optimum nonfinancial performance drives optimum financial performance, and to make accurate forecasts of future performance so they can react in advance of situations. Instead of throwing money at business problems, they seek to optimize their use of capital.

But strategies involving optimization require something different than those based on taking business as it comes. Above all, they require extensive data on the state of the business environment and the company's place within it, and extensive analysis of the data to model that environment, predict the consequences of alternative actions, and guide executive decision making. Moreover, they require analysts and decision makers who both understand

the value of analytics and know how best to apply these for driving enhanced performance. Companies that strive to optimize their business performance using this data-intensive approach are competing on analytics and analytical capabilities. Many companies are pursuing optimization-

Figure 1:
Industries of Companies Surveyed

INDUSTRIES REPRESENTED	NUMBER
Financial Services	10
Consumer Products and Retail	6
Travel, Transport, and Entertainment	5
Pharmaceutical and Chemical	4
Information Technology and Communications	3
Health Care	2
Engineering	1
Government	1

based strategies, but most have failed to develop the analytical capabilities necessary to make them succeed.

The idea of competing on analytics is not entirely new. A few organizations—most within financial services and particularly in financial investment and trading businesses—have competed on this basis for decades. The trading of stocks, bonds, currencies, and commodities has long been driven by analytics. What is new is the spreading of analytical competition to a variety of other industries—from consumer finance to retailing to travel and entertainment to consumer goods—and within companies from individual business units to an enterprise-wide perspective. Even the most traditionally intuitive industries are moving in this direction—professional sports teams, for example.

Two of Boston's sports teams have had some enviable success of late, at least in part because of their analytical capabilities. The New England Patriots football team, for example, won its third Super Bowl in four years. The team uses data and analytical models extensively, both on and off the field. In-depth analytics help the team select its players, stay below the salary cap, decide whether to punt or "go for it" on fourth down, and try for one point or two after a touchdown. Both its coaches and players are renowned for their extensive study of game films and statistics, and Head Coach Bill Belichick peruses articles by academic economists on statistical probabilities of football outcomes. Off the field, the team uses detailed analytics to assess and improve the "total fan experience." At every home game, for example, 20 to 25 people have specific assignments to make quantitative measurements of the stadium food, parking, personnel, bathroom cleanliness, and other factors. External vendors of services are monitored for contract renewal and have incentives to improve their performance.

The Boston Red Sox baseball team is also a convert to analytics (following, in many ways, the lead of the pioneering but less well-financed Oakland A's). The ability to extract knowledge from data presumably helped the Sox win the World Series in 2004 for the first time in 86 years. Boston has begun to select players less on traditional criteria such as batting average, but rather on newer, more subtle

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factors such as on-base percentage. Bill James, considered the godfather of baseball statistics or "sabermetrics," was hired by the Red Sox as an adviser. The Sox also have become more analytical off the field. Like the Patriots, they map and monitor key aspects of the fan experience—from the decision to go to a game, to the routes taken by fans to the game, to the effectiveness of the cleaning crew. The team's management has maximized revenues from Fenway Park, the smallest baseball park in the major leagues, by calculating ticket price elasticities, establishing an online market for season ticket resales, and modeling revenue increases from adding seats in unused locations (including on top of the Green Monster, the towering left field wall).

Analytical competition is not only taking root in U.S. sports. Some soccer teams in Europe also have begun to employ similar techniques. AC Milan, one of the leading teams in Europe, uses predictive models to prevent player injuries by analyzing physiological, orthopedic, and mechanical data from a variety of sources. Bolton, a fast-rising English soccer team, is known for its manager's use of extensive data to evaluate player performance and team strategies.

Analytical cultures and processes are appearing not only in professional sports teams, but in any business that can harness extensive data, complex statistical processing, and fact-based decision making. Analytics is becoming a primary basis for competition for these firms. They use analytical tools to change the way they compete or to perform substantially better in the existing business model. The gaming firm Harrah's, for example, has chosen to compete on analytics for customer loyalty and service, rather than on building the mega-casinos in which its competitors have invested. Its CEO, Gary Loveman, has commented, "We use database marketing and decision-science-based analytical tools to widen the gap between us and casino operators who base their customer incentives more on intuition than evidence." Amazon.com uses extensive analytics to predict what products will be successful, and to wring every bit of efficiency out of its supply chain. Amazon CEO Jeff Bezos notes, "For every leader in the company, not just for me, there are decisions that can be made by analysis. These are the best kinds of decisions. They're fact-based decisions." At the mutual fund company Dreyfus, analysis of customer information defined segmentation that helped reduce fund attrition from 22 to 7 percent a year. These companies, and a variety of others, are clearly competing on analytics.

Attributes of Analytically Oriented Companies

Virtually every major company uses some form of statistical or mathematical analysis, but some take analytics much further than others. In our research on the topic, we have identified several key attributes of firms that compete on analytics:

- One or more senior executives who are strongly advocating analytics and fact-based decision making;
- Widespread use of not just descriptive statistics, but predictive modeling and complex optimization techniques;
- Substantial use of analytics approaches across multiple business functions or processes;
- Movement toward an enterprise-level approach to managing analytical tools, data, and organizational skills and capabilities.

