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## **How to Compete on Analytics**

The Analytical Center of Excellence

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## Introduction

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Thomas H. Davenport and Jeanne G. Harris wrote *Competing on Analytics: The New Science of Winning* in 2007. This breakthrough book stresses the critical value of analytics in today's forward-looking enterprises and ushers in a new age in the global economy, the Era of Analytics. Every corporation should strive to become an analytical competitor. *Competing on Analytics* is rewriting how corporations think about their data and their exploitation of that data. Analytics is the secret weapon!

Davenport and Harris highlight how organizations such as the Boston Red Sox, Netflix, Amazon.com, CEMEX, Capital One, Harrah's Entertainment, Procter & Gamble and Best Buy use analytics to build their competitive strategies and beat the competition. With analytics, these organizations are identifying the most profitable customers, accelerating product innovation, optimizing supply chains and pricing, and leveraging the true drivers of financial performance.

*Competing on Analytics* provides invaluable insight into the current and future state of analytics in today's enterprise. It's clear that analytics has come of age. Analytics is today — and tomorrow.

The question of the moment is: "How does my organization start exploiting the power of analytics?" This paper provides an answer: the analytical center of excellence (ACE).

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## The Analytical Center of Excellence (ACE)

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In a recent presentation at the 2008 Competing on Analytics conference series, Jeanne Harris stated:

- Analytics is not new; it's been around for a long time, but not central to an organization ... until now.
- With firms that compete on analytics, the capabilities move to center stage.
- The best analytics companies have some centralized group.

Harris has surfaced a crucial point: The best approach to supporting and promoting analytics within an enterprise is to develop a centralized group and infrastructure.

The question now is not whether to centralize and support analytics; the question is how. The answer is the analytical center of excellence. The purpose of the analytical center of excellence is to promote the use of analytics and to support the end-to-end analytical requirements of the enterprise across all functional and geographic areas.

A great deal has changed in the past five years in the use of analytics. Five years ago, the emphasis was on promotion — selling the value of analytics to the corporate culture. While promotion is still important today, the significance of analytics to an enterprise and the understanding of the value of analytics have moved it to the forefront of business thought leadership. Analytics is here today, and now the primary need is for support. People want to exploit analytics and are asking for help.

In the process of understanding how to centralize and support analytics, let's look at a historical parallel perspective of support.

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## A Historical Perspective

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As I sat on a plane reading *Competing on Analytics*, I started thinking about what it takes to support enterprisewide analytics in an organization that has evolved to analytical maturity. I then started thinking about the evolution of end-user computing (EUC) in the 1970s and early 1980s. It struck me that there are a lot of similarities between today and 25 years ago. Actually, business intelligence (a term often used interchangeably with analytics) existed 25 years ago; we just called it something different. We called it DSS, decision support systems. In fact, some of the same analytics vendors of today existed 25 years ago, selling DSS tools.

An evolution in support took place 25 or so years ago due to the emergence of decision support systems and end-user computing:

**Late 1970s:** Fourth-generation programming languages (4GLs) and EUC

- Mainframe 4GLs such as SAS®, RAMIS, IFPS and Focus make up the computing landscape.
- Mainframe 4GLs evolve into EUC tools such as SAS, RAMIS, IFPS, Focus and spreadsheets.

**1981:** EUC and the personal computer (PC)

- IBM introduces the first desktop PC.
- PC-based EUC software such as spreadsheets, word processing and graphics, as well as PC 4GLs, enter the market.

**Early 1980s:** EUC explosion

- Use of EUC technology increases exponentially; EUC becomes mainstream.
- Within organizations, EUC tools proliferate without enforced standards and user support.

- Organizations ultimately require centralized infrastructures to support their EUC needs.

**1983**

- Information centers (also known as EUC support centers) arrive.

