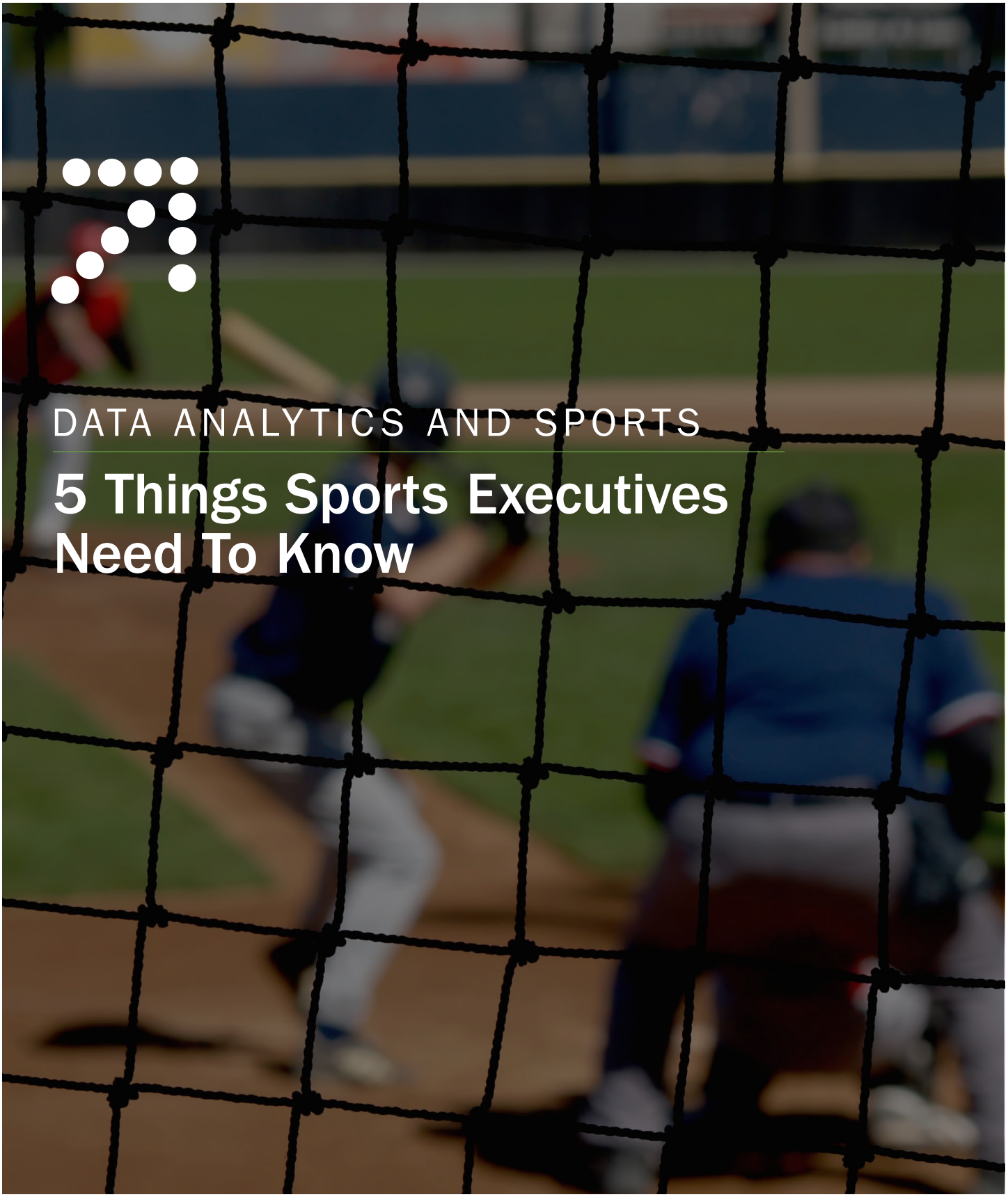

DATA ANALYTICS AND SPORTS

5 Things Sports Executives Need To Know

DATA ANALYTICS AND SPORTS

Data is everywhere, surrounding everything we do. And today, the sports industry is generating more data than ever before.