Each of these attributes is described briefly below:

One or More Senior Executives as Advocates

The adoption of a broad analytical approach to business requires changes in culture, process, behavior, and skills for multiple employees. Such changes don't happen by accident; they must be led by senior executives with a passion for analytics and fact-based decision making. Ideally, the primary advocate should be the CEO, and indeed we found several chief executives who were driving the shift to analytics at their firms. These included Gary Loveman, CEO of Harrah's; Jeff Bezos, the founder and CEO of Amazon; Rich Fairbank, the founder and CEO of Capital One; and Barry Beracha, formerly CEO of Sara Lee Bakery Group. Each of these executives has stated both internally and publicly that their companies are engaged in some form of analyti-

cal competition. For example, Fairbank commented:

It's all about collecting information on 200 million people you'd never meet, and on the basis of that information, making a series of very critical long-term decisions about lending them money and hoping they would pay you back.

Fairbank summarizes this approach as "Information-Based Strategy." Beracha, before he retired as CEO of Sara Lee Bakery, simply kept a sign on his desk saying, "In God we trust; all others bring data."

Without the push from the top, it's rare to find a firm making the cultural changes necessary to become an analytical competitor. We found some firms, for example, in which single functional or business unit leaders were trying to engineer an analytically oriented shift in their firms, but weren't able to sufficiently change the culture by themselves. This doesn't mean, of course, that such an executive couldn't lead such a change under other circumstances, and we did find organizations in which lower-level advocates were making progress on changing the culture. Any cross-functional or cross-departmental change, and certainly any enterprise-wide effort, clearly requires the support and attention of executives senior enough to direct and coordinate efforts in those separate units.

Widespread Use of Predictive Modeling and Optimization Techniques

Every firm can calculate simple descriptive statistics about aspects of its business (the average revenue per employee, or average order size), but the most aggressive analytical competitors go well beyond basic statistics. They are using predictive modeling, for example, to identify not only the most profitable customers, but those with the most profit potential, or those

most likely to stop being customers. They are combining and pooling both internal and external data in such a way as to gain a more comprehensive picture and understanding of their customers than was ever thought possible. They are optimizing their supply chains, so they can determine the impact of an unexpected constraint, simulate alternative supply chains, and route shipments around problems. They are establishing prices in real time so as to provide the highest yield possible from a customer transaction. In financial performance analysis, they create complex models of how their operational and cost measures relate to their financial performance. No matter what the business function, it's possible to improve performance through the use of sophisticated analytical techniques.

Companies that are recognized leaders in using analytical techniques for performance improvements also are using sophisticated experimental designs to measure the overall impact or "lift" of intervention strategies and using these results to continuously improve subsequent analyses. Capital One, for example, conducts more than 30,000 experiments a year with different credit card interest rates, incentives, direct mail packaging, and other parameters to maximize both the likelihood that a potential customer will sign up for a credit card, and that they will pay Capital One back. Progressive Insurance employs similar experiments. The company defines narrow groups of customers (or "cells")—for example, motorcycle riders older than 30 with no previous accidents, a college education, and a credit score higher than a certain level. For each cell, the company performs regression analysis to identify the factors that most closely correlate with its loss experience. They set prices for each cell they believe will enable them to earn a profit across a portfolio of customer groups. They use simulation software to

test the financial implications of these hypotheses. Through this analytical approach, Progressive can profitably insure customers in traditionally high-risk categories, such as motorcyclists.

Use of Analytics across Multiple Functions and Business Units

One of the hallmarks of an analytically oriented firm is the use of sophisticated analytics not just in one business function or process, but across multiple aspects of the business. Successful analytical competitors have realized the power of these tools and approaches, and are adopting them across their businesses. UPS, for example, has traditionally focused on analytics for operations and logistics. More recently, it has developed a strong analytical focus on customers, assessing the likelihood of customer attrition, or identifying sources of problems for customers. Several firms, described below, are even extending their analytical orientations to direct use by customers.

As we will argue later, however, there is a balance to be maintained in terms of broadening the focus on analytics, and employing them to address a specific business domain. Executives at several analytical competitors warned against losing a clear business purpose for analytics. Harrah's, for example, has targeted much of its analysis on increasing customer loyalty, although it has extended it into such related areas as pricing and promotions as well. Analytical competitors can broaden their focus beyond a narrow function, but they are careful not to become too diffuse in their analytical targeting so that they continue to support their primary strategies.

An Enterprise-Level Management Approach

Business intelligence applications often have been managed at the departmental level, with analytically oriented business functions selecting their own tools, managing their own data warehouses, and training their own people. However, if analytics are to be a company's basis for competition, and

if they are to be broadly adopted across the firm, it makes more sense to manage them at an enterprise level. This ensures that there is a critical mass of skills, that critical data and other resources are protected, and that data from multiple business functions can be correlated. The enterprise approach may include both organizational and technical capabilities for business intelligence. At the organizational level, for example, Procter & Gamble recently consolidated its analytical organizations for operations and supply chain, marketing, and other functions. This will allow a critical mass of analytical expertise to be deployed to address P&G's most critical business issues.