Similar to the EUC explosion in the 1980s, a technological revolution is happening now in analytics. The same types of activities and requirements present themselves today:

**2003-present:** Analytics explosion

- Use of analytical technology has been increasing exponentially. Analytics is now mainstream.
- Within organizations, analytics tools proliferate without enforced standards and user support.
- Organizations now require centralized infrastructures to support their use of analytics.

**2008**

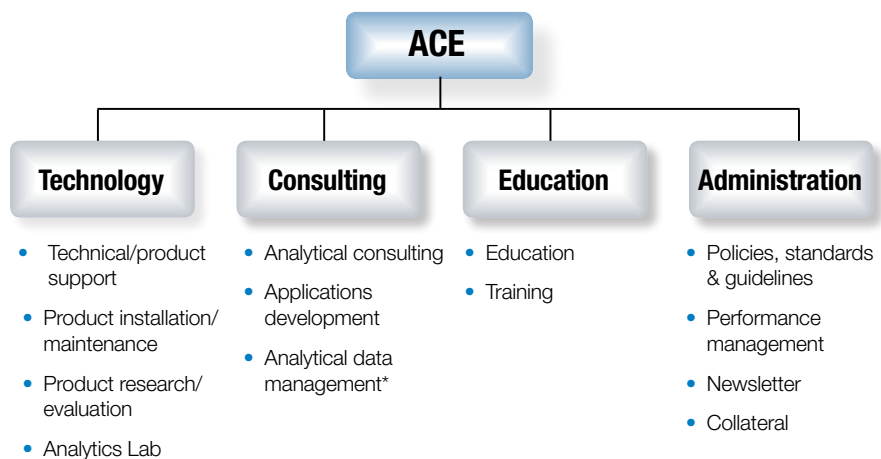
- Analytical center of excellence

Essentially, decision support systems are to business intelligence as information centers are to analytical centers of excellence. The analytical center of excellence is as critical to the success of enterprise analytics and business intelligence today as the information center was to the revolutionary success of end-user computing and decision support systems in the 1980s.

## ACE Infrastructure and Organization

Then what does an analytical center of excellence look like? The following example is a fairly comprehensive analytical center of excellence. If you recall the information centers of the 1980s, this should look familiar.

Let's examine the boxes on this chart:



\*Data warehouse resides in IT

**Technology** — Provides product support, technical support, installation, maintenance, evaluation of new products and possibly even a lab or sandbox for users to test-drive analytical technology.

**Consulting** — Focuses more on the actual solutions, supporting the analytical applications within the user community and developing new applications. It also addresses analytical data management. Because analytics is only as good as the availability and quality of the data that can be processed, data management is a very important part of the analytical problem-solving process. After all, analytics is turning data into actionable information. It's important to note, however, that this activity is *not* data warehousing. Data warehouse management (i.e., managing the corporation's comprehensive repository of data such as an SAP Business Information Warehouse data warehouse) is still a significant IT function. What we are talking about here is analytical data management — data preparation, preprocessing and data analysis (e.g., addressing data quality issues such as missing values, identifying data anomalies, making correlations and so on).

**Education** — Education and training are critical. To realize the tremendous potential of analytics in your business, you need expertise. The analogy I like to use is one of a race car. You have a powerful machine with an incredible engine. You might know how to drive, but to truly exploit the performance of that machine — moreover, to exploit it so skillfully that you win races — you should learn race-driving strategies from the experts.

**Administration** — Responsible for setting and driving standards and guidelines. Executing these activities is an important step in the analytical maturity of an organization.



