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How to Establish an Analytical Center of Excellence to Maximize the Value from Your Data and Analytics Investment

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ABSTRACT

In order for organizations to make the most of their data assets and to survive and continue to grow in the current economic conditions, the deployment and use of analytics are becoming more critical than ever before. Many organizations began enterprise initiatives to focus on applying analytics to set future directions, survive the slow economy, and identify opportunities to set them apart from their competitors. However, for these initiatives to succeed, organizations need more than just technology. They need an enterprise strategy to coordinate and align many aspects of their environments. Many have successfully established an Analytical Center of Excellence (CoE) to enable them to achieve the maximum value from their investment.

This paper will provide a comprehensive overview of the need, structure, and benefits of establishing an analytical CoE. The paper will examine the impact of the executive support and vision of analytics. It will also discuss best practices to ensure the development of consistent and accurate enterprise analytics including, information requirements, analytical resources needed, internal organizational structure and processes, and different approaches to establish and structure an analytical CoE.

INTRODUCTION

The last few years have shown an increasing rate of the application and use of analytics in many sectors of the economy. Many organizations have developed a much higher level of understanding and appreciation of the value and power that they can derive from analyzing data and making better decisions. And, the advances in the power and ease of use of many types of analytical technologies have also encouraged organizations to take advantage of analytics to make more and better fact-based decisions, to validate assumptions, to identify root causes of business problems, etc. The results enabled these organizations to achieve higher levels of business performance, to improve their market positions, and to weather the recent economic downturn by looking for ways to operate more efficiently and effectively and by identifying new market opportunities. However, a large percentage of organizations are still struggling with several aspects of using analytics, including how to start, where to start, and how to change their internal culture to one that understands the value of analytics such that analytics becomes integral to the decisions that matter most. These can be automated decisions that enable others to take best actions, one-time decisions that inform executive strategy, and a range of decision types in between.

Analytical Centers of Excellence (CoEs) can be used as a very effective way to help organizations deal with these challenges. Regardless of how much or how little analytic competency an organization may have, analytical CoEs provide a means to derive more value through greater insight and better decisions. This paper will explore the structure and role of analytical CoEs, and the various organizational aspects that need to be considered to effectively deploy analytics in an organization.

DEFINITION OF ANALYTICAL CENTER OF EXCELLENCE (COE)

Before we start discussing the role and value of analytical CoEs, let us first define what an Analytical Center of Excellence is. An Analytical Center of Excellence is an internal organization that has a specific focus of promoting the use of analytics within an organization to achieve business objectives. It is a central point for

- developing and evolving the analytic infrastructure.
- promoting collaboration and analytic best practices.
- driving growth, cost reduction, and profitability.

It is ultimately a means to support strategy and operations through objective analysis. This organization, or team of experts, must have representation to include business knowledge and participation as well as analytical expertise. The team is a permanent team, with well defined roles and responsibilities, and not a temporary group that gets called on an ad hoc basis to address a specific analytical requirement. An initial, non-permanent structure may be used as the first phase to justify moving to a permanent CoE team. The non-permanent structure may include virtual teams, outsourced services, or other arrangements based on the specific requirements of each organization.

It is important to point out that there are many types of CoEs (also called competency centers or centers of expertise), depending on the focus and scope. Some of the focus areas include:

- Enterprise information management, which covers all aspects of information management across the organization.
- Data Integration.
- Information Delivery (reporting, performance management).
- Analytics.
- Specific technologies such as SAS Centers of Excellence, or ERP types of CoE.
- Specific business functions such as Customer Insight or Finance CoEs.

A PROPERLY IMPLEMENTED ANALYTICAL COE

A well implemented analytical CoE should be a permanent, formal organizational structure (team) with the following characteristics:

- Supported and sponsored by the executive-level management.
- Owned and staffed by the organization.
- Representation from business, analytical experts, and IT.
- Well defined focus, roles, responsibilities, and processes.
- Chartered to collaborate with all appropriate stakeholders, especially the IT and Enterprise Data Warehouse (EDW) teams to influence the structure of the current EDW environment to support analytics and analytic best practices.
- Committed to provide and manage robust analytical development environments, including data marts.
- Committed to provide and manage processes to push results and decisioning logic to production/operational environments.