From a technology standpoint, many firms have had highly dispersed analytical technology in the form of many spreadsheets. However, one researcher suggests that between 20 and 40 percent of spreadsheets contain errors. Furthermore, the proliferation of user-developed spreadsheets and databases inevitably leads to multiple versions of key indicators within an organization.

Because of these problems, many firms are attempting to consolidate and integrate their technologies for business analytics. Adopting such an approach means

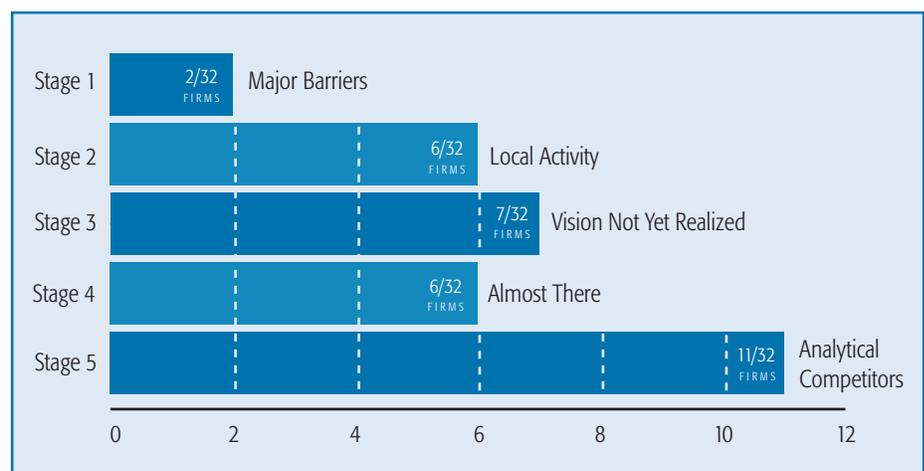
IT organizations must develop new and broader capabilities for extracting and cleaning data, loading and maintaining data warehouses, data mining, and query and reporting. These tools historically have come from separate vendors and have been difficult to integrate. However, the leading vendors of business intelligence tools and applications are beginning to broaden and integrate their offerings themselves, and to market and sell them at the enterprise level.

Stages of Analytical Competition

Analytical competition is not a binary attribute, which an organization either has or lacks. There are several stages of analytical orientation that we observed in the companies we interviewed (Figure 2). The percentages of organizations at these stages are by no means representative of any larger population; we intentionally sought out companies at the higher end of the analytical spectrum. A random sample of organizations would probably look like an inverted version of Figure 2, with the highest frequencies at the lower stages.

Stage 1 ("Major Barriers") organizations have some desire to become more analytical, but thus far they lack the will and

Figure 2:
Stages of Analytical Competition among Study Organizations



skill to do so. They face some substantial barriers—both organizational and technical—to analytical competition, and are still focused on putting basic, integrated transaction functionality in place. As a result they are not yet on the path to becoming analytical competitors. Because we attempted to interview only organizations that compete on analytics, we encountered only two Stage 1 organizations—a state government agency and an engineering firm (and even that firm is becoming more analytical about its human resources). However, Stage 1 organizations probably constitute the majority of all large organizations.

Stage 2 (“Local Activity”) organizations have made substantial progress in becoming more analytical, but it is primarily local, within particular functions or units. Marketing, for example, may be identifying optimal customers or modeling demand, but the example has not spread to other parts of the company. Their business intelligence activities produced economic benefits, but not enough to affect the company’s competitive strategy. We found six of these firms. What they primarily lacked was a vision of analytical competition that came from senior executives. Several of the firms had some of the same technology as firms at higher stages of analytical activity, but they had not put it to strategic use.

The organizations in Stage 3 (“Vision Not Yet Realized”) do grasp the value and the promise of analytical competition, but they are a long way from actually succeeding with it. We found seven organizations in this position. Some only recently have articulated the vision, and have not begun implementing it. Others have very high levels of functional or business unit autonomy, and are having difficulty mounting a cohesive approach to analytics across the enterprise. One multiline insurance company, for example, had a CEO with the vision of using data, analytics, and a strong customer orientation in the

fashion of Progressive, an auto insurance company with a history of technological and analytical innovation. But the company only recently had begun to expand its analytical orientation beyond the traditionally quantitative actuarial function, and there was little cooperation across the life and property and casualty business units.

Stage 4 (“Almost There”) organizations have the vision, and are close to achieving it. Six organizations fell into this category. Some only recently had adopted an enterprise-wide approach to analytical competition, and had yet to fully realize it in terms of marshaling the necessary resources. Others were competing on the basis of analytics, but also were competing on the basis of other factors, such as maintaining strong personal relationships with customers. Only a small degree of added emphasis on analytical capability would place these companies in the top rank.

