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Measuring Organizational Maturity in Predictive Analytics: the First Step to Enabling the Vision

Organizations are increasingly turning to Predictive Analytics as a way to gain business insights, and hence strategic advantage, from their data.

What is predictive analytics?

Predictive analytics is used to determine the probable future outcome of an event or the likelihood of a situation occurring. It is the branch of data mining concerned with the prediction of future probabilities and trends. Predictive analytics analyzes large amounts of data with different variables; it includes clustering, decision trees, market basket analysis, regression modeling, neural nets, genetic algorithms, text mining, hypothesis testing, and decision analytics.

Predictive analytics (PA), advanced analytics, quant modeling – these terms have often been used interchangeably, primarily with regard to initiatives involving statistical modeling, data mining and other quantitative techniques. The common thread across these initiatives is that some human intervention will be required, which implies having people who understand the relevant techniques and tools. Indeed, many theorists consider predictive analytics to be as much an art as a science.

While many organizations have successfully defined their Business Intelligence (BI) roadmap, PA requirements have proved much harder to pin down. They are also more difficult to implement. PA makes demands on both business and IT functions. Advanced statistical and quantitative techniques are needed to synthesize qualitative and quantitative data into insights that can be acted on. Equally critical to successful organization-wide PA are a compelling business case, and a strong culture of using data-driven methods to reach decisions.

This paper describes a framework for measuring how mature an organization is in terms of its ability to realize the potential of PA: the Capgemini Predictive Analytics Maturity Framework. The same framework produces a roadmap for moving the organization towards its PA goals. An assessment against the framework is the first step towards making PA into a valuable source of competitive advantage.

In order to put a product in the market ahead of the competition, organizations need to be able to explore a vast amount of data quickly to uncover latent needs and wants. That can only be done by aligning PA more closely with operational and decision-making systems.

Background: a history of silos

It has generally been specific business groups or departments (marketing, risk, etc) that have advocated and adopted PA. As a result, analytics efforts, resources, and applications tend to be scattered across the organization. These business groups have also invested in tools and developed analytical techniques and procedures, with a focus on solving business problems specific to their own group.

Data requirements are also defined within silos. Analytics teams across the organization may separately request data from IT teams or external data providers, or may sometimes extract the data themselves for statistical modeling. We have even come across instances when two analytics teams in different parts of the same organization have both purchased similar external data.

These silo-based initiatives have benefited the departments concerned, but rarely the rest of the organization. The departmental approach has also led to a proliferation of tools and vendors that serve niche areas, or tackle a familiar problem with a new (and maybe untested) technique. With this approach, effort is duplicated between silos, and the IT function gets relegated to a "servicer" role rather than being exploited as a fully-fledged partner.

What has changed today?

Now, however, changes in the technology and data landscape are beginning to reshape the way businesses approach PA. The main areas of change are summarized below:

Strategy and vision

PA is becoming more central to business strategy, as businesses explore the power of data to drive business decisions. That strategic focus brings with it the complex task of measuring ROI on PA initiatives.

Integration with other IT systems

As we saw above, point solutions for PA have historically been bought by business units to serve their own purposes. This practice continues, but organizations increasingly realize that departmental solutions need to be integrated with other systems.

Part of the reason is the competitive environment. Shorter product lifecycles mean a shorter window of business opportunity. Organizations need to get quicker at understanding customers, analyzing customer data and responding to customer needs. In order to put a product in the market ahead of the competition, they need to be able to explore a vast amount of data quickly to uncover latent needs and wants. That can only be done by aligning PA more closely with operational and decision-making systems.

Commercial PA software is also getting integrated with the larger data warehouse (DW) and BI technology stack. For example SAS, a leader in PA software, increasingly offers end-to-end integrated BI and data mining solutions. This type of integration is helping to drive PA infrastructure and applications into the main IT fold.

Governance
In some cases, especially in the banking and insurance industry, regulatory requirements are forcing greater transparency and governance. For example, Basel models in banking have to be validated by an independent third party.

Resources
Resources – particularly skills – for analytics are scarce. Therefore organizations are increasingly looking at how their analytical assets, capabilities, and competencies can be shared across the whole organization

Big Data
Big Data opens up a new world of possibilities for PA. However, the current analytics infrastructure and processes would require substantial additional investments if each individual business unit were to tackle Big Data challenges independently; it makes sense to do so at organizational level.