It is important to structure the data and processes to facilitate the application of analytics, to provide the appropriate level of governance (for repeatability, auditability, knowledge management, etc.), and to enable closed-loop learning to allow for continuous improvement.

The team is responsible for the following:

- Supporting and promoting the effective use of analytics within the organization.
- Developing and promoting analytical best practices to facilitate the identification of analytical requirements (including new data sources and metrics to measure their efforts/contributions), the application of analytics, and more importantly the interpretation and distribution of results.
- Educating the organization on the importance of data quality.
- Fostering greater analytic competency to support and guide more fact-based and timely decisions, in the pursuit of achieving organizational priorities and objectives.
- Leveraging available analytical skills and resources to optimize their contribution to the high-priority projects and problems.
- Gradually changing the culture of the organization to always apply critical thinking and to demand the validation of business assumption and strategy. This includes fostering a learning culture—one that encourages experimentation and provides permission to fail. Sometimes the learning is more valuable than the success or failure of any given experiment. To quote Professor Paul J.H. Schoemaker, “Experience is inevitable. Learning is not.”
- Continuously developing analytical talent

There are many implementations of analytical CoEs out there. However, a large percentage of them can be described as specialized shared-service organizations. These organizations receive requests from the business community to apply analytics to solve business problems. There is no question that these types of structures provide value to the organization, but they may not be able to change the internal culture without having a much closer connection and integration with the various business units where many better decisions could be enabled. When used in an ad hoc way and without the right level of executive sponsorship, the CoE is limited in its ability to have more lasting impact on the way decisions are made and on the quality of those decisions.

Many of these organizations are set up to deal with requirements from a project perspective. Each project has a scope, deliverable, and start and end date. Because of this setup they may not be able to identify the root cause of data issues such as data consistency, availability of master data, data quality, and integration. And consequently, they may not be able to make changes to address the root cause of these problems. Many data extraction and manipulation tasks tend to be repeated. The other challenge to these organizations is due to where they report in the organization structure. Continuous executive support and high visibility will empower these organizations to put the results of analytics to work and to implement changes to facilitate future and more advanced applications of analytics.

A MORE STRATEGIC AND EFFECTIVE IMPLEMENTATION OF AN ANALYTICAL COE

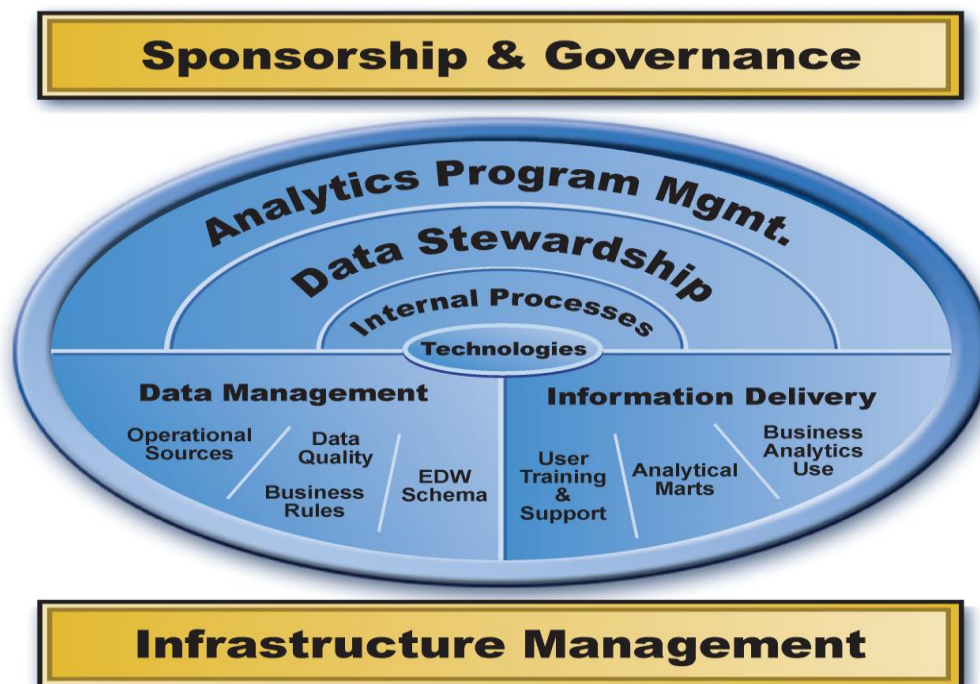
The best implementations of analytical CoEs have these traits:

- partnering with business stakeholders for ongoing success.
- high-level executive sponsorship.
- sufficient prominence in the organizational hierarchy to have visibility and impact.
- a reputation for proven results, excellent work ethic, and ability to deploy results to impact decision making.

These strategic implementations will have the highest chance of promoting wide-spread analytically driven decisions and surfacing new opportunities.

All CoEs share many common components and characteristics.

The following diagram illustrates the key possible focus areas and functions for Analytical Centers of Excellence. It is important to point out that not all of these functions need to be managed by the analytical CoE. However, addressing these functions is critical to ensure that analytics are used in an efficient, repeatable, and effective manner in the organization.



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Figure 1: Possible Key Functions for Analytical CoEs

- **Sponsorship and Governance:** Although this function is not part of the day-to-day operation of the analytical CoE, it is an essential requirement to provide the CoE with the support and alignment needed for it to be successful and effective. The support refers to the sponsorship from the executive team and the commitment to promote the value of analytics throughout the organization, and to use the results of the analytical work in the decision-making process. The governance refers to the need to align the analytical CoE with any existing information and BI governance that may be managed by other groups.
- **Analytics Program Management:** As we discussed earlier, the effective application of analytics should not be based on a pure ad hoc project perspective. The application of analytics should be managed as an ongoing

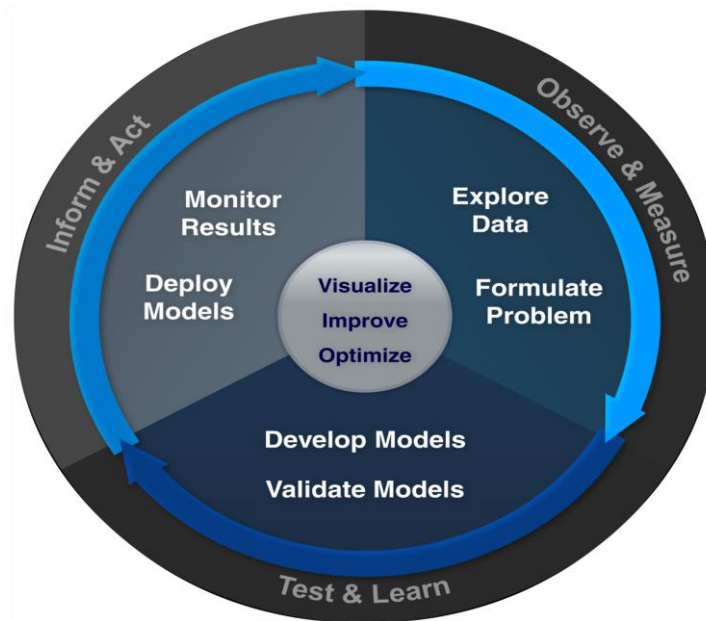
program or process that is core to the decision-making process. The program will have to work with many stakeholders in the organization from business, IT, and other groups. This function highlights the need to have someone responsible for managing this program on a consistent basis and for coordinating and collaborating with all appropriate groups.