The top rank is Stage 5 (“Analytical Competitors”), which describes organizations that have embarked upon analytical competition as a primary dimension of strategy. These are the organizations we primarily sought to uncover in our research, and therefore we identified 11 of them. They include such large and small organizations as Apex Management Group (a health care actuarial firm), Barclays Consumer Finance, Capital One, Harrah’s, Marriott, Owens & Minor, Progressive, Wal-Mart, a consumer products firm, and the sports teams, the New England Patriots and the Boston Red Sox. These firms exhibited each of the attributes described above as the components of analytical competition. They are also all highly successful within their industries, and attribute their success at least in part to their analytical strategies. Barclays, for example, increased its revenue per active account by 25 percent, while reducing delinquent accounts by 23 percent, by following its analytically oriented “Information Based Customer Management” strategy.

What’s the Business Value of Analytics?

Analytics can be used to pull almost every lever of organizational performance. However, we found several business objectives and issues that were driving most of the analytical activity in the firms we studied. They include the following:

- **Customers or consumer**—Several organizations were focused on customer or consumer analytics, which encompass a variety of specific objectives. They might include, for example, identifying the most profitable or desirable customers, or those with the lowest risk of nonpayment. Customer analytics also include identifying the current customers who are most likely to stop being customers. They also might include customer-specific pricing or product/ service offerings based on the customer’s past or predicted future buying frequency and habits. Companies that pursued this set of analytics among our study respondents included Harrah’s, Procter & Gamble, Progressive Insurance, Barclays, and Capital One.
- **Supply chain**—Analytics for logistics and the supply chain are well-established in many large firms, with the primary orientation usually being reduction of in-process inventory. Supply chain analysis also might encompass matching demand and supply, routing shipments around logistical problems, reducing stockouts and overstocks, alternative supply simulations, plant and distribution center siting decisions, and price optimization. Among the companies in our study, Wal-Mart is the leading exponent of supply chain analytics.
- **Financial performance and cost management**—One domain of business value for analytics can revolve around performance management. Monitoring and decision making on financial information is not often thought of as a

competitive strategy, but it can be. At MCI, (the company once known as WorldCom which recently emerged from bankruptcy and was acquired by Verizon), managing the business with accurate information on costs and their allocations is crucial to the company's strategy. CEO Michael Capellas and the

and analysis is a focus for anyone who hopes to compete in the industry. We also found evidence of analytics in new product development in the financial services industry. Brown Brothers Harriman, for example, is employing analytical models for its insurance industry clients to model risk-adjusted

• **Human resources**—Several firms mentioned they were beginning to do human resource planning with analytics, but the most aggressive users today seem to be professional sports teams. Both the Boston Red Sox and the New England Patriots, for example, use statistical analysis to identify the most promising

The most important factor in being prepared for sophisticated analytics is the availability of sufficient volumes of high-quality data.

management team reasoned that the company couldn't restore investor confidence or make good decisions on products and services without a better notion of the company's costs. Most of MCI's services run over the same network, so allocating costs to service offerings is difficult. MCI embarked on a major activity-based costing initiative, and developed algorithms for allocating all costs. The company needed to report segment profitability anyway, and with accurate cost allocations, managers can make effective decisions about what services to launch and what resources are needed to support them.

• **Research and new product/service development**—Perhaps the most active use of analytics in research and product development is in the pharmaceutical industry. We interviewed three pharmaceutical firms (Millennium, Novartis, and Vertex), each of which was attempting to conquer the overwhelming complexity of relating chemical, clinical, and genomic data. Many pharmaceutical firms have embarked upon discovery techniques involving high-throughput screening, which yields an enormous amount of data and a need to analyze and make sense of all of the experimental results. No firm has yet mastered all of these complexities, but statistical modeling

options for asset allocation. This service had not previously been available in the industry, and it has brought BBH a considerable amount of new business among insurance firms. Similarly, The Hartford was the first to market an options-based annuity product that accounted for a significant increase in year-to-year revenues.

• **Strategic planning**—Several of the firms we interviewed are using statistical analysis for the first time in strategic planning. Their objective is to determine what markets and customer types to address with what products and services. In the insurance industry, for example, while pricing decisions are made on detailed analysis of actuarial risk and loss patterns, strategic planning often has been purely intuitive. One insurance firm we interviewed (The Hartford), however, is using analytics to assess new business opportunities, considering market segmentation, economics, risk-adjusted returns, and the cost of capital for the opportunity. Capital One is using detailed analytics to assess what financial products to offer customers in addition to credit cards; auto loans are one example of a product that was tested extensively before a broad rollout, and it has become a profitable business for the company.

players to draft. The Patriots have been particularly successful in this regard, using analytics to stay below the stringent salary cap in the National Football League. In fact, the Patriots have won three of the last four Super Bowls with a relatively low-cost payroll, the 19th highest in the league in the 2004-5 season. The team ranks potential recruits on the basis of intangible attributes that other teams don't assess, including intelligence, commitment, coachability, and a willingness to subordinate individual ego to the goals of the team. In Major League Baseball, the Red Sox and a few other teams have adopted the analytical approaches pioneered by Billy Beane, the general manager of the Oakland A's (described by Michael Lewis in the book *Moneyball*). These approaches involve selecting players on such factors as on-base percentage (the percent of the time a batter reaches base) and slugging percentage (the number of bases achieved per time at bat), rather than more traditional criteria such as batting average and running speed.