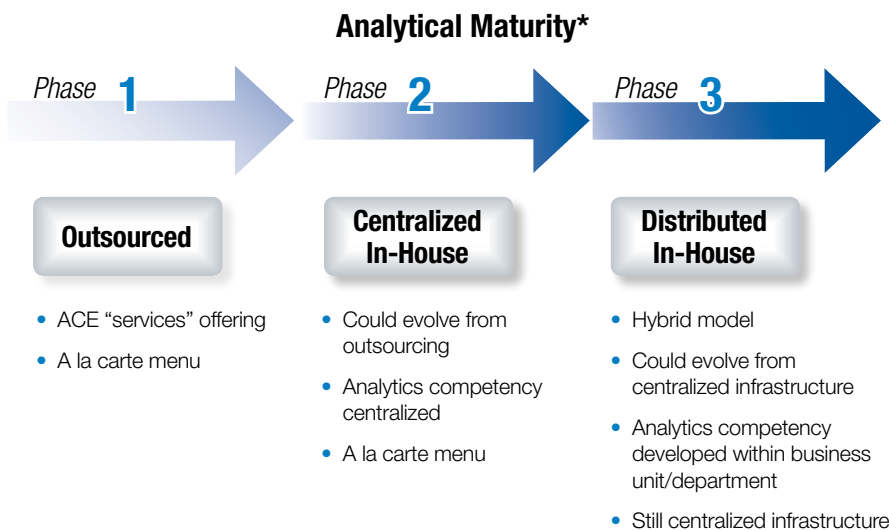
Previously I mentioned the proliferation of analytical tools within organizations and lack of standards to direct selection and use of those tools. The administrative group addresses that disconnect, bringing great synergy to an organization. With common standards in place, employees can trust and share each other's work. They can integrate and align their analytic activities to create an enterprisewide flow of accurate, meaningful intelligence — which unifies the organization in business execution and fact-based decision making.

The administrative group continually monitors the success of analytics and drives continuous improvement through performance management. They may even go as far as developing a newsletter, collateral, etc. This is where the promotional aspect of an ACE resides.

Of course, every company is different. Each company is at a different level of analytical maturity, as well as a different level of maturity in its business life cycle. How a company embraces and implements an ACE depends on its maturity. Consider my list of infrastructure recommendations as an a la carte menu from which you can choose according to your organization's maturity and requirements.

## Phases of an ACE

How should an analytical center of excellence be positioned within an enterprise? There are three phases of an ACE. These are not discrete phases, but more of a continuum; and like the ACE infrastructure, each phase presents an a la carte menu of organization and services. The positioning of an ACE within an enterprise should be approached with flexibility and regard to the current environment.



*\*Based on an Analytical Maturity Assessment, and scored against the Five Stages of Analytical Maturity and Decision Process Spider Diagram*

**Phase 1** — This is for the less mature or smaller company that does not have the critical mass or funding for an in-house analytical center of excellence. Of course the services retained can include any or all of those previously discussed; the service requirements will vary from organization to organization. This can be outsourced to a consulting organization such as Accenture, Deloitte or SAS that provides service on an as-needed basis. SAS has even set up contracts with customers to deploy dedicated resources that reside on-site for periods of up to a year while the customers grew their internal analytical capabilities.

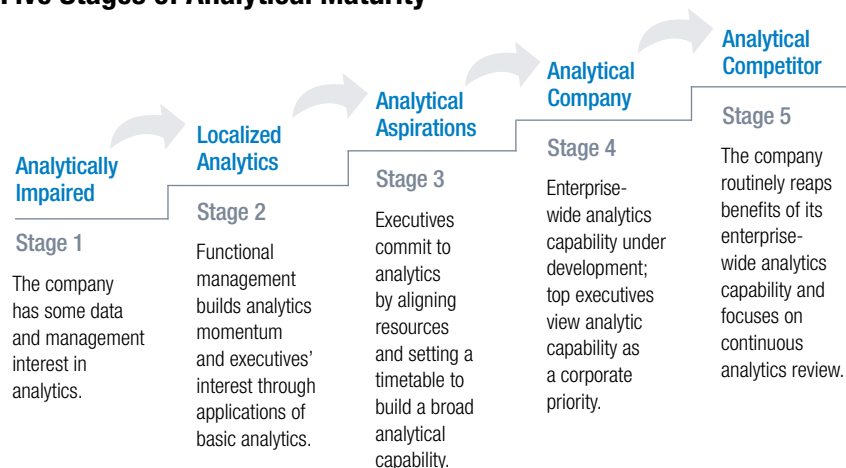
**Phase 2** — As a company migrates from pockets of analytical competency to enterprisewide capability and standards and the execution of global projects across departments, requirements for a centralized in-house analytical center of excellence emerge. This infrastructure can also evolve from an outsourced ACE. The components of an in-house ACE depend on the organizational needs. Again, consider the a la carte approach to creating a support infrastructure.