Organizations need to develop their predictive analytics DNA
PA can strengthen the strategic decision-making ability of the organization enormously. Every organization therefore needs to build up its analytic DNA if it is to gain or maintain competitive edge in the marketplace.

What do we mean by DNA here? Let's consider an example. Publicly-available credit scores are just one of the variables that a bank considers when it decides whether to lend to an individual. The bank will refine the picture with any additional information it has or can get about the person's recent behavior, transactions, and relationships. It will then calculate its own version of the credit score. In the process, the bank is developing and using its analytic DNA: a unique way of addressing the task that it believes gives it an edge over the competition.

To gain competitive advantage, organizations need to excel at a wide range of challenges, such as responding fast to customer preferences, detecting fraud early, or accurately identifying potential customer attrition. In all these cases, they can supplement publicly-available information with their own information or techniques. The better and more unique the DNA, the more responsive the organization will be to business events and customer demands. This enables it to become more competitive.

The Predictive Analytics Maturity Framework Assessment
The first step in making the most of your analytic DNA is to assess your current capabilities. That is the purpose of the Predictive Analytics Maturity Framework Assessment (PAMFA) from Capgemini.

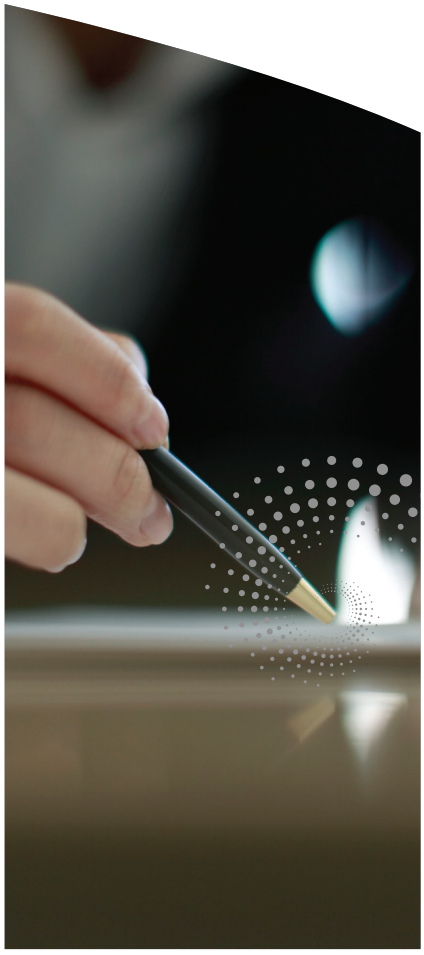
PAMFA examines the maturity of the client's current PA environment: its data and technology readiness; its tool selection; its adoption of modeling techniques; and its deployment and integration to decision systems. It also looks at the adequacy, for PA purposes, of its people, processes, deployment, prioritization, and governance.

With the information provided by PAMFA, the organization can benchmark its current analytics initiatives and infrastructure at both departmental and enterprise levels. It can assess its decision-making effectiveness and the alignment of its PA activity to overall business objectives. At the same time, it can identify opportunities to share local pockets of analytic DNA across the enterprise as a whole.

PAMFA provides an individual roadmap to help the organization move up the analytic maturity curve. Doing so will allow it to adopt a proactive stance in the marketplace, focus on strategic priorities, make smarter decisions, and optimize processes to achieve high performance.

The assessment looks at the organization's current adoption of, and environment for, PA in five dimensions:

1. Vision and strategy
2. Enablers
3. Competence
4. Deployment
5. Governance



[1]Dan Vesset, Take Care of Your Quants: Focusing Data Warehousing Resources on Quantitative Analysts Matters, March 2011.

We will now summarize the way PAMFA assesses organizations in each of these dimensions.

1. Vision and strategy

Almost all organizations are aware of the potential of PA, but very few have defined and articulated an enterprise vision and strategy for using it. Even among organizations that have implemented some PA, few have systematically surveyed their internal PA landscape.

We help to develop a comprehensive "analytical map" of what the organization currently has, together with a vision of where it wants to be. It then becomes possible to define the roadmap for the future. The roadmap makes it possible to synchronize PA initiatives with the organization's overall objectives. It shows where rationalization, or implementation of additional initiatives, is required.

PAMFA examines the current PA strategy, identifying any gaps and key enablers needed for implementation. Where there is no strategy, we make recommendations for creating one. Having a robust strategy in place makes it possible to prioritize analytics initiatives based on enterprise business imperatives, not departmental ones.