There are undoubtedly other business areas in which analytics would prove to be of value, but the ones above were the most common in our study. It is likely, however, that many decisions previously made on intuition and hope will soon be

addressed with detailed analysis. Procter & Gamble, for example, pulls together an analytical team whenever it considers the supply chain opportunities an acquisition might offer to drive synergy savings. One might hope that more analytical approaches will improve the dismal record of success many companies have experienced in mergers and acquisitions.

How Do Firms Become Analytical Competitors?

In order for a firm to become an analytical competitor, the supply of and demand for data and analysis must be in alignment. The supply issues are much easier to deal with and are generally available in the marketplace, although their absence in a firm is certainly problematic. The supply factors for analytical competition include the following:

High-Quality Data

The most important factor in being prepared for sophisticated analytics is the availability of sufficient volumes of high-quality data. This is less of a problem today than it was previously for many organizations, which have made substantial progress in accumulating transaction data the past several years. Whether the data come from ERP systems, point-of-sale systems, or Internet transactions, many organizations have a greater volume of data than ever before. The difficulty is primarily in ensuring data quality, integrating and reconciling it across different systems, and deciding what subsets of data to make easily available in data warehouses (i.e., having a clear strategy for data access). Many organizations remain highly fragmented, and have issues involving integration across their diverse business functions and units. Even such basic points as agreeing on the definition of who is a customer can be problematical across lines of business. As we noted above, the lowest-ranking firms in our scale of analytical competition still face significant difficulties with these basic

data issues. The leading firms, however, have largely overcome them.

Previous studies of firms' analytical capabilities have found even leading-edge companies tend to be good at either qualitative knowledge management or quantitative data management, but rarely both. Companies still wrestle with this combination, but we found a few more examples of firms that do both well—particularly in the realm of consumer information. Procter & Gamble historically has been an industry leader in customer analytics, but it also tries to develop a detailed understanding of consumer behaviors through ethnographic (close observation) and psychographic analysis. Wachovia Bank combines knowledge from customer relationships and quantitative data analysis of customers (primarily customer segmentation analysis and marketing campaign targeting) to determine what services to offer a particular customer, what markets to target, and what new initiatives to undertake at particular financial centers. The importance of personal business relationships is deeply embedded in the Wachovia culture, and CEO Ken Thompson insists it remains there even as the culture also embraces analytics. Particularly where customers are concerned, it's important to remember that marketing and service processes involve more than the application of statistics.

A Capable Technology Environment

In order to take advantage of good data, an organization also needs a capable hardware and software environment. Complex analytics chew up a good deal of processing power, so the workstations and servers used for this purpose need to be substantially more powerful than those used for conventional office tasks. Apex Management Group, for example, a health care actuarial firm, is transitioning to a 64-bit computing environment to deal with the complex and data-intensive statistical analyses it performs for its clients.

An analytics group at a consumer products firm rented time on a supercomputer to do some of its more complex analyses. From a software perspective, "business intelligence" software offers a variety of capabilities, including data warehouse management, query and reporting, data mining, and various forms of statistical analysis. Ideally all these capabilities would be well-integrated and easy to use. From the end user perspective, ease of analysis, reporting, and data visualization were often mentioned as important in the firms we interviewed. For some firms focused on real-time analytics (such as real-time pricing and yield management), the speed of data management and analysis is a critical factor for software and hardware.

Quantitative Expertise

While analytical software becomes increasingly easy to use, firms that compete on analytics still require substantial quantitative skills—either in-house or contracted from outside. The statistical expert, in order to be useful, also will need to be familiar with the business problems in the function and industry; the quantitative skills of a good analyst are rarely equally applicable across diverse businesses. One pharmaceutical company, for example, attempted to use several bioinformatics experts to pursue analysis of commercial problems in marketing and operations, and found they were neither motivated nor expert at the applications. While statistical analysts who also understand business issues always have been difficult to find, it is increasingly possible to hire analytical expertise outside of a company—even from India or China in some cases.

However, some firms we interviewed stressed the importance of a close and trusting relationship between quantitative analysts and decision makers. The need is for statistical experts who also understand the business in general, and the particular business need of a specific decision maker.

As one manager at Wachovia Bank put it with regard to the relationships his analytical group tries to maintain:

We are trying to build our people as part of the business team; we want them sitting at the business table, participating in a discussion of what the key issues are, determining what information needs the business people have, and recommending actions to the business partners. We want this [analytical group] to be more than a general utility, but rather an active and critical part of the business unit's success.

A consumer products firm we interviewed hires what it calls “PhD’s with personality” for its analytical group—individuals with heavy quantitative skills, but also the ability to speak the language of the business and market their work to internal (and in some cases, external) customers. To find these types of people and develop these types of relationships would surely be much more difficult in an outsourcing situation, and virtually impossible with the analysts half a world away from the decision makers.