**Phase 3** — Finally, the enterprise has developed both centralized and departmental analytics competency. The latter, however, is aligned with the centralized group! The centralized infrastructure has strong ties into the user communities (a scenario that is far different from widespread use of analytics by rogue statisticians). In this hybrid model, standards, product evaluations, consulting services and product support continue to reside in the centralized group, but strong knowledge and competency reside within the departments. This is an organization that has thoroughly embraced analytics and has embedded analytics into the very fabric of its culture.

## Five Stages of Analytical Maturity

So where do you start when implementing an analytical center of excellence? The answer depends on your organization’s analytical maturity. I derived the following Five Stages of Analytical Maturity chart from Chapter 6 of *Competing on Analytics*. Let’s examine each of these stages and how they apply to the support and promotion of analytics within an enterprise.

### Five Stages of Analytical Maturity



Source: Derived from *Competing on Analytics*. Scored against the Analytical Maturity Assessment

**Stage 1** — The company needs to work on its data environment. As I mentioned previously, analytics is only as good as the availability and quality of the data that can be processed — so you need to fix the data first. Management must also buy into analytics and agree that fact-based decision making is preferable to gut-based decision making. They may not yet be sponsors, but they need to buy in.

**Stage 2** — A company has management support, but management needs to prove the value of analytics through commitment (e.g., investing in analytics infrastructure, resources, etc.) and by building successes. Consider a phased approach, beginning with some pilot analytics implementations (possibly departmental). Start small and build; this is easier than enterprisewide adoption and requires less investment. Enterprisewide adoption of analytics comes later.

**Stage 3** — Executive sponsorship of analytics now surpasses the managerial buy-in of Stages 1 and 2. The top levels of management actively advocate analytics and are committed to ongoing investment.

However, use of analytics at Stage 3 is usually isolated to a few areas of the enterprise, without standards, support and consistency in implementation. Now is the time to leverage the independent success cases, identify who the analytical resources are within the organization and start building a corporate infrastructure including metrics, skills and standards.

At this point it's important to note that it's not enough to invest only in good hardware and software. Effective analytics also require the right people and processes. We could spend considerable time covering the process of analytical problem solving, but we'll leave that discussion for another day.

**Stage 4** — The company migrates from pockets of analytical competency and success to enterprisewide capability with standards in place, global projects and a centralized infrastructure. Analytics is now a corporate priority with companywide commitment. A centralized infrastructure is critical to support corporate analytics at this stage. Most, if not all, of the elements of an analytics center of excellence are in place in this centralized infrastructure.

**Stage 5** — Analytics has become a central theme and focus of the enterprise — how it operates, how it makes decisions. Analytics is embedded into the core business processes. In place are the experts, data management, processes and metrics. In Stage 5 organizations, analytics is a passion; people get up in the morning eager to do analytical empirical work.

## Vocabulary of Key Components

I want to supplement my explanation of the five stages with Davenport and Harris' vocabulary of key components that constitute each stage's picture of analytical maturity:

**Analytical objectives** — Address where you are with commitment, investment, continuous improvement and metrics.

**Analytical processes** — Address how to solve an analytical problem and how well analytics is embedded into the core of business processes.