It's measuring the business and the game in ways never imagined. It can be seen in the use of Doppler radar and camera systems to track ball and player movement on the baseball diamond, as a single Major League Baseball game has been reported to generate up to *seven terabytes*, or 7,000 gigabytes, of data.[1]

For industry executives, understanding this massive amount of data and determining the best way to make use of it can be daunting. As analytics' capabilities and disciplines mature, the insights gained from data science will be critical to informed organizational decision-making at all levels. By leveraging data science, sports organizations have the opportunity to substantially reduce operational costs, strengthen their brand, and generate additional revenue across existing and emerging channels. But with the numerous types and sheer volume of complex data being generated, where do executives even begin?

Booz Allen Hamilton, a leader in helping sports organizations apply their data to solve business and game performance challenges, has identified three central areas in which sports organizations can use data to improve performance: *on the field, off the field, and in the stands.* We've also identified the *five most important considerations for sports executives* as they begin to take advantage of their data and stand-up robust analytics operations.

THE SPORTS DATA SCIENCE LANDSCAPE

Today, the sports industry is at a unique time in which data creation, technology, and computing power are converging to enable analysis and decision insight that was unattainable just a few years ago. Technologies like cloud computing have empowered unprecedented levels of connectivity among devices and systems, parallel processing allows for execution of multiple complex computing actions in milliseconds, and wearable technologies have infused continual data collection into our most everyday activities.

Simultaneously, sports organizations are recognizing that in today's cluttered economy with a myriad of consumer choices, a successful on-field product may not be enough to ensure business success. And at the same time, even professional teams with losing records can still stand among the most highly valued teams in their leagues. Sports organizations must focus on winning both on AND off the field, recognizing the interconnectivity among their on-field performance, off-field planning, and boardroom-based business activities.

Data science can be a conduit to collective success in all of these arenas. Although the industry is still imagining all the potential uses for data science in sports operations, a number of applications hold particular promise:

1. *Newsweek,* "With Big Data, Moneyball Will Be on Steroids," July 24, 2014. http://www.newsweek.com/2014/08/01/big-data-about-change-how-baseball-teams-evaluate-player-defense-260972.html

On the field: Wearable technologies have the ability to track player movement, direction, speed, and distance, among other metrics. These data points have multiple applications for improving player performance by helping identify specific areas for improvement and development. Moreover, data science can help teams create winning game strategies. With historical and real-time game data, teams can predict the plays and strategies their opponents are most likely to employ, helping them to create game plans to consistently counter their competition. Teams can also engage in proactive player maintenance using data. With information collected from wearables and camera tracking systems, coaches can design custom fitness regimens to ensure athletes perform at their peak, as well as prevent injuries by gauging fatigue levels and identifying when athletes are at increased risk.

Example: Booz Allen developed an application for the Microsoft Surface Pro 3 that predicts the plays that NFL offenses are most likely to run, in real time. Leveraging an advanced machine-learning algorithm, this application augments defensive coordinators' insights with visualizations of where and how opponents are most likely to strike.

Off the field: As teams face salary cap restrictions in a budget constrained environment, data science techniques can inform player personnel decisions and maximize outlay of limited monetary resources. With data from draft combines, on-field performance, and social media, coaches and scouts can identify what players are most likely to be a steal or a bust in the draft, as well as supercharge their rosters by identifying who the optimal players are for individual positions. Organizations and players can also manage their brand and reputation by examining data around social media, awareness, ad spending, perception, and other variables. With these data sets, they can develop models of reputational and business impacts to best allocate marketing resources.

Example: Booz Allen works with organizations in the sports industry to manage public perception and proactively anticipate constituent concerns. Using social listening and sentiment analysis across channels such as Twitter, Facebook, and news sources, Booz Allen provides multidimensional perception tracking on hot-button issues in real time.