- **Data Stewardship:** The application of analytics often requires significant data management tasks to access and manipulate the information to prepare it for the applications of analytical techniques. Many of these data management tasks run into data quality and data access challenges. This function highlights the need to work with the data stewards in the business and IT groups to identify data quality and consistency challenges, as well as the need to work collaboratively with these groups to address the root causes of these problems so that they can be fixed,
- **Internal Processes:** This function refers to the need to have well defined internal processes to facilitate the identification of areas in need of analytics. This would address things like requesting analytical resources to address the need, providing a consistent process to collaborate with the business to ensure that analytics are applied appropriately, and that the results are properly communicated to decision makers.
- **Technologies:** This function refers to ensuring the availability and proper configuration and use of the required analytical technology. This topic is addressed in more detail in the “Technology Infrastructure” section below.
- **Data Management:** This function refers to all the tasks related to extracting and loading operational data into the staging area and the EDW environment. These tasks are managed by the EDW team in the IT organization. However, obtaining a good understanding of this process and of the data schema used in the EDW environment is essential to enable the analytical CoE team to identify the right source of information to apply analytics. Establishing a link between the analytical CoE and the EDW team will enable the CoE team to perform their work more efficiently when they get the support they need from the EDW team.
- **Information Delivery:** This function covers the essential interaction between the analytical CoE team and the business side. It includes many processes such as the identification of analytical requirements, application of analytics to solve business problems, the interpretation of analytical results, the configuration and maintenance of analytical data marts, and many more.
- **Infrastructure Management:** This function is not part of the day-to-day operation of the analytical CoE. However, it is important to ensure that the IT infrastructure team is somehow able to support the requirements of the analytical. This function highlights the need to establish a link of collaboration between the CoE and the IT infrastructure team.

Again, this diagram provides a comprehensive list of all possible areas that may have to be addressed to ensure proper and effective implementation of an analytical CoE. It is important again to point out that not all of these functions will be managed by the analytical CoE team. The point here is to ensure that these topics are considered to ensure that they are addressed. An assessment will evaluate how these areas are functioning and the best way to utilize the existing resources and enable the analytical resources to focus on applying analytics to solve business problem and not focus too much of their time on other data management and quality challenges.

EFFECTIVE APPLICATION OF ANALYTICS

Analytics is a process unto itself that can add significant value to other business processes. When analytics is applied as a closed-loop process, the stage is set for continuous learning and improvement. The following diagram is a generalized version of the scientific method. Drawing on a quote from W. Edwards Deming, “the object of taking data is to provide a basis for action,” it is essential to measure the results of your efforts to close the loop:



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Figure 2: Analytics Is a Closed-Loop Process

The application and effective use of analytics requires more than just technology. In practice, technology is the easy part. The other challenging components are related to many aspects of the organization itself. To achieve the greatest degree of success with analytics, organizations have to consider the following four critical components or dimensions of what ultimately comprises the analytics infrastructure:

- Human capital and skills.
- Internal information and knowledge processes.
- Technology Infrastructure.
- Organizational culture.

SAS has developed a comprehensive maturity model called the Information Evolution Model that describes these four critical dimensions in detail. Check this link for more details: <http://www.sas.com/software/iem/>. The model outlines five levels of organizational maturity, and the impact and interaction of the four dimensions in each level. Organizations can use this model to conduct a comprehensive assessment of their information management practices and of how well information, analytics, and performance management are used in their decision-making process.

The following sections will explore the impact of each of these four dimensions on the organization's ability to use analytics effectively.

HUMAN CAPITAL AND SKILLS

This dimension refers to the available skills and resources within the organization. More importantly, it also refers to the organization's effort and ability to attract, develop, and retain its resources and to the extent to which the organization is empowering these resources to apply their knowledge to affect positive change in the organization's performance.

Good analytical resources are not easy to attract, and they are usually driven by the desire to have a positive impact in their organization. Having skilled analytical resources can provide a significant competitive advantage for the organization if those resources are placed in the right position, are allowed to continue to develop their skills, and are empowered to effect change. The organization's human capital policies and practices, and more importantly, the management view and appreciation of these skills, are vital to ensure effective use of analytics. These policies and practices should:

- Demonstrate the organization's understanding and appreciation for the value of analytical and information skills.

- Promote practices to show the organization's commitment to fact-based decisions, critical thinking, and the need to use analytics to identify critical issues, to reveal new opportunities, and to maximize learning from trying new things.
- Provide ongoing opportunities to provide training and self-improvement opportunities for the existing analytical and information resources.
- Optimally allocate current analytical resources in the proper analytical CoE structure to maximize their contribution to the organization.
- Provide a career path that allows key analytic talent to remain as individual contributors so that a management path is not the only means of promotion.