**Skills** — Include high-level analytical resources and requisite competence.

**Sponsorship** — Describes your level of executive management support.

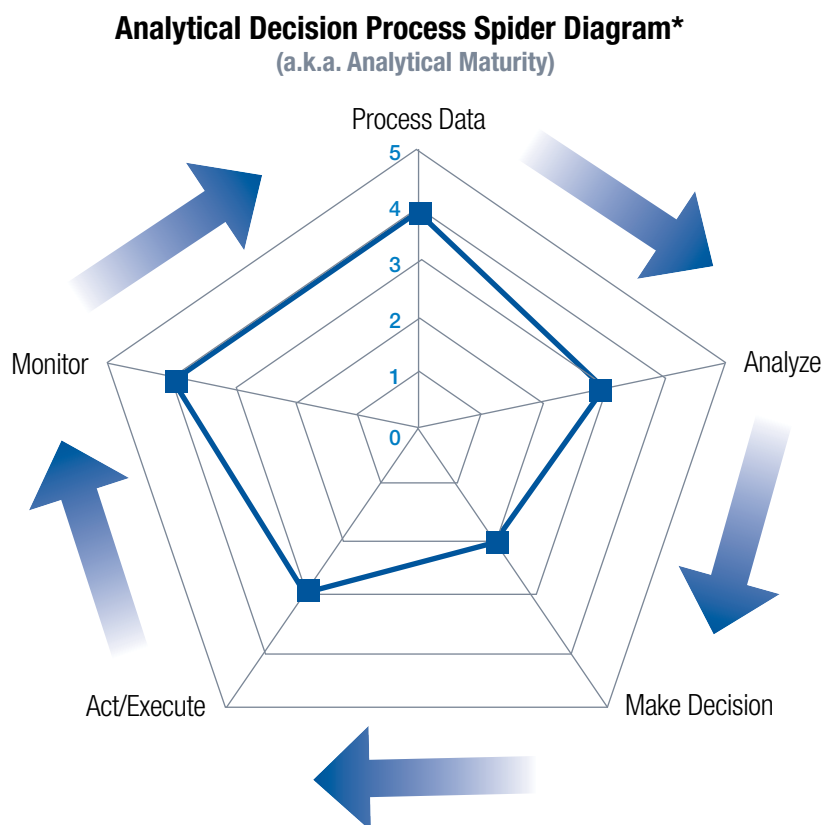
**Culture** — Concerns how well your organization embraces analytics.

**Technology** — Includes current hardware and software architecture and IT infrastructural issues.

This isn't intended to be an in-depth discussion of the stages of analytical maturity. Chapter 6 of *Competing on Analytics* describes the stages in more detail and provides an overview of a road map and guidelines required to progress through the stages.

## Analytical Decision Process Spider Diagram

In addition to the five stages of analytical maturity, the following diagram provides another conceptual framework that's a critical tool in determining the most suitable ACE infrastructure.



\*Scored against the Analytical Maturity Assessment

This is basically the infamous OODA loop (observe, orient, decide, act). There are probably 100 versions of this process that you can find on the Web, but essentially they are all about the cyclical process of analytical decision making. As mentioned earlier, business intelligence is decision support renamed, and that's what we have here. Each step is a critical element of the decision process. A company's competence in this area reflects its analytical maturity, and is ultimately an input to what phase of an ACE the company should implement.

**Process Data** — Because analytics requires high-quality data, this step is crucial. It consists of data preparation, preprocessing and data analysis (e.g., addressing data quality issues such as missing values, identifying data anomalies, making correlations, etc.).

**Analyze** — This is where the heavy analytical lifting takes place and where the data is processed. It's analyzed, postulated, correlated, clustered, diagnosed and modeled. In this phase you forecast, predict, mine, profile and optimize. You answer questions such as: Why did this happen? What will happen next? What will happen if I do X versus Y? What is the best that can happen? What should I do next?

**Make Decision** — At this point we have turned data into actionable information that can be used to make competitive and differentiating decisions. This is decision support!

**Act/Execute** — Of course, no decision has worth unless it's acted upon. Some corporations are great at coming up with ideas and even making decisions, but fail to execute. A tremendous advantage of an analytically mature company is that its employees make decisions based on sound analytical information as opposed to intuition. Not only can the employees tell you what your forecasted sales will be — they can tell you the 95 percent confidence interval. (That is, they can predict with 95 percent confidence that your sales will fall within a certain range.)