PAMFA asks questions like:

- Are objective, robust business cases made for each initiative?
- Are these business cases tied to ROI and organizational targets?
- Who sponsors the initiatives?
- What is their visibility in the organization?

For each analytics initiative, PAMFA makes it possible to create a business case that is not only related to organizational strategy, but also based on realistic estimates of both payoff and effort. An independent assessment counteracts the usual tendency to underestimate the cost of technology interventions.

2. Enablers

To find out how ready the organizational environment is to adopt or pursue PA, PAMFA examines the data environment, existing solutions, analytics process, technology environment, and support arrangements. We also assess the organization's understanding of PA, and its perception of the benefits. In our experience, these factors are critical to achieving a culture in which the organization's analytic DNA can grow.

Among the enablers we consider are:

- a data infrastructure that accommodates PA needs
- a rationalized portfolio of applications

A data infrastructure that accommodates PA needs

Few organizations have built their data infrastructure with analytics requirements in mind. As a result, the data cleaning and transformations required for advanced modeling tend to be duplicated in different parts of the company. Most "quants" (analytical experts) will tell you that 40-50% of their time is spent cleaning data and doing mundane transformations.

Therefore, the organization needs to identify and rationalize these processes, creating an infrastructure to accommodate the quants' needs. They will then be free to focus on their real job of modeling, and the organization can achieve much more with the same resources.

Improving the infrastructure in this way will increase accuracy. If each analyst has to carry out their own processing to turn extracted data into a modeling dataset, nobody can guarantee the integrity of the resultant data.

A rationalized portfolio of applications

Usually, as we have seen, different business sponsors have purchased various PA applications to serve a specific purpose. Useful though they may be at departmental level, the organization ends up owning disparate applications, each being utilized sub-optimally. PAMFA assesses the extent to which this has happened, and identifies opportunities for rationalization.

3. Competency

The IDC research report Take Care of your Quants[1] points out the benefits of focusing the analytical ecosystem to support the quants. PAMFA looks at three aspects of this task:

- Cross-pollination
- Nurturing analytic competencies
- Visibility

Cross-pollination

When PA experts work across functional areas rather than in silos, best practices from the different functions can more easily be shared. It also becomes easier to integrate and adapt general best practices for software development, to improve the way PA people tackle tasks like project planning, requirements definition and so on. As one of the panel members said at a Competing on Business Analytics event, "If you get in a

[1]Dan Vesset, Take Care of Your Quants: Focusing Data Warehousing Resources on Quantitative Analysts Matters, March 2011.

room and you have to get people to introduce themselves before you can even start talking (about a project), you know you've got a problem[2]."

Today, few organizations are successfully sharing PA expertise across functions. Interestingly, most analytical experts are function-neutral when they start work in an organization, but few ever cross over to a different function. It is true that PA initiatives require direction from functional leadership – but then so do most IT projects, and yet IT people are not normally tied to a particular function.

Cross-pollination between functions is a way to increase efficiency and break down silos. One way to make cross-pollination happen is by creating a "Chief Analytics Officer" position, which many organizations are now doing. Even among businesses that do not want a formal PA department, there is increasing awareness of the need to create an organization-wide alliance of PA people. Alliances like this can alleviate skill shortages, as can a "center of excellence" – a shared pool of PA experts.

Nurturing analytic competencies

There is a difference between an organization with PA competency and one that just employs a few people who have PA competency. Since PA should power strategic decisions, it is important to implement processes and governance that nurture the analytic competencies of the organization as a whole. This also minimizes the negative impact of employee turnover.

PAMFA assesses strengths and weaknesses in this area. We can then help you decide how to convert individual competencies into organizational competency and hence, organizational DNA.

Visibility

The organization should have visibility of all current PA engagements, and of areas where analytics could be deployed in future. PAMFA investigates how far this is true.

Outsourcing is a special area for attention. Some business units in an organization may outsource core modeling. While this enables organizations to borrow analytics competency, it is important to oversee the program to make sure that all outputs follow the organization's vision. Analytical assets from outsourced engagements should be included in the overall inventory and analytical map. That way you can make the best of all available assets and competencies, and minimize duplication.

4. Deployment

The ability to deploy PA and integrate it into business processes is a critical aspect of PA maturity. The main point of PA is to power the decision-making capability of the organization. During a PAMFA exercise, we look to see whether this is happening, and ask questions about integration at an operational level, for example:

- Have the results of the churn model been integrated into the call center dialer?
- How quickly can updated models be integrated with operational workflow?

