Welcome to the Analytics Economy:
Making the Most of Digital Transformation

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Contents

Introduction

Throughout history, innovations have transformed society. From the prehistoric discovery of fire and stone tools through modern developments such as electricity, digital computing and the internet, the impact of innovations on the world has been dramatic.

Consider the early 1990s. Though the internet had been around for more than two decades, it had not affected most people's daily lives. Until 1990, it was used mainly by universities, the military and very advanced software programmers. Then something happened: The development of the World Wide Web and web browsers made the internet much more accessible. Today, almost everyone uses the internet. It affects how we communicate, how commerce is conducted and is responsible for the rise of the digital economy.

Think about analytics the same way. Though organizations used analytics for decades, it was mostly limited to specialists trained in math, statistics, econometrics, etc. That's no longer the case. As data exploded, so did technologies that enabled a wide range of users to access, analyze and find value within it. Fueled even further by advances in connectivity, the cloud and computing power, analytics now feeds on huge amounts of data to produce insights. These advancements are creating an economy where data, people and machines must work together to accelerate innovation and stay competitive.

Just like the internet drove the evolution to a digital economy, analytics is driving a new economy where each decision and action is based on the systematic analysis of data.

Welcome to the analytics economy. This market transformation recognizes the changing nature of data within the enterprise – where data should not exist without analytics and a movement toward crowdsourcing data collection and analytics is spurring collaboration. The analytics economy is predicated on enabling anyone who is curious about data to quickly and easily explore it and share gained insights, driving new experiences and innovations.

This paper examines how this new economy is already affecting businesses and society, looks at some of the challenges we face in maximizing the value of data and examines how a collaborative analytics approach can help your organization thrive in this economic evolution.

> The analytics economy is a reflection of a changing world, where data should not exist without analytics. In the analytics economy, each insight – discovered by people or machines – is added back into the analytical ecosystem as a new data point. With this learning loop, insights are compounded, accelerating the pace of incremental improvements and innovations.

How the Analytics Economy
Is Touching Us Now

We are beginning to see how the analytics economy influences how we work with each other, how it drives efficiencies that improve our quality of life and how it enhances our experiences. Here are a few examples of the analytics economy at work.

Retail and Entertainment

In the US, the Orlando Magic are one of the top revenue earners in the National Basketball Association, despite being in the 20th-largest market. And revenue is a tangible outcome where a team can measure its success in creating an experience that turns visitors into loyal fans.

The organization combines data from many revenue streams (concession, merchandise and ticket sales) with outside data (secondary ticket market information) to develop analytical models. Pricing scenarios are predicted and optimized to help fill the arena, while data is used to determine which concessions and merchandise will be most in demand on any given night. Data is collected on the team and opponents for crafting an on-court strategy.

All data is analyzed on a continuous basis to look for relationships and insights to improve both team performance and fan experience.[1]

Transportation

Nothing frustrates passengers more than delays – especially unexpected ones. That's why VR Group, a Finnish railway, turned to analytics to keep its fleet of 1,500 trains on the rails and provide a better, safer experience for passengers.

In recent years, the railway began fitting sensors on various systems and subsystems to monitor symptoms of wear and other failures. Using this data, along with data from maintenance records and other operational systems, it developed a predictive maintenance program that focuses on monitoring the condition of parts at all times. Analytical models predict when parts are likely to fail, so they can be replaced before they cause unplanned downtime.

Every new data point then feeds further analysis, providing the ability to refine and improve analytics and insights over time.[2]

Medical Research

Incredible progress has been made in the field of cancer research. Yet each year, 8.2 million lives are lost to cancer around the world, and we're losing nearly the same number of people today as we were 40 years ago. Enter Project Data Sphere, an independent, nonprofit initiative of the CEO Roundtable on Cancer's Life Sciences Consortium that was established in 2014.