INTERNAL INFORMATION AND KNOWLEDGE PROCESSES

This dimension refers to all the internal processes that decision makers have to follow to obtain information, to perform analysis, and to get answers to help them make decisions and set strategies and directions for the organization.

Organizations often find themselves in a position where the required analytic skills are available, the appropriate data to solve a business issue is available, and the technology is also available, but there is no defined process to help them connect the pieces together. As a result, decision makers may resort to gut feel or they may rely on individual effort to perform some pieces of the required analysis manually just to meet the deadline. In other cases, internal politics may get in the way and present obstacles to accessing the necessary data, technology, skills, and resources. The results may have a negative impact on organizational performance, including missed opportunities, sub-optimal use of resources, and more, all of which have the potential to become visible outside the organization. These cases will obviously minimize the return on the organization's investment in analytics and will continue the status quo of the current environment.

To overcome these challenges, a deliberate effort is necessary to develop well defined internal processes, to obtain executive support to implement those processes, and to promote their use. These processes should include the following key areas:

- Processes to support Information governance within the organization. These processes should focus on ensuring data quality, consistency, security, and access, etc.
- Processes to identify and engage data stewards in business areas to discuss and solve data quality issues.
- Processes to develop a consistent and accurate enterprise view of the business. These business views should provide decision makers, analysts, and other stakeholders with a good understanding of the organization value chain.
- Processes to develop and promote best practices around the use of analytics and data as strategic assets.
- Processes to clearly define how to engage and use the analytical CoE.
- Process to clearly define the interaction between competency centers if more than one center exists in an organization.

Having these processes in place will enable the organization to take advantage of the analytical technology they have, to utilize their analytical resources, and to use the results to improve business performance in a timely manner. The key benefits are the departure from the ad hoc and siloed project mentality, and the movement toward a more holistic and integrated enterprise approach that uses the analytical talent efficiently and effectively by providing them with the required information and closed-loop knowledge processes. The analytical CoE will play a significant role in developing and enhancing these processes if they are not already in place.

TECHNOLOGY INFRASTRUCTURE

The technology portion of the analytic infrastructure should complement and enable the organization's people, process, and culture, facilitating effective and efficient information management and decision making. As organizations assess their technology-readiness—or lack thereof—in support of analytics, there are many considerations.

WITH RESPECT FOR THE DATA

First, what is the state of the data? Are the tools to access, cleanse, and manage the data sufficient to support the anticipated analytic uses of the data? Even though data quality is typically thought of as having 5 dimensions (accuracy, integrity, consistency, validity, and reliability), a sixth is really needed: fit for intended use(s). This is especially true when we consider *analytic* uses of the data.¹

Are the tools to manage, monitor, and improve data quality and data quality processes sufficient to provide the level of quality needed for confidence in the data (and ultimately in decision making)? Data are fundamentally measurements, and data collection is the process of measuring. Applying an analytic perspective to data (as a manufactured asset) allows you to address the whole data “manufacturing” process. By viewing data as a measurement process (with a goal to making it fit for anticipated uses), we can apply quality improvement concepts to measure, monitor, and improve the quality of the data. For example, are percent missing values trending up, down, or flat over time? What seasonal/cyclical patterns are there, and are they taken into account where needed for other data quality metrics?

If you want to maximize the value from data, it pays to start with an analytic perspective at the point of measurement. To do that, the following data characteristics should be examined:

- Are the necessary and sufficient data available for important decisions? Are you measuring what matters?
- Is the data collection process efficient, and are duplicate measurements taking place?
- Are there points of high likelihood of error?
- Is the measurement arbitrary in nature?²