5. Governance

Governance is an often-overlooked but vital aspect of PA. It is better to have no models at all than to have models that are no longer relevant or accurate. Many predictive modelers are so busy that they do not have the bandwidth to update their models.

For this reason, we examine the organization's modeling lifecycle management and its governance of model accuracy and relevance. We check to see whether there is a feedback loop to ensure optimal modeling, and ask questions like:

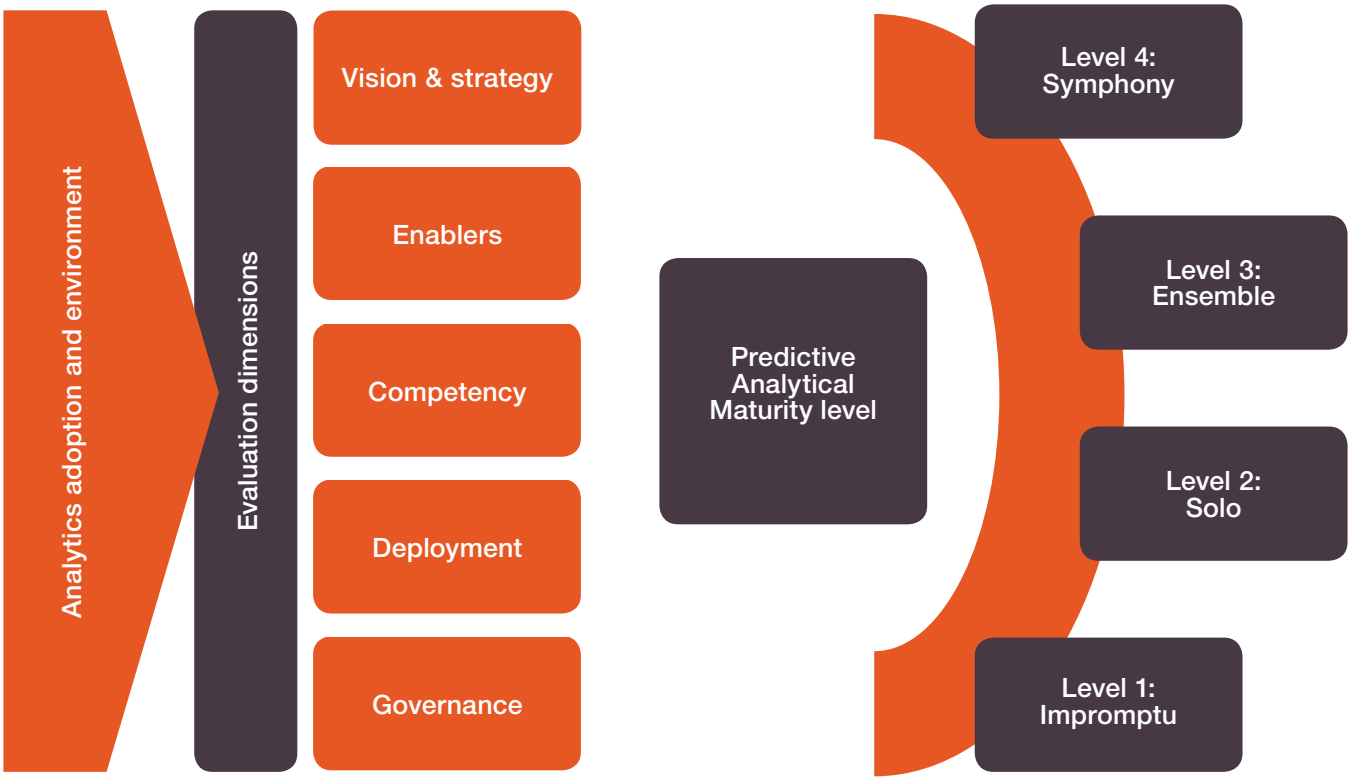
- What governance is in place in relation to programs, processes, and models?
- Are governance processes and procedures adequately documented?
- How well-maintained are the analytics models and processes that power organizational decisions?
- How frequently are the models updated to keep them relevant?

[2]Vernon Marchal, Taking the Enterprise View to Leverage Analytics, Harvard Business Review blog entry, April 28, 2010
http://blogs.hbr.org/events/2010/04/taking-the-enterprise-view-to.html

Assessment levels

PAMFA can assign an organization to one of four maturity levels. We use musical analogies to communicate the characteristics of each level.