Demand—The Critical Factor in Analytical Competition

More difficult to create than supply is the demand for analysis and fact-based decision making within a company. In the earliest stages of analytical competition (Stage 1 and 2 organizations), demand is created by particular business problems. As analytics becomes more central to the competitive strategy, demand becomes more generalized across an organization. Yet, unlike the supply factors described above, demand—the desire to use analytics as a primary competitive factor—cannot be bought in the marketplace. The key demand factors we identified include:

Willing Senior Executives

Several lower-stage firms we interviewed

that made some use of business intelligence said the lack of demand from top-level senior executives was their single most significant barrier to engaging in analytical competition. These executives were more comfortable with intuitive decisions, or weren’t aware of the possibilities for analytical competition within their industry. Some were not averse to analytics, but didn’t have enough personal analytical experience to base their strategies on analytics and fact-based decisions. Without executives who want to use data and analysis to make decisions, even the best business intelligence applications will not be used. We saw several patterns of involvement by senior executives on the demand side, which we describe below.

Some organizations’ leaders had the desire to compete analytically from their beginning. Capital One, for example, was created in a 1994 IPO in order to apply the founders’ information-based strategy to the credit card business. Amazon.com was viewed by founder Jeff Bezos as competing on analytics from its start. Its concept of personalization was based on statistical algorithms and Web transaction data, and it quickly moved into analytics on supply chain and marketing issues as well. Amazon recently used analytics to explore whether it should advertise on television, and concluded it would not be a successful use of its resources. The vision of the founders of these startup businesses led to analytical competition.

In other cases, the demand for analytical competition came from a new senior executive arriving at an established company. At Harrah’s, for example, the recruitment of Gary Loveman as chief operating officer, and eventually CEO, greatly accelerated the company’s analytical orientation and led to a new basis for competition—competing on customer loyalty and service, rather than building the most expensive casino properties. Sometimes the change comes from a new generation of managers

in a family business. At the winemaker E&J Gallo, when Joe Gallo, the son of one of the firm’s founding brothers, became CEO, he intensified the firm’s focus on data and analysis—first in sales, and later in other functions, including the assessment of consumer taste.

At the New England Patriots National Football League team, the involvement in the team by Jonathan Kraft, the son of the owner Bob Kraft and a former management consultant, helped move the team in a more analytical direction both in terms of on-field issues such as play selection and team composition, and off-field issues affecting the fan experience.

The prime mover for analytical demand doesn’t always have to be the CEO. At Procter & Gamble, for example, the primary impetus for more analysis is coming from a vice chairman. However, we did observe two cases in which a single functional executive with a strong demand for an analytical orientation was unable to change the culture in that direction. At a consumer products firm, an analytically focused marketing executive made his own function more analytical, but was unsuccessful in moving the entire firm in that direction. Another analytical marketing and sales executive at an information technology firm was similarly unable to change his firm’s entire culture, although other executives were certainly aware of his strongly data-based management style. In both firms, business intelligence is alive and well, but it has not yet become a key element of strategy.

Stimulating Demand

Even with willing executives, there is often a need to stimulate demand on an ongoing basis. Several firms have created organizational units for this purpose. At Quaker Chemical, each business unit has a “business adviser”—an analytical specialist—reporting to the head of the business unit. The role acts as an intermediary between

the suppliers (normally the IT organization) and users (executives) of data and analyses. The advisers not only stimulate demand by showing the business unit how analysis can be useful but, as intermediaries, explain business needs to the suppliers and ensure that business-relevant data and analysis will be provided. Wachovia has a similar arrangement in its Customer Analytics group, in which analytical teams are tied to particular business units and act as partners in creating and fulfilling analytical demand. Managers of these groups commented frequently that a relationship of trust between the analyst and the executive decision maker is critical to the success of an analytical strategy.

The enemies of an analytical orientation are decisions based solely on intuition and gut feel. Yet these have always been popular approaches to decision making because of their ease and speed, and a belief that gut-feel decisions might be better. For those organizations without sufficient demand for data and analysis in executive decision making, the obvious question is whether such demand can be stimulated. If there is no senior executive with a strong analytical orientation, must the organization wait for such a manager to be appointed? One answer, of course, is for an analytical group to build a successful track record of analytical decisions that have paid off—a set of success stories. However, it can take several years to build this type of reputation.

We did find some more specific examples of attempts to stimulate demand. Whether they will ultimately prove successful is as yet unclear. One reasonable and logical approach is simply to provide senior executives with accurate and timely information and performance measures so the facts will be available if they choose to make fact-based decisions.

