The Secret to Winning with Data Science: Use the Right Playbook
Executive Summary

The world of sport has always been a numbers game. But it has never been like this. Thanks to recent advances in technology, managers, coaches and trainers have access to more data than ever before. Information on everything from how quickly players move around the field to how well they sleep at night can now be tracked, measured and quantified.

Many sports organizations are left with one burning question: How can we unlock the potential of this vast treasure trove of data and transform it into a real competitive advantage?

There have been many stories about teams that used data to improve performance. But is it really that easy to turn data into a winning formula? The short answer is no. Data science is complex and requires some expertise, but organizations that follow a few important guidelines can be successful.

In this white paper, we will talk about the importance of knowing what you want data science to do for your organization and what challenges it needs to overcome. We will also show you how getting the right data into the right hands of the right people at the right time is the key to success.

You will learn what a highly effective, data-driven sports organization looks like and how yours can become one.

Competition fuelling interest in data science

Virtually every major sports organization, league or team is either doing data science, thinking about doing it or worried that they should be doing it. “It’s the competitive nature of sports,” says Ted Lambrinides, a sports science consultant who works with NFL and collegiate football teams. “You don’t want to be left behind and miss something that could improve the performance of your organization.”

But when we talk about data science, what do we really mean? The key to understanding the potential of data science is to recognize that it is more than recording statistics and looking for patterns. It is about running simulations, making predictions and using that insight to make decisions.

“It’s the investment in appropriate and advanced uses of data to inform and influence better decisions that can improve an organization,” explains Tim Trussell, Director of Data Science at Kinduct Technologies, a data and analytics software provider whose clients include more than 100 professional sports organizations.

Most teams are drawn to data analytics by the prospect of enhancing performance, keeping athletes healthy and finding the right balance between having the best players and optimizing salary costs. Two significant developments are making now the perfect time to add data science to your roster.
Firstly, data is everywhere. That is especially true in sports. In the past, coaches and trainers tracked everything manually, filling journals with the number of sit-ups a player did in a workout and how many touches he had on the ball during a game. Technology has automated much of that and is also providing access to a new wave of performance and movement tracking data that could never be generated or captured before.

The sheer volume and variety of information available today makes it easier for data science to extract more insight to help athletes and teams perform better. But, as we will discuss later, sometimes this tsunami of data can be overwhelming.

Secondly, there is real proof that data science works. The Oakland Athletics’ data science glory story is legendary – made famous in Michael Lewis’ bestseller *Moneyball* and later in a movie. The small-market team used analytics to propel itself into the competitive realm of league giants by harnessing the power of data and changing the way it measured player performance.

It was proof that evidence and statistics can be more effective than instinct and anecdotes. But the competitive advantage the A’s got from using data did not come from putting a revolutionary new twist on the game. Instead, it was the ability of general manager Billy Beane to "move his franchise along an analytically driven path more quickly than his competition," writes Mark McClusky in his book *Faster, Higher, Stronger*.

The A’s success using data science was tied to leadership and support for the follow-through. In recent years, a few other teams and other sports have followed suit, putting analytics advocates into their front offices. But it is still rare.

“Everybody understands it and are trying to compete on having the right data science but not everybody is investing in it strategically,” says Trussell.

Organizations that take data seriously are seeing results. The National Football League, for example, is using data to enhance safety. Amid growing public concern over player safety, the NFL has made improvements on a variety of fronts by "changing rules, expanding care, analyzing data and making connections." The main focus is on preventing head and neck injuries, as the number of concussions continues to increase. Data released in January 2016 showed that 182 concussions occurred during the NFL’s 2015 regular season – a 58 percent increase over 2014.

Dr. Matthew J. Matava and Dr. Simon Görtz looked at the NFL’s attempts to improve player safety in their article, *The University of the National Football League: How Technology, Injury Surveillance and Health Care Have Improved the Safety of America’s Game*.

The authors describe how data science is helping the league improve injury surveillance, treatment and prevention. Data from all pre-season to post-season practices and games is collected and analyzed to "assess injury trends" based on metrics like player position, mechanism and type of play. "As a result of the detail and accuracy afforded by such a comprehensive injury surveillance system, 39 rule changes have been instituted in the NFL since 2005."
Beyond the hype, there is real benefit in doing data right

There is a huge upside to taking the time to plan your data science strategy. But what does that look like? Your planning should focus on three key areas: data collection, data analysis and data activation.

Data Science Essentials

1. **Data collection** – The sheer volume of data can be overwhelming enough. What complicates the situation even more is the diversity. Most organizations have data that comes from multiple sources – GPS tracking systems, radio-frequency identification (RFID) chips, heart-rate monitors and fitness-testing devices. All of that information arrives in different formats and ends up in segregated environments, making it difficult, if not impossible, to evaluate and analyze it. Obtaining valuable insight from massive amounts of disparate data requires a way to consolidate everything into a common platform. That way, it is easier to compare one metric against another and make sense out of what you are seeing.