Analytics adoption and environment



Level 1: Impromptu

Sporadic and isolated analytic capability results from ad hoc projects done by a lone manager or business unit.

Level 2: Solo

Level 2 is broken down into two sub-levels:

- Amateur Solo. PA capabilities and processes exist mostly at an individual level, and are not supported by the environment.
- Professional Solo. Excellence within a silo. PA processes, capabilities and environment come together to address business issues effectively, but only for individual functions.

Level 3: Ensemble

Here we see PA initiatives across business functions, with some assets and processes being created jointly.

Level 4: Symphony

Well-orchestrated, enterprise-wide initiatives apply analytics for competitive advantage.

	Level 1: Impromptu	Level 2: Solo	Level 3: Ensemble	Level 4: Symphony
Vision and strategy	There is no defined analytics strategy or vision – all development is incidental.	Individuals in some business units may have an analytics vision, but there is no articulated analytics strategy, even for a single business unit.	An analytics vision may have been articulated by individual business units, along with the IT, who have to support the vision.	A well-defined and articulated enterprise-level analytics strategy supports PA initiatives. People, processes and technology are aligned and used optimally.
Enablers	Each business unit can develop ad hoc solutions on its own, or fund groups to build them. There is no standardization of tools/techniques and no data and technology enablers.	Individual business units may collaborate with BI or technology units, but there is very little dialogue.	Some initiatives may see collaboration around data and technology across business units. Some business units share analytics assets and environment.	A formal center of excellence or PA department, or just an informal alliance of PA people, optimizes use of organizational resources. PA environment supports the organization's vision.
Competency	Competency is very low or non-existent.	Individual competency may exist in some business units, but is rarely used more widely.	In some areas, individual competency may have matured into analytic DNA for the business.	Enterprise-wide competency enabling rationalization of initiatives and skills.
Deployment	No integration with operational processes, BI or decision-making systems; some reporting may be enabled.	Integration with operational systems is manual, or a request is made to IT.	Analytics may be integrated with decision-making systems, but not with BI systems.	The technology environment is able to integrate predictive model output with BI, decision systems and operational systems.
Governance	No governance.	Business unit level governance may exist.	Limited enterprise-level governance.	Robust governance ensures enterprise-level review and prioritization of analytics projects.

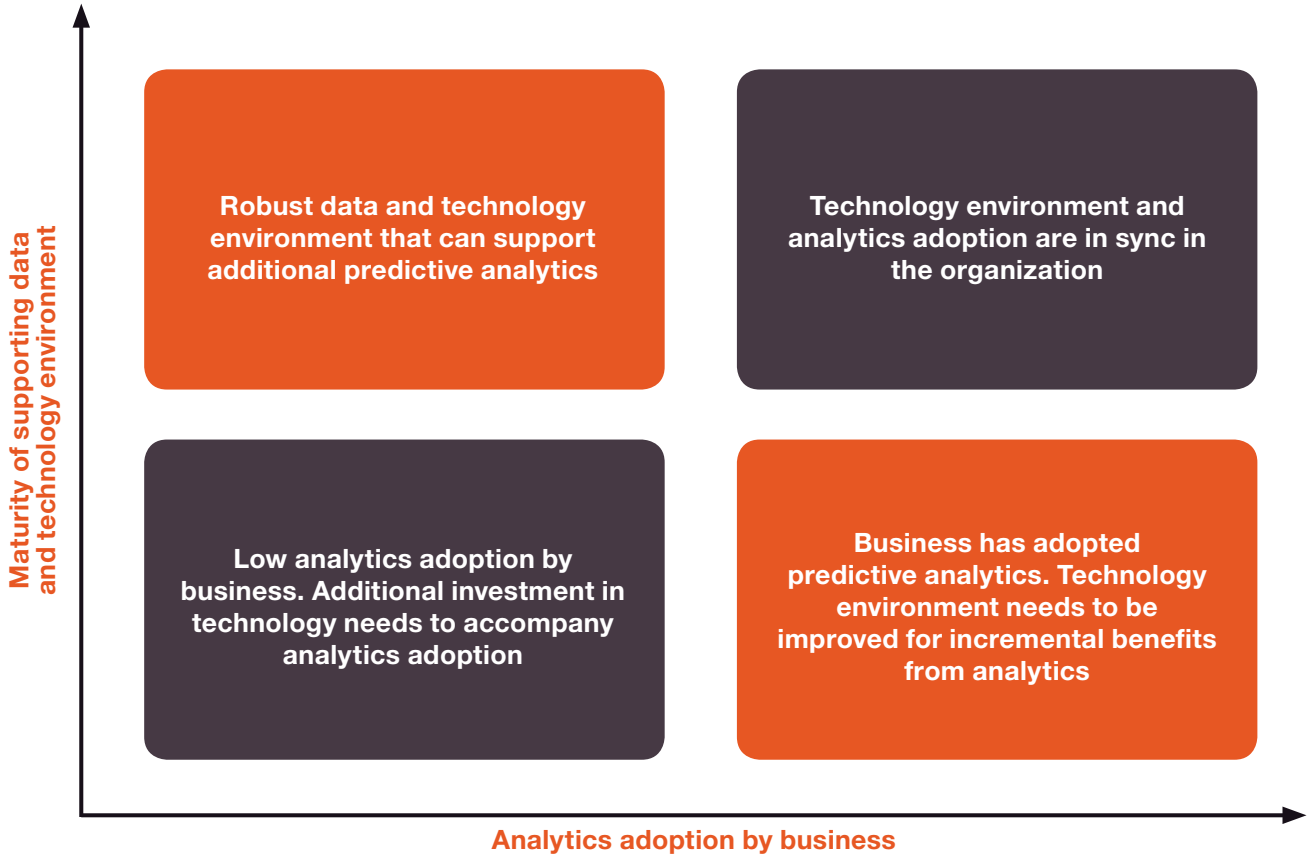
Most organizations fall somewhere around level 2 or 3. It is not unusual to find different business units within the same organization operating at different maturity levels. The table outlines some characteristics of organizations and units at each maturity level.