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[1] https://www.sas.com/en_us/customers/orlando-magic.html

[2] https://www.sas.com/en_us/customers/vr-group-fi.html

An example of the power of big data, analytics and collaboration in the analytics economy was demonstrated through Project Data Sphere's first-ever Crowdsourced Prostate Cancer Data Mining Competition. Researchers from around the world worked in a common data and analytics environment, which led to better models for predicting patient outcomes. Doctors are informed of treatment options that can improve patient survival rates and life expectancy.

Through this process, Project Data Sphere is proving that a shared view of data and collaboration can accelerate how insights are found – and find better, more effective treatments sooner.[3]

Challenges to Advancing in the Analytics Economy

All three of the above examples demonstrate the power of analytics. They're great stories that generate tangible value for businesses, governments and society. But how can organizations take the next step to ensure advanced analytics is pervasive and produces the insights needed to drive innovation?

The analytics economy is in its infancy. Getting to the next phase requires an ability to capture, manage, regulate and govern crowdsourced analytics and insights. Let's look at some of the main issues that can hinder advancement into the new economy, using a framework of people, process and technology.

People

Many organizations lack an established analytical culture. This can often be traced back to leadership that is trying to balance day-to-day priorities and operational issues. Focusing on the now makes it difficult to move forward – especially when moving forward requires a different approach to decision making.

Another roadblock to advancing an analytical culture is simply the lack of trust in organizational data and analytics. A recent KPMG report pointed out that only 35 percent of respondents have a high level of trust in their organization's use of analytics. (Guardians of Trust, KPMG International, 2018). This, combined with poorly defined desired business outcomes, scattered responsibilities and lack of collaboration across the organization, makes it difficult for organizations to adopt a broad-based culture of analytics – a key driver for the analytics economy.

The well-documented lack of skilled analytical resources also presents challenges. Skills often exist in silos based on specific responsibilities, such as forecasting, data mining, optimization and reporting. These areas need to be integrated so results from one area can be shared with others. However, organizations that invest in training and provide employees with a consistent set of integrated tools make it easier to bridge the skills gap.

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[3] https://www.sas.com/en_us/insights/articles/big-data/can-data-sharing-help-cure-cancer.html

Process

Organizational silos, lack of governance and analytical inconsistencies are three process inhibitors to success. Unfortunately, silos are a reality in many organizations. It's the nature of teams to focus on their own goals and priorities, though this singular focus can create collaboration barriers. Organizations must do more to foster an environment where teams develop ideas together.

Governance often conjures thoughts of regulatory restrictions, lack of imagination and other constraints that inhibit agility. But a recent MIT Sloan Management Review report[4] pointed to data governance as a key enabler for innovation with analytics. The report noted that companies with strong governance programs usually see an expansion of innovation and that data governance promotes opportunities.

Analytical inconsistency prevents organizations from fully realizing the value of analytics. There is little to no repeatability and reuse in how analytical models are created or deployed. Many efforts are ad hoc and trapped within team silos. While these organizations may believe in the power of analytics, they lack a clear vision and plan for use.

Technology

Many organizations struggle to keep pace with the current technology landscape. For some, the volume of options and confusion over the best solution results in no decision. Others, after seeking and implementing tools for improvement, find themselves with an analytics infrastructure that is fragmented and complex.

The diversity of tools within an analytics ecosystem can be hard for IT to govern and for organizations to consume. With so many options across the various analytics reporting and discovery areas, many find that a large portfolio of vendors and open source software is onerous to manage. This also leads to difficulties in efficiently converting analytical experiments into realized, valued assets – due to scaling issues and delays deploying models into operational systems.

Could Orchestrating Your Analytics Environment With an Analytics Platform Be the Answer?

Industry experts confirm that most business leaders are not happy with their analytical initiatives. At the same time, IT leaders are challenged with creating and managing an analytics environment that can meet current and future requirements – at the lowest total cost of ownership.

Unfortunately, many organizations have built their analytical infrastructures based on various "capability standards," using different vendors for data integration, analytics, reporting, visualizations and interfaces. And while this approach may produce some successes, they're typically limited to silos. Initiatives that have been created using specialized capabilities or partners may be difficult to apply to different problems or scale to other parts of the organization.