At the telecommunications firm Verizon, for example, one executive's goal is not to

stimulate analysis per se, but rather to stimulate a different kind of analysis by different groups of people. Verizon and other firms arising out of the "Bell System" have long been analytically oriented, but decisions were generally made slowly and were pushed up the organizational hierarchy. Shaygan Kheradpir, Verizon's chief information officer, is attempting to change this culture through continual exposure to information. He created a form of continuous scorecard in which hundreds of performance metrics of various types are broadcast to PCs around the company, each occupying the screen for 15 seconds. The idea is to get everyone—not just senior executives—focused on information and what it means, and to encourage employees at all levels to address any issues that appear in the data. Kheradpir feels he is beginning to see signs of cultural change from the use of the scorecard.

At one pharmaceutical firm where we interviewed several IT executives, there was generally little demand from senior executives for analytical decision making, particularly in marketing. IT managers didn't have access to the decisions marketers were trying to make, and the marketing executives didn't know what data or analysis might be available to support their decisions. However, two external events offered opportunities to build analytical demand. One marketing manager discovered a vendor who showed how sales data could be displayed graphically in terms of geography on an interactive map. The company's IT executives felt the display technique was relatively simple, and they offered similar capabilities to the manager.

A second opportunity was offered by an external study from a consulting firm. One outcome of the study will be a new set of performance indicators. The IT group plans to seize upon the indicators and will offer more analysis and related data to the man-

agement team. These IT managers refuse to wait until more analytically oriented senior executives happen to arrive at the company.

Several executives we interviewed commented that analytics have to be continually sold throughout an organization. Executives change, new business issues emerge, and those who need to use analytical approaches in their jobs are not always compliant. At UPS, for example, the customer intelligence group determined customer defections could be accurately predicted based on customer data patterns and complaints, but the sales force needed to be sold on the new approach. When a potential defector is identified through the use of the data, the salesperson should contact the customer to review and resolve the potential issue. Despite a high record of success, only about 75 percent of the salespeople were willing to act on the predictions—though the percentage is increasing. Even without full compliance, the analytical approach has reduced the frequency of customer defections.

Harrah's has developed a centralized real-time yield management system for all of its hotels that needed to be sold to property managers. The system's decisions are based not only upon the usual room availability patterns, but also on the customer's loyalty level. When a customer calls for a reservation, the system's algorithms weigh a number of variables and data (including the number of available rooms, the amount of time before the planned stay, and the amount of business the customer gives Harrah's at this and other casinos) to calculate a price to offer to the customer. The system almost always produces higher revenues for individual properties when it is employed. Yet property managers usually have to be convinced the system is more effective than traditional approaches to yield management and local decision making.

These examples are evidence that in order to build demand for complex analytics, managers and affected users need to be educated.

Bank of America is facing this issue head-on by incorporating models into its executive development programs that encourage leaders to look at the “three I’s”—insight, intelligence, and ideas—when looking for opportunities to

Virtually every firm we interviewed that had built up its analytical capabilities finds demand for them exceeds the supply. Therefore, the use of analytical resources must be prioritized and allocated. Procter &

Wal-Mart is not alone in sharing data. Progressive Insurance, for example, shares pricing data—its own and that of competitors—with customers. The company also offers customers the possibility of lower rates if they accept a device in their cars that gathers data about driving activity.

Some firms share both data and analyses with their customers. Procter & Gamble offers data and analytics as a service to its retail customers as part of a program it calls “Joint Value Creation,” and to its suppliers in order to help them improve their responsiveness and costs. The hospital supplier Owens & Minor provides data and analyses for its customers and suppliers, enabling them to access and analyze their buying and selling data, track ordering patterns to look for ways to consolidate orders, and move off-contract product purchases to a group contract—for products distributed by Owens & Minor or its competitors. The winemaker E&J Gallo provides its distributors with data and analytics that lets them determine how best to convince retailers to add shelf space for Gallo wines. Finally, the Hong Kong-based Octopus Cards, a provider of electronic stored value cards for public transport, provides retailers with data on the customers who pass nearby the retailers’ facilities, and runs promotions encouraging customers to use the Octopus Cards for retail purchases.

How Long Does the Change Take?

Firms desiring to compete on analytics will naturally wonder how long it takes to implement such a strategy. The best advice is to begin working on it now, because it typically requires several years for analytical competitive strategies to come to fruition. Barclays Consumer Finance, for example, embarked upon a five-year plan to apply analytical approaches to marketing credit cards and other financial products to its customers. It takes time to refine the systems that produce transaction data, to

“We’ve been collecting data for six or seven years, but it’s only become usable in the last two or three, with enough time and experience to validate conclusions based on the data.”

— Manager of Customer Data at UPS

grow their businesses. The program challenges leaders to look more broadly at the data available to them, both data available internally as well as external data related to customers, competitors, and the broader environment. This program builds on a solid cultural and strategic foundation of using data to drive the business.

Analytical Targets: The Fine Line Between Spread and Focus

One challenge in using analytical capabilities to advance strategy is maintaining a balance between depth and focus. Several executives commented in our interviews that a focus on particular business problems and outcomes is necessary if an analytical strategy is to be successful. There is only so much analytical expertise to go around, and only so many business problems on which analytical supply and demand can be focused. Harrah’s, as mentioned above, focuses its efforts on the management of customer loyalty, and its management team is reluctant to venture very far outside of that orientation. Capital One briefly diversified its application of analytics into such businesses as cellular phones and flowers, but concluded credit cards and other consumer financial services should remain its focus.