**Monitor** — And of course, you want to monitor the results through metrics, performance management and dashboards to drive continuous improvement.

Achieving full analytical maturity is not a simple task. It requires cultivating executive management sponsorship and staff commitment; it requires data readiness, the appropriate hardware and software, processes, metrics, skills, education and more.

Companies that have achieved analytical maturity and are analytical competitors (such as P&G, Cisco Systems and Marriott) have planned and worked long and hard. Most companies are not at this level and many don't have a plan to get there. A plan requires understanding an organization's current business, cultural dynamics and current level of analytical maturity.

In the next section, I cover the all-important assessment process that delivers this plan.

## **Analytical Maturity Assessment**

The assessment starts with a comprehensive questionnaire of more than 140 questions, designed to get an initial understanding of where an enterprise is positioned with regard to the categories of analytical maturity. Each question of the assessment relates to one or more of nine categories:

1. Strategy
2. Management Support
3. Culture
4. Technology
5. Data Management
6. Analytics Skills/Competency
7. Decision-Making Process
8. Execution
9. Reporting/Monitoring

These categories constitute both the five stages of analytical maturity and the analytical decision-making process. The results of the questionnaire are scored against each of the categories. However, the questionnaire alone is not a sufficient assessment tool.

The questionnaire is followed by on-site assessment sessions in both group and one-on-one settings. The on-site assessments expand the scope of the information gathered in the questionnaire and provide an opportunity to examine the corporation's analytical maturity more closely. Participants are from the company's various business units and its IT department. Using the questionnaire results and the on-site assessments, the assessment team scores the corporation against the five stages of analytical maturity and the analytical decision process spider diagram.

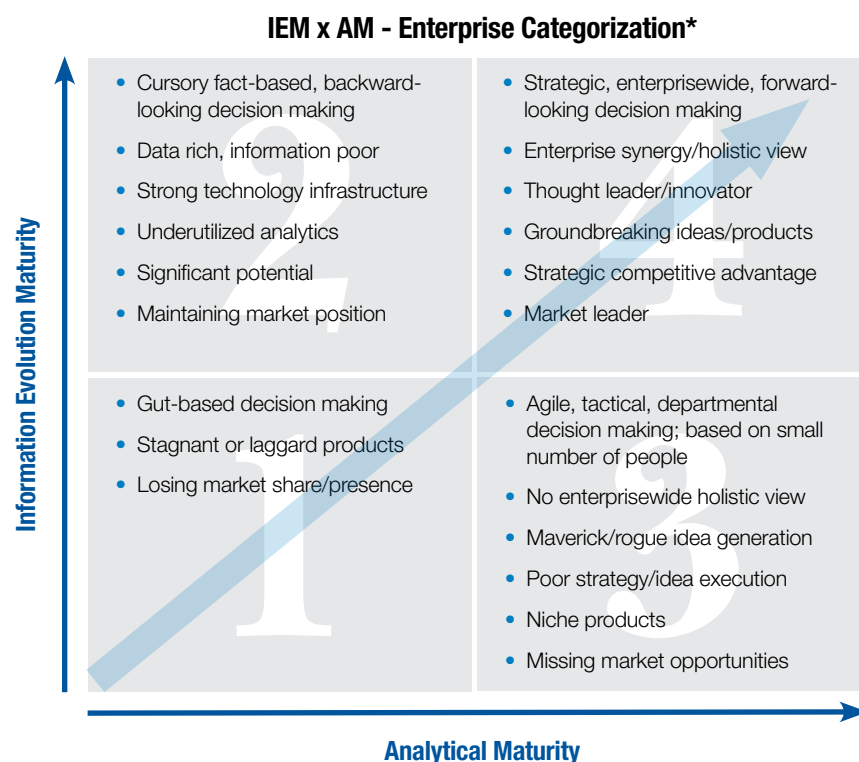
Recommendations are then made regarding which phase (or variation on a phase) of analytical center of excellence is most appropriate for the organization. The assessment team recommends an initial ACE infrastructure (which it assembles according to the a la carte approach that I've discussed) and develops a high-level plan and timeline.