Apart from data quality, significant data management is often required above and beyond what has been done to load even the most pristine of data warehouses and marts. Even with relatively clean data, successful analysis requires the ability to do even more data manipulation: having the ability to do variable transformation and reduction, to deal with outliers, anomalies, missing and suspect values, and much more. These tasks can be greatly facilitated by the right software with the appropriate user interface. The power to program is increasingly surfaced in graphical user interfaces in the context of process flow diagrams (PFD). Such GUIs add functionality much more powerful than just writing code. In particular, the process flow allows you to more logically lay out and connect chunks of code and call sub-routines without the need to repeat programming logic unnecessarily. Through a PFD approach, you avoid mistakes common to a pure programming approach, such as failure to run predecessor routines when changes have been made to the data. The ability to insert custom code where needed and automate process flows graphically is boosting the productivity of analysts and data stewards. Even hard-core coders who formerly derided the use of any GUI have come to value the combination of benefits such a flexible environment provides, the power of custom code, the convenience of metadata flow-through reducing the amount of coding mistakes and the visual bird’s eye view of the whole process with the ability to easily insert steps in the flow if needed. In addition, the time savings of having score code that addresses all of the pre-modeling steps—variable creation and transformations, recoding, etc. automatically and with no risk of translation error when done manually can be considerable.

In summary, data quality, including the extent to which its structure and format is fit for the intended analytical use, is an important foundation for effective application of analytics. The technology should address these important considerations with guidance by the analytical CoE. Utilizing a well structured, dynamic, and scalable set of analytical marts will facilitate the effective, timely, and accurate applications of analytics.

METHODS AND MORE

Analytic methods and capabilities help you explore the data and ask the right questions. The importance of good data exploration capabilities cannot be overstated! The power of interactive, dynamic data visualization can provide an incredibly efficient means to quickly explore the shape and structure of the data, often revealing insights and data anomalies that may have otherwise gone unnoticed. Many organizations only outfit analysts with one-size-fits-all capabilities. This typically results in an over-reliance on spreadsheets and uses for which they are ill-suited. Several forward-thinking companies have taken advantage of some of the more modern and advanced data visualization

¹ Granted, not all uses of the data being collected are known at any given point in time. However, to the extent that they are known or anticipated, having that perspective at the beginning of the data collection process is much more effective in evaluating and treating data quality issues.

² For example, this is sometimes seen with call center data, where the end goal was simply reporting and no one thought through more useful ways to measure call center activity to facilitate analysis and ultimately to provide greater insight into call center activity patterns and trends which could inform better decisions.

capabilities recognizing the value in an environment optimized for data discovery. Good data discovery technologies provide faster insights **and** help generate even more important questions to ask.

Good data exploration also helps you assess which other analysis methods you may need to gain greater insight. Given the growing number and complexity of problems needing to be solved, it pays to consider a well-tooled analytic workbench for current and anticipated needs. There is also a tie to people and process here, in that the technology often supports new, faster, and better ways of doing things. If people have the opportunity to keep their skills current, they will feel valued, and they will feel that they, along with the rest of the analytics infrastructure, receive ongoing investment.

Here are some questions to consider when assessing the sufficiency of the analytical technology in relation to people, process, and culture:

- Are the analysts properly tooled to address old and new problems? Do they have the range of methods and capabilities to efficiently and effectively solve problems and reveal opportunities? For example, are newer methods available to analyze textual data, to do more automated variable selection, to enable real-time model deployment, etc.?
- Is the technology a good match for the skill sets? Is training required?
- Should the organization consider a hosted option as a more cost-effective way to deliver value—perhaps as a way to get started, to achieve greater analytic bandwidth, or to achieve a higher service level than could be obtained on premise?

Ways of using the technology should evolve along with the enhancements and innovations that are available in the technology. Some of the challenges that are involved in assessing technology needs include:

- Keeping current. The rate of change and the plethora of capabilities make it hard to assess and determine whether additional capabilities may be warranted.
- Knowing and assessing options and what benefit they bring. For example:
 - Should you take advantage of in-database analytics or in-database scoring?
 - Is your analytic workbench optimized for productivity for the kinds of analysis, collaboration, and deployment needed for your organization?
 - Do you have the necessary environment(s) to best enable different parts of the analytic life cycle--from interactive data discovery to promoting models into production environments?
- Monitoring and managing models throughout the model lifecycle.