In the stands: Data science offers the opportunity to improve Customer Relationship Management (CRM) to create a better fan experience and a new class of fully engaged and connected stadium goers. With the power of data science, organizations can create informed ticket pricing strategies to ensure seats stay full throughout the season. They can design

"It's become mainstream because it works."

—DARYL MOREY
General Manager, Houston Rockets

"The Mavs have been using analytics since the day I bought the team."

—MARK CUBAN
Owner, Dallas Mavericks

more robust loyalty programs by identifying campaign targets, engagement opportunities, power users, and characteristics of popular promotions. In addition, sponsorship analytics—examining data sets around past contract performance, Q-scores, activation costs, and competitive intelligence from other sports markets—can help organizations determine the true value of potential commercial partnerships.

And stadium managers can even use data science to optimize merchandise and concession operations to maximize on-site sales.

Example: Booz Allen recently worked with a Major League Baseball team to predict the secondary-market price and expected performance of its tickets—down to the individual game, section, and row—for an entire season. Using data science, the team answered questions about its customers that were previously unanswered, helping inform the organization's underlying pricing strategy. With these insights, the team determined the true value of its tickets to maximize direct sales and better connect with its fan base.

DATA SCIENCE EMPOWERS DECISION-MAKING

Although the landscape of potential applications of data science to sports industry operations can feel overwhelming, it's important to remember that using statistical analysis and past performance data to make on- and off-field decisions is not new to the sports industry, or any industry. From an on-field perspective, with the rigor of a team schedule, teams don't have the time and resources between each game to manually scout and break down their opponents from every necessary angle. Even using the current data at their disposal, traditional data analysis techniques simply won't scale. Introducing new and often more complex data from emerging technology in sports only compounds the problem. Leveraging scalable data science techniques, sports organizations can use machines to look across ALL of their data, bringing to the forefront the most pertinent insights to which analysts and key decision makers can devote their valuable time.

Exhibit 1: Common Approach vs. Data Science Advantage

	COMMON APPROACH	DATA SCIENCE ADVANTAGE
In-Game Strategy **Exploit Advantages, Opponent Weaknesses**	*Reactive post-game analysis of similar match-ups*	REAL-TIME ADJUSTMENTS: Analyze your competitor's in-game decisions to proactively determine probabilities of their next move, equipping your coaches with new insights to adjust the game plan in real time.
Team Construction **Scout Players Effectively**	*Pen and paper statistics, eyes on the player, traditional evaluation criteria*	DYNAMIC, MULTIFACETED EVALUATION: Capture data from game performances, draft combines, digital media, and other disparate data sets to create never-before-possible measures of a player's likely level of performance on the field.
Fan Loyalty **Increase Fan Lifetime Value**	*Ticket sales data and self-reported questionnaires*	FAN LIFETIME VALUE ANALYTICS: Use past fan behavior and "earn and burn" cycle rewards-program data to pinpoint what truly motivates fans, then design targeted loyalty programs that maximize future cash flows.

Data science, in and of itself, cannot replace informed decision-making based on industry—and sport-specific insight and experience. Nor can any computer program or line of code incorporate all of an organization's singular circumstances and produce fail-safe instructions that guarantee a specific optimal outcome.

But organizations *can* significantly enhance their decision-making processes with the additional insights that data science and analytics can provide. Thanks to emerging technologies, organizations now have access to more and new types of data than ever before, along with the ability to process and synthesize it in real time. Coupling domain expertise with access to an unprecedented volume of data means your organization has the opportunity to power on-field performance and revenue generation in never-before-possible ways.

THE TIME TO MOVE OFF THE SIDELINES AND GET INTO THE GAME IS NOW

Still, given the many potential applications of data science to business and on-field performance challenges, the analytics landscape can be difficult to navigate. The following key considerations will be critical to helping you stand up a data science operation that keeps you competitive across all aspects of your organization.