2. **Data analysis** – Numbers alone do not tell the full story. Technology and people have to work together in order to get the most benefit from your data. On the technology side, you need a way to quickly sift through the data, make connections and display results in an easy-to-understand graphical format. Good communication will keep everyone on the same page. Data scientists, coaches and trainers should all know exactly what your organization is trying to accomplish, so they can ask the right questions and find the right answers.

3. **Data activation** – Behind the data, there is a call to action. If a data science program only produces a weekly report containing a few interesting but non-actionable statistics, it is really not delivering much value. To guide decision-making, data must answer the right questions, make the right connections and lead coaches and trainers to the right conclusions. The data science team needs to understand exactly what information you want and have the technology to automatically deliver that data when and where it is needed.

Supporting all of these critical capabilities requires an investment in people, technology and processes. When data science initiatives falter, it is often because an organization did not invest enough in one or more of these key areas.
With data science experts, performance staff, technology and processes all focused on solving the same challenges, organizations are more likely to achieve better results:

- **Healthier athletes** – Data provides great insight into a player’s workload and can help trainers fine-tune practices and workout sessions to prevent injuries and design more effective treatment plans if players do get hurt.

- **Enhanced team performance** – Healthy players win more games, says Ted Lambrinides. “Having a greater percentage of your best players on the field or on the court for a greater number of minutes in games, the research shows that you’ll have a better record.”

- **Informed decision-making** – Data takes some of the guesswork out of the game. Armed with insight and a clear understanding of the story data is communicating, coaches and trainers will have more confidence that their decisions are the right ones to get your organization where it wants to go.

**Common pitfalls and how to avoid them**

1. **Thinking data science can solve all your problems.** It is a powerful tool, but only one part of a winning strategy. Data science will not replace your game and player performance experts, who will always have inherent insights that data alone cannot account for. That is why organizations with winning strategies incorporate both and cross-reference what their experts say with what the data is telling them.

2. **Failing to get buy in from the top.** Organizations that are most successful are the ones that see their data as “a strategic asset” worth investing in, says Tim Trussell. And getting buy-in should be ongoing. You need a way to clearly tell the data story to your leadership team and keep justifying why your organization needs to invest in data science.

3. **Starting without a clear strategy.** The best data science game plan is one that considers all the issues – data collection, ownership and integration. How will data be collected? How will you integrate different data sources? Who is going to own it? How are you going to use it? These are all key questions that should be considered and agreed to by everyone involved.

4. **Trying to do too much.** While it is tempting to start analyzing everything, that is not the best approach. It is best to tackle one challenge at a time, using a data analysis plan that builds on each new insight. Know what you want to accomplish, go after that first and proceed from there. An iterative approach that sets realistic expectations and generates insight over time is the key to a successful data science strategy.
New capabilities are changing the game

Advances in data science technology and capabilities are expanding the opportunities to improve team and athlete performance, reduce injuries and cut costs.

Here are three key developments that are opening promising new doors for data science:

1. **Machine learning** – This is one of the biggest game changers in data analysis. Advances in computer science are enabling computers to learn from data. They can take data from the past and present and use it to predict the probability of something happening in the future. That can have a profound effect on efforts such as preventing player injuries by determining the likelihood of them getting hurt before it happens.

2. **Data visualization** – Seeing results in a clear, graphical format makes it easier to figure out what data really matters and what story the data is telling. An effective data visualization tool can help you ask the right questions, explore meaningful relationships and make useful connections.

3. **Optimization and recommendations** – Using data to see connections and applying predictions within the real-world scenarios of a game can help you keep players healthy by enabling you to make better decisions about who to play and for how long. Here is an example of how it can work: The graph below shows that a player’s physiological load is trending near the injury danger zone. Using this data, a trainer could start tweaking the intensity and duration of the player’s practice sessions or hypothetical game minutes to see how much that reduces the probability of injury.

**Player Physiological Load Analysis**

The image above is a screen capture from a scenario-planning tool. In the application, a user can adjust the intended Game Minutes or Practice Intensity (boxes on the bottom) and see the forecasted impact on physiological load seven days in the future (blue line).

The ideal data science technology platform should support each of these capabilities and also integrate with all the other data sources you are using to assess player performance.
Are you in it to win or just in it?

While data analytics in sports is still maturing, the practice is gaining momentum and making converts. But even those who have bought into the benefits of data science have varying attitudes about the role it should play in their organizations.

Some sports organizations see analytics as an interesting side project that runs tests, and some of the data it pulls occasionally produces a few useful recommendations. Often, it is a long shot. Others are making a strategic investment and organizational commitment to using data to become more competitive. They are taking a long-term view and are in it to win.

“The ones that are continually successful by investing in data science will do so by doubling down to push analytics through the initial hype cycle and continue to fund it and continue to make it a priority,” says Trussell.

About Kinduct Technologies

Kinduct is a leading software provider, using intelligence to shape human performance. Our secure, cloud-based Athlete Management System turns rich data into powerful insights that deliver tangible results to help coaches, trainers, teams and athletes perform better. Find out how to use your data to gain a competitive advantage at www.kinduct.com.

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