Competing on analytics essay

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. 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 strategy less 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. Business performance and making ex post facto adjustments, they seek to understand how optimum nonofficial per

performance drives optimum financial per romance, and to make accurate forecasts of future per 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 strategy less 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, hey require analysts and decision makers who both understand the value of anally tics and know how best to apply these for driving enhanced per performance. Companies that strive to optimize their business performance using this data- Intensive approach are competing on anally tics and anally tall capableness.

Many companies are pursuing optimization- 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 ND 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 interpretatively 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. Instead of looking backward at their Figure 1: Industries

of Companies Surveyed I N DUSTER SEES RE PRESS . NET D Financial services consumer products and Retail Travel, Transport, and Entertainment Pharmaceutical and Chemical Information Technology and Communications Health Care Engineering Government N U M BE R 106543211 CONVENTIONALITY'S 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? room 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 Boson'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 ND 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 Belching 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. Ways, the lead of the pioneering but less well-financed Oakland As). 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 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

Hurrah'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 Loveland, 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. Mom 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 Bozos 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 Dresses, 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.

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. Factors such as on-base percentage. Bill James, considered the godfather of baseball statistics or " cybernetics," 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 Fenny Park, the smallest baseball park in the major leagues, by calculating ticket price elasticity, establishing an online market for season ticket resale, and

modeling revenue increases from adding seats in unused locations (including on top of the Green Monster, the towering left field wall). BASSOON EXECUTIVE EDUCATION 2 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 eve 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 Loveland, CEO of Hurrah's; Jeff Bozos, the founder and CEO of Amazon; Rich Fairbanks, the founder and CEO of Capital One; and Barry Breach, 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 analytic- cal competition. For example, Fairbanks 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.

Fairbanks summarizes this approach as " Information-Based Strategy. " Breach, before he retired as CEO of Sara Lee Bakery, imply 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- bevel 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 They are using predictive modeling, for example, to identify not only the most refutable 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 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 WORKING KNOWLEDGE RESEARCH CENTER 3 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 equines.

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 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 equines domain.

Executives at several analytical competitors warned against losing a clear business purpose for analytics. Hurrah'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 eve 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 broadsheets 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 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 shiest 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 Stage 1 Stage 2 Stage 3 Stage 4 Stage 5 0 2/32 FIRMS Major Barriers 6/32 Local Activity 7/32 Vision Not Yet Realized Almost There 11/32 Analytical Competitors 12 4 6 8 10 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 multitude insurance company, for example, had a CEO with the vision of using data, analytics, and a strong customer orientation in the suasion 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 enterpriser 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 One, Hurrah's, Marriott, Owens & Minor, Progressive, Walter, 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.

Barclay, 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 Hurrah's, Procter & Gamble, Progressive Insurance, Barclay, 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 cookouts and overstocks, alternative supply simulations, plant and distribution center sitting decisions, and price optimization. Among the companies in our study, Wall-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 5 competitive strategy, but it can be. At MIMIC, (the company once known as World 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 Capsules and the 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 Mi's services run over the same network, so allocating costs to service offerings is difficult. MIMIC embarked on a major activities costing initiative, and developed algorithms or 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, Innovations, and Vertex), each of which was attempting to conquer the overwhelming complexity of relating chemical, alnico, 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 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, resuscitated 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 fore a broad roll, and it has become a profitable business for the company.

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 options for asset allocation. This service had not previously been available in the industry, and it has brought EBB a considerable amount of new business among insurance firms. Similarly,