Gamble, for example, ensures that the efforts of its Global Analytics group are devoted to issues that are highly strategic and worthy of the scarce talent. Although Wachovia has invested significantly in analytical resources, it must still go through an annual planning process (with quarterly adjustments) to ensure that its initiatives are well-targeted.

Customer and Supplier Use

As we noted above, analytical tools and techniques are often used to enhance relations with customers. The most obvious uses of customer analytics are internal, to inform decisions about internal strategies and operations. Quaker Chemical, for example, uses detailed analysis of its product performance with current customers to win new ones by offering both documentary proof of product quality and evidence of its extensive, experience-based expertise.

Yet we found several of the more advanced analytical competitors offer some elements of their data and analytics directly to their customers and suppliers. Perhaps the best-known example is Wal-Mart, which uses its voluminous data and product demand analyses not only for internal purposes, but also to share with its suppliers through its Retail Link private exchange. All suppliers are required to use the system.

make the data available in warehouses, to select and implement analytical software, and to build a robust hardware and communications environment. Firms planning to embark upon analytical competition should have a hardware and software plan for how they will achieve the needed capabilities. It should address such issues as the amount of data to be processed, the number of users of the analytical systems, and the speed of response necessary to meet the business need.

Even more time-consuming at most firms is coming up to speed in human capabilities, to optimize business processes based on the outputs of analysis, and, in some cases, to build a sufficient body of data to support reliable predictive results. At UPS, one manager of customer data analytics noted that:

“We’ve been collecting data for six or seven years, but it’s only become usable in the last two or three, with enough time and experience to validate conclusions based on data.”

Several executives at other firms noted that it takes time for managers to understand data and be comfortable with the analytics based on it. An analytical executive at Procter & Gamble suggested firms might begin to keep managers in their jobs for longer periods because of the time required to master analytical approaches to their businesses.

One manager of an analytical group in a consumer products firm pointed out that the longevity of analytical capabilities is critical to their value; his firm has been pursuing analytical capabilities for more than 50 years. This executive pointed out that not all projects will be successful, so analytical groups need to build up a broad portfolio of executive relationships, projects, and analytical technologies. He also suggested that short-term, project-based funding of analytical resources is inconsistent with the long-term nature of analytical competition.

However, despite the difficulty and expense of establishing these capabilities, many of the firms we have identified as early adopters of analytical strategies are clear leaders in their industries. This suggests the time and trouble necessary to become analytical competitors are definitely worthwhile.

Summary

This study has provided a glimpse into a new form of competition. Instead of competing on traditional factors, companies are beginning to employ statistical and quantitative analysis and predictive modeling as primary elements of competition. These firms have overcome the historical barriers to gathering and managing transaction data and some of the cultural resistance in organizations accustomed to “gut-feel” decision making, and are using complex analysis and data-intensive decisions to change the way they manage themselves and compete in the marketplace. They have marshaled both supply and demand factors for analytical competition, and are employing their capabilities across multiple functions.

Opportunities for analytical competition are possible in every industry. Therefore, virtually every firm should consider how it might adopt analytical methods and capabilities. Figure 3 summarizes key action steps that firms should consider in moving toward analytical competition. While not all of the steps will be applicable to all organizations, it’s likely everyone would find some of them appropriate.

There is every reason to believe this approach will grow in acceptance. The necessary data will become increasingly available, and the analytical resources are increasingly accessible to all. Yet the move to analytical competitiveness is typically a journey of several years. Companies that do not rapidly embrace these possibilities risk falling dramatically behind. No business can afford to lose its best customers, to spend more on logistics and inventory, to miss out on opportunities for new products and services, and to hire less capable employees than its more analytically astute competitors.

Figure 3: Action Steps for Analytical Competition

- 1. Begin to build analytical skills**—It’s often difficult to find individuals with the requisite quantitative and business skills. Organizations should start looking for them as soon as possible, and hire them in sufficient volume to create “critical mass.”
- 2. Get your data in shape**—Analytical environments require large amounts of high-quality data. Figure out what data you really need to advance your strategy, make sure it’s being gathered, and clean it up.
- 3. Implement analytical technology**—You’ll need heavy-duty hardware and software to do serious analytical work. Start putting it in place today.
- 4. Examine your business strategy**—Analytical competition requires a clear business strategy that is optimized with data and analysis. Your executives should begin to consider what key processes and strategic initiatives would be advanced if the right analytics were available.
- 5. Find an executive partner**—Since the most difficult factor to put in place in analytical competition is demand from senior executives, you should begin to cultivate that demand by finding an executive partner and embarking with him or her on some analytical initiatives.

This research report is part of an ongoing research study at Babson on how companies compete with analytics. The research was carried out independently, but was sponsored by SAS and Intel. To learn more about or participate in the research, contact Tom Davenport at tdavenport@babson.edu.



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