As organizations explore options for greater analytic bandwidth, technology has a lot to offer, but analytic bandwidth can come in many forms to augment the existing analytics infrastructure. In addition to a possible hosted option, as mentioned above, there are other ways to obtain more analytic bandwidth:

- Hire more analytical talent.
- Invest in more compute resources (more/bigger hardware, cloud and other options).
- Configure more efficient deployments (grid, in-database and the like).
- Take advantage of smart automation for certain analytic tasks and/or steps in analytic processes (e.g., more automated variable selection when warranted, etc.).
- Ensure that allocation of analytic resources is optimal; that all available resources are used when needed.
- Outsource when warranted, tapping into partners, academia, or other organizations.

Serving up an environment for analysis is necessarily different from one for reporting. Sufficient work space must be available for analysts to explore the data and to try different approaches to discover important trends, patterns, and relationships in the data. This means right-sizing the environment—providing reasonable disk space, memory, and compute power. SAS, along with our hardware and database partners, assists in configuring optimal environments for a range of needs and deployments.

An integrated analytic workbench provides a common environment to allow the additional data management and preparation so often required for analysis; it allows for many methods to be used in easy succession as well as in combination when required for more complex problems. The analytic workbench should fit in easily to the existing technology architecture in the organization and should scale to make the investment one that evolves easily with the evolving needs of the organization.

The investment in the systems (and the skills to support and use them) needs to be re-evaluated from time to time. Sometimes the original investment can be greatly extended with relatively minor re-investment. While technology is characterized as relatively fast-changing, people and organizational cultures generally are not. When the technology is improved, it often requires changing the way it is used to take full advantage of the enhancements. The benefits of updating skills and obtaining new capabilities should be assessed on a periodic basis. The analytical CoE is in a good position to help objectively assess the value of adopting technology improvements, and more importantly, to work with other IT and business groups to coordinate these enhancements with other initiatives that are planned for the organization.

ORGANIZATIONAL CULTURE

This dimension refers to the internal culture that is defined, to a great extent, by the vision and commitment of the executive team. The culture sets the tone for how groups and resources interact with each other, and more importantly, for how business decisions are made. This dimension is probably the hardest to change, but perhaps has the most significant impact on the organization's ability to take advantage of analytics.

The internal culture should effectively and continuously address the following key areas:

- Communication of the organization's business priorities and objectives.
- Alignments of internal groups, resources, and information management and analytical efforts around the changing organizational priorities and direction.
- Providing the incentives and mandate to foster collaboration and information sharing between organization units on a consistent basis.
- Demonstrating the value of analytics and information in general as a corporate asset.
- Rewarding individuals and groups for demonstrating effective applications and use of analytics and information in the decision-making process
- Facilitating acceptance of change by business units and resources.

The analytical CoE will play a significant role in working very closely with the business representatives to guide and facilitate the adoption of these key requirements.

ORGANIZATIONAL BENEFITS

A properly implemented analytical CoE will provide your organization with the following key benefits:

- An effective way to leverage existing analytical skills.
- A structure and a set of processes to develop and promote best practices.
- Support ad hoc analytical requirements, but more importantly start establishing the framework and foundation to implement repeatable and more advanced analytical analyses in an efficient way.
- Provide a much needed link and alignment between the business, analytical efforts, and the organization's technology infrastructure. Alignment between the business, analytical resources, and IT is a critical requirement to enable an effective use of analytics. It will enable analytical resources to use their skills to apply effective analytics to support decision making and organizational objectives.
- Support analytical resources by allowing them to focus more on analytical tasks and less on data management and data quality tasks.
- Establish a solid and consistent communication and alignment between the business community, especially the decision makers, and the analytical resources who conduct the analysis. This is the foundation to change the internal culture to one that understands the value of analytics and that uses a fact-based decision-making approach.

APPROACH TO ESTABLISH AN ANALYTICAL COE

The objective of Analytical Centers of Excellence is focused on maximizing the organization value from the investment in data and analytics. The discussion presented by this paper so far highlighted the four critical organizational dimensions that form the foundations necessary to achieve the highest possible value from the investment. The maturity, interaction, and alignment of these four dimensions provide essential requirements to identify the form, structure, vision, and mandate of an effective analytical CoE in each organization. Analytical

Centers of Excellence, and any other type of centers of excellence, are not one-size-fits-all. Although there are common key characteristics of all centers of excellence, the most effective structure and type will have to be based on the nature and maturity of the four organizational dimensions in each unique organization. The common characteristics of all centers of excellence have been presented earlier in this paper.