Let me emphasize that ACE implementation is a stepwise approach with prioritized focus areas; the assessment team should never recommend a Big Bang approach.

Remember, companies that have achieved analytical maturity and are analytical competitors have succeeded through significant planning. A major deliverable of the assessment is that plan.

## Analytical Maturity and the Information Evolution Model

Finally, I'd like to tie this all together with comments on *Information Revolution*, a book written by SAS' Jim Davis, Gloria Miller and Allan Russell. They discuss the Information Evolution Model, which relates to a company's broader business intelligence maturity.



\*Derived from *Competing on Analytics and Information Revolution*

The distinction I'm making here is that business intelligence has an even broader scope than analytics and addresses the full platform of data, analytics and reporting. Analytical maturity, while very dependent on the platform, is a bit more focused. Hence analytics and business intelligence play hand in hand.

In *Information Revolution*, Davis looks at the maturity of an organization from a comprehensive business intelligence platform perspective. What I've attempted to do in this diagram is tie the *Information Revolution* and *Competing on Analytics* texts together.

As you can see, information evolution maturity, or platform maturity, grows along the Y axis and analytical maturity grows along the X axis.

**Quadrant 1** — Without strong platform and analytical capabilities, a company is relegated to making gut-based decisions. Its products are not advancing, and it is likely losing market position.

**Quadrant 2** — As a corporation evolves toward platform maturity, it has a superior data infrastructure. It does not, however, have the analytical capabilities to turn data into viable information — therefore it lacks strong analytical decision making. It is probably doing a good job of scrutinizing the past and making decisions based on historical reporting, but it is not making forward-looking decisions based on analytics such as predictive modeling and optimization. The company is missing market opportunities and probably barely maintaining its market position.

**Quadrant 3** — Conversely, as a company evolves toward analytical maturity, if it doesn't have a strong platform infrastructure, it is unable to leverage the plethora of data that typically abounds within (and outside of) its walls. These companies have disparate and rogue analytics activities and often lack adequate data quality. They are likely missing a tremendous opportunity to harvest their data and move business forward.

**Quadrant 4** — This quadrant represents the culmination of all of the principles and practices I have discussed. These companies combine Level 5 of information evolution maturity and Stage 5 of analytical maturity with both strong platform and analytic infrastructures. In place are the right people, skills, data management, processes and the metrics; analytics is a passion, and part of all core business processes. These companies are analytic competitors — truly innovative market leaders.



## Summary

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The best approach to supporting and promoting analytics within an enterprise is to develop a centralized group and infrastructure, an analytical center of excellence (ACE). There are several approaches to implementing the ACE infrastructure and organization. These approaches can be viewed in three phases: outsourced, centralized in-house and distributed in-house. The phases are not discrete, but more of a continuum; the ACE infrastructure should be approached from an a la carte perspective.

The first step is to conduct an analytical maturity assessment to determine where on the three-phase ACE continuum an enterprise should initially focus. The assessment is designed to gain an understanding of where an enterprise is positioned with regard to the five stages of analytical maturity and the analytical decision-making process. The goal is to be at Stage 5; however, most companies are not at this level, and many don't have a plan to get there. The assessment team determines the current analytical maturity and delivers a plan to migrate toward Stage 5.

Analytical maturity, in concert with information evolution maturity, turns a company into what Davenport and Harris call an "analytical competitor." Examples are Amazon.com, CEMEX, Capital One, Procter & Gamble and Best Buy — all of them innovative market leaders. To attain their levels of performance, your organization, too, must embed analytics into all operations and decision-making processes. And ultimately, you must embed a passion for analytics into your organizational culture.

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