1. **Give data science a seat at the table.** You can't afford to treat data science as a peripheral, experimental enterprise with an undetermined value proposition and uncertain future. Data science in sports isn't going anywhere—look no further than the annual MIT Sloan Sports Analytics Conference, which consistently draws thousands of attendees and stands among the world's most prominent data science gatherings. Accordingly, you need to treat data science as a core operational business unit, held to the same standards and evaluated against the same ROI metrics as other units within your organization. Allowing data scientists access to central conversations around your business challenges is critical to their ability to use analytics to augment and improve—not replace—your decision-making.
2. **Be a data evangelist.** Changing the culture around data in your sports organization starts with making a commitment to helping others understand its potential and use it to drive decision-making. A fundamental willingness to explore what the data can provide will allow you to ask deeper questions that, before the age of analytics, may never have occurred to your organization. Letting your data speak to you, and encouraging your internal and external communities to be continually attune to the insights it can provide, can help you unlock previously unachievable levels of innovation and insights.
3. **Don't tackle your business intelligence on your own.** Too often, sports organizations hire one individual to perform their analytics, or buy full-scale into a single, narrow solution that fails to live up to expectations. In order to take full advantage of analytics' ability to enhance your decision-making, you need a holistic strategy that incorporates analytics throughout your organization, aligned with your workforce, culture, and enterprise strategy and goals. This allows your management and operational teams to find new applications for using data science to solve challenges across the enterprise, as well as anticipate and

head off difficulties before they manifest as full-scale problems. However, with the deluge of data currently entering the sports world on a daily basis, appropriately scaling your data science operations and seeking outside support and guidance in this emerging field will be important for seeing the maximum return on your investment.

4. **Use analytics on the field, off the field, and in the stands.** Even across units separately focused on in-game and on-paper financial performance, the same data science techniques are used to inform decision-making across all aspects of the business, from determining which players to draft to setting prices for concessions. Accordingly, openly sharing data across units is critical to enabling such cross-functionality. If analytics are conducted in a "black box," without organizational transparency on techniques and types of data employed, their ability to enhance your holistic competitive advantage is reduced significantly.

5. **Treat analytics as a team sport.** Contrary to the "secret sauce" depiction of data science as portrayed in popular media, conducting analytic activities in an open, public environment can have significant benefits for sports organizations. For example, Muthu Alagappan's "From 5 to 13" theory presented at the 2012 MIT Sloan Sports Analytics Conference—in which he used publicly available statistics and advanced analytics to redefine basketball positions—revolutionized how the sport evaluates players. No single person or small group of people maintains both the domain and the technical expertise to "best" apply data science for any organization. Encouraging an external community of enthusiasts to explore public, non-proprietary data sets allows for active fan engagement, crowd sourcing of challenges, and finding opportunities to apply analytics in creative ways. It's also a chance to listen to and be honest with your fan base about your performance as you employ analytic techniques around listening and data sharing. Open source technologies and platforms are useful in enabling community access to public data and the subsequent development of novel applications.

DON'T WAIT ON DATA—YOUR COMPETITION MAY ALREADY BE AHEAD.

Interested in learning how to start using data science to empower decision-making at your sports organization? With industry-leading expertise in helping sports organizations make use of their data as a resource, Booz Allen is here to help.

For More Information

PETER GUERRA
Vice President
Guerra_Peter@bah.com
301-497-6754

RAY HENSBERGER
Principal
Hensberger_Raymond@bah.com
301-497-7263

JOHN D. HANNICK
Lead Associate
Hannick_John@bah.com
617-428-4427

BEN JARVIS
Lead Associate
Jarvis_Benjamin@bah.com
757-846-7811

CUTTER BRENTON
Associate
Brenton_Cutter@bah.com
703-412-7764

www.boozallen.com/data-science

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Booz Allen Hamilton has been at the forefront of strategy, technology, and engineering for more than 100 years. Booz Allen partners with private and public sector clients to solve their most difficult challenges. To learn more, visit www.boozallen.com. (NYSE: BAH)

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