The following key areas must be considered as organizations think about this valuable concept and about the approach to establishing an analytical CoE for their own environment.

- **Degree of centralization vs. de-centralization:** Many organizational aspects need to be considered to determine the right approach. Some of these factors include the size of the organization, level of reach (global vs. local), the structure of the business units and technical and IT resources, the existing culture and level of collaboration between groups, the distribution of analytical resources, etc.
- **Executive support:** The support from an executive level is essential to empower the analytical CoE to be effective in producing accurate, repeatable, and timely results from applying analytics. Collaboration and discussion between groups are necessary in many cases to collect the necessary requirements and data to apply analytics, and more importantly to use the result in the decision-making process. Many successful applications of analytics are promoted by the support of an executive in a business unit that has a clear vision and need to use analytics. Other implementations can have a broader scope to cover multiple business units, or even the entire enterprise. The common requirement is to have high-level management support.
- **Analytical skills:** The availability of analytical resources, their skill level and responsibilities is another critical factor. These resources are clearly needed to move forward. However, there are options for organizations to explore if these resources are not available, if they are too few, or if they need additional training. Some of these options include outsourcing some or all the analytical work initially, or working with SAS and other partners in a collaborative way to provide the initial resources while acquiring new resources or training existing members.
- **Current data structure and quality:** The availability of required data, the level of data quality, and the amount of data management that may be necessary to apply analytics are also key factors. To effectively address these areas, other technical resources and activities may be needed to facilitate and accelerate the use of analytics. Some of these resources and activities may be addressed by existing resources. There are also options that include securing external resources to get this process started.
- **Level and scope of the required analytical work:** There are many types of analytic applications that can support the decision-making process and the strategy of organizations. Some of these analytical applications may be easier to perform than others. Some may require a high level of processing power to complete in a timely manner, or specialized analytical skills. Another factor is how aggressively the organization is planning to use analytics and their timeframe. Again, organizations may find it more cost effective and faster to outsource some of these types of analytics. SAS offers different types of outsourcing services that can meet some of the most demanding analytical skills effectively.

The above list is not comprehensive, but it covers the essential areas. An assessment of each one of these areas is required to identify an approach that balances the requirements and characteristics of each of these areas. SAS offers several types of services to assess the current environment of each organization and to develop the most effective approach to promote analytics and to assist organizations in establishing their own analytical CoE.

The following approaches can be considered as organizations explore options and assess the characteristics of their own environments:

- **Outsourcing analytical projects:** This may be the appropriate approach to meet the need for a particular business unit, the entire organization, or as an initial phase to train existing resources in the organization.
- **Outsourcing specific tasks:** Depending on the requirements and the available resources, certain analytical or even data management functions and steps may be outsourced. In some cases, organizations may be outsourcing some of these tasks. This process can be an initial phase, or it can be used on-demand.
- **Centralizing some or all functions:** In some cases, centralizing some of the analytical work or the data management work may be an effective way to maximize the available resources. The IT team, or other resources within the organization, may be in the best position to take on the responsibilities of some key functions. Existing information governance and policies may also be leveraged when appropriate to determine the best approach.
- **Decentralizing:** Depending on the need, the executive support, and the readiness of internal groups, decentralizing specific analytical tasks may be the best approach to ensure that analytical work is closely

aligned with the business requirements. This will require the availability and alignment of sufficient analytical resources in business units. From a best practice stand point, some information management tasks may still need to be centralized.

SAS can provide services to assist your organization in analyzing all the different organizational aspects discussed so far, and in developing recommendations for the best possible approach and structure to meet the analytical requirements of your organization. SAS also offers a comprehensive public class that covers the concept, types, and application of different types of centers of excellence. Check this link for more details and a schedule:

<https://support.sas.com/edu/schedules.html?ctry=us&id=42>

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