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percent of executives say their organizations have been at best only somewhat effective at meeting the primary objective of their data and analytics programs, including more than one-quarter who say they've been ineffective.

"The Need to Lead in Data and Analytics," McKinsey & Co., April 2016

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[4] *Analytics as a Source of Business Innovation*, February 2017

How an Analytics Platform Can Help Organizations Thrive in the Analytics Economy

To succeed in this unfolding economy, sharing data and analytical insights is critical. But it's also necessary to democratize analytics so its use isn't limited. You want to make it easy for anyone who is curious about data to be able to derive value from it without limiting their choices in terms of data, techniques or languages.

An analytics platform orchestrates all aspects of analytics, provides governance and helps organizations create and tap into collective intelligence. It also enables organizations to produce new and compounding value from data – where actions and insights build on previous iterations to drive innovations for businesses, governments and society. It does so by supporting and accelerating the entire analytics life cycle cohesively.

In its simplest form, the analytics life cycle is a series of activities that make it possible to extract value from raw data. These activities can be grouped into three core components: data, discovery and deployment.
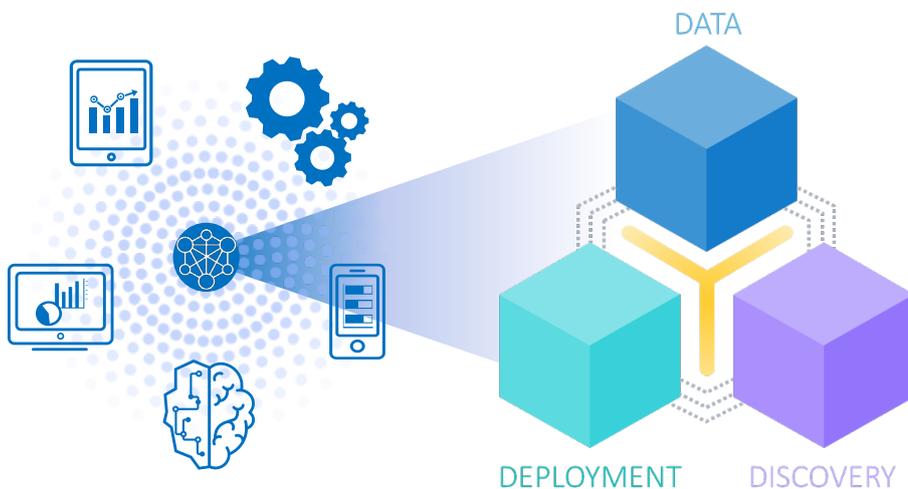
Analytics Platform

Figure1: Data, discovery and deployment are the core components of the analytics life cycle – an integrated series of activities that enable you to extract value from data and drive innovations.

Data: Your Foundational First Step

It's widely acknowledged that too much time in the analytical life cycle is spent on preparing data for analysis. Data is stored in many places, in all kinds of formats. It's difficult and time-consuming to access, clean and prepare different types of data for analytics. It's also an iterative process, as data discovery often uncovers the need for more or different data.

An analytics platform needs to facilitate and streamline access to all kinds of data, data quality, data preparation, minimized data movement, optimized processing and automated operational deployment. These are all critical aspects of the data function within the analytics life cycle, making the step to discovery as efficient as possible.

Discovery: Moving Toward Intelligence

In the analytics economy, data is combined with creative techniques to discover patterns and identify insights that create value. Discovery is a creative process, and creativity is key to innovation. Trying out new ideas, rapidly. Failing fast. Learning and then improving. It's better to know quickly that something isn't working, rather than spending months before finding out you're not getting the right answers.

A superior analytics platform needs to include a complete and integrated spectrum of discovery techniques, from visualization and reporting to forecasting, machine learning, prediction and optimization. It also needs to accommodate a variety of analytic programming languages. And as you explore data, develop models or perform root-cause analysis, you need to move up and down the discovery spectrum, often in a single session. Interconnectivity is essential.

