The target audience for this presentation is people with an interest in data analytics and possibly an interest in basketball/NBA. That is not to say that an individual interested in basketball with no initial interest in data analysis couldn’t enjoy the presentation. The themes and content will be within their knowledge base. They will leave the presentation knowing more about data analysis and how it is applied.

The overarching purpose of the presentation is to discuss the practical application of data analysis. The NBA and 3-point shooting are the vehicles for that discussion. My goal is to demonstrate how a group of people used a data set to move the direction of a company and a sport.

Key takeaways for the audience:

1. Data analytics can be used to make improvements with data-driven decision making
2. The NBA is a dynamic league
3. The rise of the 3-point shot changed the makeup of the NBA

SCRIPT

[Slide 1] My name is Jeff Watson and I’d like to talk to you about how data analytics and the 3-point shot changed the NBA.

[Slide 2] Some high-level things I’d like you to keep in mind during this discussion are, number 1, the NBA is a dynamic league. Second, recent innovators shaped and evolved the game. And third, a great deal of this change came directly from using data analytics.

[Slide 3] On February 5, 2016, the Miami Heat beat the Charlotte Hornets by three points. Miami shot 8 (3-pointers), circled in red. And one of those 3’s, the deepest one from almost the middle of the court, was a buzzer-beater at the end of the 1st quarter. It was a prayer shot. Effectively, the Heat shot 7 (3-pointers) during that game, far less than the league average of 24. This was the last time a team won an NBA basketball game without scoring a single 3-point field goal. As we speak, that is almost 7 years, or 8500 games, ago.

[Slide 4] When was the “time before?” Officially, that time ended in the summer of 1979. NBA team owners met to discuss making changes to the rules for the upcoming season. They decided to introduce a mark on the floor that indicated any shot taken further away than the line would count for three points instead of two. Their goal was to increase fan excitement by increasing points scored. Prior to the 3-pointer, basketball generally consisted of passing the ball to the tallest man on the court who was as close to the basket as possible. While efficient, this wasn’t as dynamic a game as possible. There were still shooters in the league, but a cursory glance at the all-time scorers prior to 1990 will show almost exclusively centers i.e., the biggest men in the league from the 1950s, 1960s, and 1970s.

The popularity of the 3-point shot increased in a slow, linear fashion increasing by just less than 1 attempt per game each year, on average. Then, in 2011, something changed.

[Slide 5] Before I discuss that, let me step back and discuss a few important characters in this story. The first is Daryl Morey. He was the general manager for the Houston Rockets in 2006. His background was not in basketball. He came to the NBA via an analytics consulting firm. He did work with the Boston Celtics who brought him on as a full-time employee. From there he went to Houston. Mr. Morey deeply believed in the power of statistics. He believed that there was real value in the numbers. All you had to do was poke and prod. By digging through the analytics, Mr. Morey found gems. From a team that consistently finished in the bottom half of the division, Daryl Morey built a team that won the division four times in six years, produced an MVP in James Harden, and just missed the NBA finals.

[Slide 6] Bill James is a baseball writer, baseball statistician, and one of the foremost proponents of an advanced statistical analysis of baseball called Sabermetrics. Bill James and his book, *Bill James Baseball Abstract*, are the person and ideas that inspired Daryl Morey to look at basketball statistics in a new way.

[Slide 7] Billy Beane was the general manager of the Oakland Athletics that decided to acutely focus on Sabermetrics to build a baseball team. Some of you may have read the book or seen the movie Moneyball starring Brad Pitt. That was about Billy Beane. He was forced to do more with less because the A’s weren’t willing to spend a lot money on star athletes. Oakland’s payroll ranked 27th in the league. For reference, their payroll was a third the size of the New York Yankees from the same year. Yet, at a much lower cost, the A’s made the playoffs. This trend of High Return On Investment baseball continued for a decade and made the Oakland A’s the best team in baseball since 2000.

[Slide 8] We’ve talked a bit about general managers, baseball writers, and the plot of a great Brad Pitt movie. Now let’s circle back to the 3-pointer. Basic math tells us that a 3-pointer is 50% more than a 2-pointer. If you can make 3-point shots at a similar pace to 2-point shots, your scoring will be more efficient. By more efficient I mean you score the same number of points using fewer attempts. That seems simple enough. Just get more players that can consistently shoot 3-pointers and you stand a better chance of winning games. But NBA teams were hesitant to commit.

[Slide 9] We’ll look at four examples of generational shooters to compare the impact of the 3-pointer across eras of the NBA. This chart shows adjusted 3-point shooting totals for each of the respective player’s seasons. #1 is that player’s first season, and so on. Larry Bird, the green line, was considered a tremendous threat from long-range during his time in the NBA. Reggie Miller, here in blue, stepped this up a notch during his time in the 1990s. Ray Allen, the red line, held the record for most 3-pointers made up until recently. Stephen Curry, the yellow line at the top, is the most prolific 3-point shooter in the history of the NBA. I want to point out that both Larry Bird and Steph Curry had season-ending injuries early in one season, and this chart was adjusted for readability. Neither Ray Allen nor Reggie Miller had drastic, single-season drop-offs, so no adjustments were made for either of those players.

[Slide 10] What changed? Are shooters simply better now than they used to be? While it’s true that the percentage of 3-point shots made has increased, that increase plateaued about twenty years ago. This chart shows 3-pointers made per game, in yellow, compared to 3-point shooting percentage, in blue. Note that the bump from 1994-1997 occurred because the 3-point was moved closer during those years. The trajectory of the 3-pointer changed in 2011. This was due to data analytics. A few things were happening. Data was used to help direct coaches and players to high-value shot locations. This started to change the paradigm. Smaller, accurate shooters were gaining value at a higher-than-expected rate based on historical patterns. Where the league previously preferred height, it now preferred efficiency.

[Slide 11] In 2013 the NBA installed cameras in every stadium to track players and the ball on the court. The 14-camera array is set up around an area to give very precise measurements of the speed and position of players, the ball, and referees during a game. The data gathered is used to calculate the distance between players and various passes from player to player and other pieces of information that can’t be parsed from a stat line or box score.

[Slide 12] The data collected by these cameras is compiled for teams to analyze and act upon. Take these heat maps as an example. Since that time, the number of 3-point attempts has increased almost every year. 3-pointers peaked in 2019 with James Harden, from Daryl Morey’s Houston Rockets, taking 1028 (3-point) shots.

[Slide 13] I would like each of you to walk away from this remembering to be dynamic. Take chances and make changes accordingly. When you make changes, collect data so you know if you’ve improved. Once you have that data, act upon it. Wash, rinse, repeat. Never stop growing and changing.