Technology environment versus business adoption

A PAMFA exercise will help the organization understand where it currently stands in terms of analytical maturity. The assessment will reveal the dimensions and areas where the organization should focus in order to mature further.

The technology environment and the business's ability to adopt PA are both critical to maturity, and as the figure below shows, there can be a mismatch between them. For example, we have seen organizations that use innovative analytics to make tactical and strategic decisions in certain areas, but are not able to go further because of the limitations of the technology environment.

Technology environment versus business adoption matrix



Clearly, technology is crucial to the adoption of analytics in any organization. The role of the IT function is to create and sustain a uniform yet flexible technology environment that will foster the innovation needed to create unique analytic DNA. Mature technology teams will be able to find ways to meet the data needs of PA, which are very different from the needs of a typical reporting or BI application.

In order to fulfill their pivotal role in enabling organization-wide PA, technology teams may have to move away from typical IT mandates around data custodianship, development process standardization and data efficiency. While many established best practices can be applied to PA, IT needs to put in place a new, more flexible, set of criteria and standards for analytics. The organizations that are best at PA are those whose IT teams have learnt where to draw the line in enforcing IT standards: they know what to insist on and what to leave to the business.

The Ideal Analytics Maturity Level and roadmap

PAMFA is designed not only to identify the current level of analytical maturity, but also to discover the organization's Ideal Analytics Maturity Level (IAML). The IAML is the level that would enable the organization both to get the most out of existing resources and also to invest optimally in additional resources, in order to achieve strategic goals and derive maximum business benefits.

PAMFA also gathers all the information needed to design a roadmap for migrating towards the IAML. The roadmap will prioritize all the additional investments that are to be made based on the needs of the organization as a whole, not just one department.

It will also provide a basis for measuring and documenting the returns on existing or new PA initiatives.

Conclusion

PA has the power to unlock the (often huge) business benefits that are currently hidden in an organization's data. Realizing this potential requires clear goals, together with a roadmap that prioritizes the necessary work based on quantified projections of business benefits.

Enabling PA needs a collaborative approach that involves the whole organization, together with supervision by cross-departmental management teams. One successful approach is to form a center of excellence with defined mandates and powers.

Capgemini's Predictive Analytics Maturity Framework Assessment positions your organization to apply PA for competitive advantage.

Capgemini Business Analytics

Capgemini's Business Analytics global practice network is a core unit within the Business Information Management (BIM) global service line and operates in 25 locations across the world, drawing on a database of over 100 analytics client credentials and analytical models. It provides high-function analytics-based solutions to all major industry sectors and business functions.

Capgemini has over 7,000 consultants working in BIM across the world. We work with all the leading big data and analytical technologies, and provide services to support business analytics, from high-level strategy to managed outsourced services. We recognize that analytics are specific to industry sector and sub-sector, and have experts and solutions across all of them.

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