And just as data permeates nearly every function and aspect of an organization, discovery capabilities need to extend across an organization and provide a common experience to users with different skills or language preferences.

Deployment: Turning Discoveries Into Actions

After the data and discovery phases, you have models that are ready to be moved to production – where value will be realized. Because even though data and discovery provide insights, that's only part of the equation.

Insight without action creates no value. To complete the equation, you need deployment. Within an analytics platform, deployment functions put the insights into production and are crucial for proper governance and efficiency. Important deployment functions include an inventory for all organizational analytical models, model tracking and refinement, and the automation of end-to-end processes without human intervention.

In the deployment function, collaboration between the business and technology teams (IT) is important. An analytics platform should not only bring data, discovery and deployment into an end-to-end process, but also bring business units and IT together. In a sense, you're looking for a platform that can orchestrate the elements needed to capture the value of data in the analytics economy.

The Analytics Life Cycle: An Example

To illustrate how the analytics life cycle can help an organization thrive in the analytics economy, let's look at the transportation organization mentioned earlier. Its goal is to ensure reliable and safe train service.
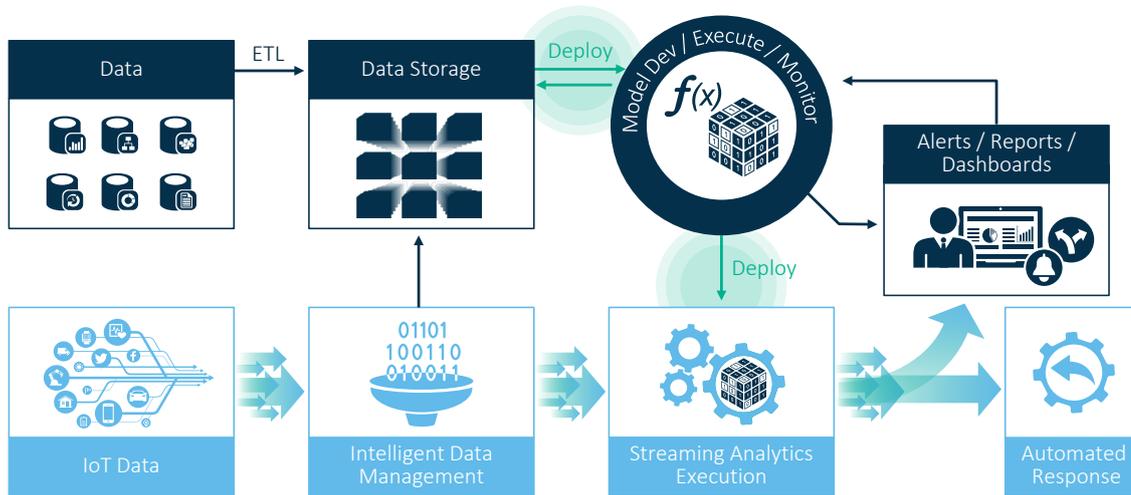
Analytics Platform
From data to decisions

Figure 2: A collaborative analytics platform can take you from data to decisions more efficiently.

The volume of data coming from sensors is enormous and much of it isn't useful. Intelligent filtering is required to assess the data and store only what will provide value. During the model-building process, data associated with both train events and other events is required to effectively predict future events. Once this is completed and the model is deployed, the intelligent data management process should only push data to the data store when the predictive model identifies a future event. These capabilities illustrate the data functions required in an analytics platform.

In this example, discovery takes place in two forms: for predicting a maintenance or safety issue, and root-cause analysis. Both functions require different forms of data and likely will use the full spectrum of discovery capabilities. The continuum from exploration and forecasting to predictive modeling and optimization builds upon each component. Business users and data scientists will move up and down this shared continuum as they work.

Finally, once the predictive model is built and tested, it needs to be efficiently moved into production. The deployment should be seamless and governed.

The deployed analytical asset runs where data rests (x times per day), inside the data store (as data lands in the data store) or within the data stream near the machine (real-time analytics). In the case of an operating train, in-stream analytics provides the earliest warning of a potential alert and gives the organization time to schedule maintenance that isn't disruptive to operations. This is just one example of how an analytics platform drives the entire analytic life cycle (data, discovery and deployment). But many possibilities exist.

Qualities of an Analytics Platform

Successfully competing in the analytics economy requires an analytics platform that doesn't limit options and ensures appropriate controls are in place. An analytics platform needs to bring order to the chaos caused by disparate tools, languages, data and techniques being used across the analytic life cycle. SAS addresses this need with an analytics platform that orchestrates the analytics journey with the perfect balance of choice and control. With the SAS® Platform you accelerate the analytics life cycle so everyone can collaborate and innovate faster.

Choice

Organizations need to have the freedom to choose languages, tools, data, techniques and environments, because this is what drives innovation and creativity.

- **Data:** Get value from any data source, from legacy applications to streaming data to images.

- **Programming languages:** Today there are many programming languages available and there should be no reason for a platform to limit access. Everyone has different skills and preferences. Whether it is R, Python, Lua, SAS or other languages, analysts should be free to choose what works best for them.

- **Analytic techniques:** Use the latest techniques in machine learning, deep learning, natural language processing and forecasting – all within a governed environment.

- **Deployment:** Apply newly found insights throughout the enterprise. On-site or in the cloud; in traditional or cutting-edge environments.

- **Talent:** Foster a culture of analytics by empowering a wide range of users to use data and analytics, regardless of their analytics skillset.

Control

Appropriate controls are necessary to provide trust in your analytics. Businesses need to trust the data, get accurate results and monitor model performance over time. As a result, transparency, governance and security are essential. And controls become even more critical as organizations scale their analytic efforts. Here is how SAS provides you with better control of your analytics environment:

- **Data governance:** Capabilities such as data preparation, quality enhancement, lineage and permissions ensure there is transparency, trust and protection of data assets.

- **Model governance:** Models are documented, version-controlled and centrally managed with procedures and rules to ensure that modeling efforts can be easily deployed and reused.

- **Deployment:** Develop once; deploy anywhere. Create organizational intellectual property using validated, cutting-edge methods that reduce coding burdens and encourage repeatability

- **Security and privacy:** Features such as authentication, authorization, encryption and web security are critical controls for analytic environments. An easily governed platform with unified administration and security hardens your environment and protects against vulnerabilities.

- **Scalability:** If models can be refined, refreshed and deployed in minutes rather than weeks or months, you're ensured of fast insights always based on the newest data.

Conclusion

The analytics economy provides opportunities for organizations to realize value from their data and create exciting innovations. And it provides a compelling case for integrating analytics into all aspects of business environments. But achieving success with analytics requires more than just a single step – it should be a loop of continuous improvement. Each step and data point feeds another. Insights are constantly refined and improved, creating the opportunity for better decisions and actions.

An analytics platform helps overcome the cultural issues of analytics adoption that exist today by orchestrating and accelerating an analytics life cycle that integrates data, discovery and deployment activities. Efficiency and accuracy depend on this integrated loop and its collaborative elements, enabling you to compete in an analytics economy.

The SAS vision is to provide an orchestrating platform that powers the analytics economy. This doesn't mean you have to replace existing tools and techniques within your organization. Rather, it's designed to bring everything together into a trusted, scalable and flexible ecosystem that forms the basis for ongoing innovation and value.

The analytics economy will produce incredible success stories in businesses, government and society. This new economy will affect all industries and create new ones. The compounding of insights enabled through an analytics platform will drive new innovations, solve complex problems and have a transformative effect on our daily lives around the world.

Learn More

To explore how to achieve excellence in analytics with a platform that supports diversity, enables scale and promotes trust, visit sas.com/platform.

The analytics economy provides opportunities for organizations to realize value from their data and create exciting innovations.

The SAS vision is to provide a single, orchestrating platform that powers the analytics economy.