How Data Analytics Transformed Major League Baseball Franchise Operations

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Ahmed Y. Mahfouz
Kishwar Joonas
Dominic Cox
Josh Larzabal
Dewaylon Wilson
Prairie View A&M University
(aymahfouz@pvamu.edu)
(kajoonas@pvamu.edu)
(dcox27@pvamu.edu)
(jlarzabal@pvamu.edu)
(dwilson23@pvamu.edu)

The purpose of this study is to highlight how technology has impacted baseball franchise through applying statistical and analytical concepts, and affecting culture. Major League Baseball (MLB) became a franchise in 1876, recording their first game on September 23. The Baseball Industry showed dramatic transformation, in terms scouting players, building a team, and managing organizational resources. Data Analytics help team managers and owners to cost-effectively recruit and construct a championship team, reveal and improve players' hidden talent. The resultant competitive advantage promotes optimal resource allocation and profitability.

Keywords: Data Analytics, Franchise, Competitive Advantage, Major League Baseball, Management Information Systems, Sports Marketing and Management

1. Introduction

1.1 Background

"The MLB (Major League Baseball) Association is one of the oldest professional sports leagues in the United States, one of the chief pillars of American sports"

- Mission statement, Major League Baseball Players Alumni Association, n.d., a.

The MLB consists of two leagues, American and National, which have been around since 1876. Combined there are a total of 30 teams that are spread out throughout the United States, including a team in Canada. Teams play 52 Division games (13 games, four opponents), as well as 64 games within their League (six games against six opponents, plus seven games against the remaining four opponents). These are private club teams in a privately owned league where games are publicly watched or "consumed" for profit. Since the beginning of baseball, there have been many breakthroughs and changes that have come along with the evolution of the sport. The breaking of the color barrier back in 1946 with the well-known player Jackie Robinson, the idea of women in baseball in 1992, and the relocation and expansion of teams started in 2003 (e.g., Chen et al, 2022, History.com). Some of the most recent topics in baseball include scandals and the changing of the game, the "steroid" era with further expansion, and new contracts. Next, we will discuss the game in the modern age, and efforts the MLB has made to create more buzz around the sport.

1.2 Description of MLB as a Business

As a business, the MLB is just more than a company trying to make money.

"We achieve our beliefs by demonstrating through our leadership our commitment to preserving core human values, promoting a passion for the game of baseball, globally showcasing its values, heritage, and heroes, and by serving the unique needs of players."
- Mission statement, Major League Baseball Players Alumni Association, n.d., a

With core values like this, it ensures the players that it is bigger than a money-gathering industry. As the MLB is looked at as a slow-paced and boring sport it is not at the top of the list compared to other sports. In the US the NFL and NBA are viewed more than the MLB and tend to bring in more money. As a business the MLB initiated a new Data Analytics system with an outlay of tens of millions of dollars, expected to pay for itself in a short time span. The size and scale of the MLB business can be gauged from the fact that in itself, it has sufficient resources to seal broadcast deals $12.4 billion with the likes of ESPN, Fox, and TBS, as well as service its own web site and TV network. Billions of dollars' worth generated by its 30 unique teams in North America are not accounted in this amount (Mochari, n.d.). MLB data is a significant driver of the above. Over 30 million people worldwide participate in the $4 billion fantasy sports market. All of those fantasy baseball players are attempting to predict players' statistics in some way. The data from Statcast may be quite profitable in this situation. Data Analytics tools used by real-word clubs and their team members will be available to spectators as well as fantasy baseball players. Some assessments show MLB makes an increasing amount of Statcast data available to fans, via TV broadcasts, as well as through

sortable metrics on its website and elsewhere (Mochari, n.d.). Profits have increased because technology enables Data Analytics, and in future there will be new methods to scout players (Figure 1).

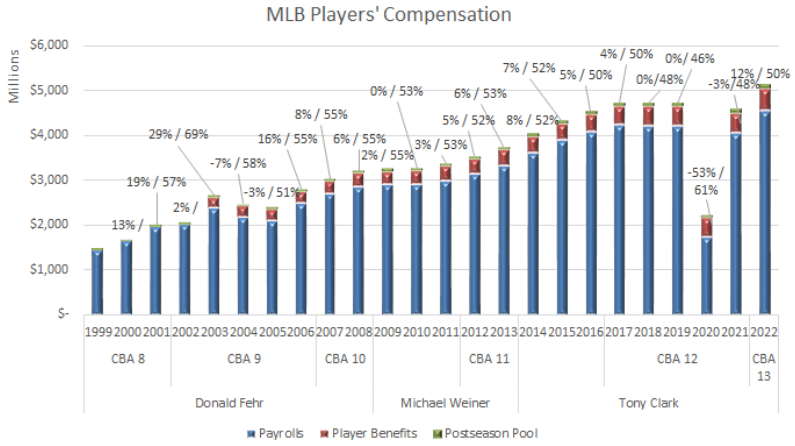

Figure 1 *MLB Player Compensation vs. League Revenue*

Notes: Data Labels represent "year over year comp growth / total comp as percentage of net revenue". Revenue is net of stadium debt service. Total compensation is actual payroll + player benefit costs + players' share of the postseason revenue pool. For pre-2015, benefit costs were determined by working backward from the known 2015 amount and assuming a 4% growth rate (CBA calls for increases up to 10%). For 2021, year over year revenue comparison is to 2019. Source: William Juliano, March 25, 2023. captainsblog.info, MLB releases published by AP (actual payroll, post season revenue), baseball-almanac (older postseason revenue) and Forbes (net revenue).

1.3 Motivating Factors

"Sabermetrics, which is the empirical study of baseball, particularly the statistics used to gauge activity during games. To provide particular answers, saber-metricians gather and compile the pertinent data from this in-game behavior".

- Neyer, R. Sabermetrics. Encyclopedia Britannica.

We explore how the idea of Data Analytics is utilized in baseball as a business. This is where teams can create competitive advantage in every way possible in sports. To unpack this, even more analytics in sports is data on performance of players, operations, as well as recruitment. The data has benefits for individuals as well as teams in a competition or sports organization. Before the use of Data Analytics in baseball, understanding how to utilize these components was very difficult in answering questions such as:

- How do you make sure you scout the right players?
- How do you manage player trades, including free agency?
- What is the best decision to make as a manager?
- How can you build a championship team while optimizing expenses?

Data Analytics has emerged because baseball owners want to run better and more profitable private baseball clubs.

2. Description of the Study

When operating a business/franchise it is important to optimize profit while keeping your lower head low. Before Data Analytics in baseball MLB owners of a team struggled to not overextend its resources on players. Keeping payroll down keeps profit margins high and ownership happy. The MLB has adapted Data Analytics as a solution to these problems and many more. Before the evolution of technology, Major League Baseball franchise success was majority based on who had the most expensive players and the most amount of money to disperse. Baseball as a business was becoming very repetitive early on as far as who would win championships. However, there is a remarkable difference in the number of championships that were won by a team in 2000 compared to 1970, as can be seen below.

1998-2000 Yankees
1998: Yankees defeat Padres, 4-0
1999: Yankees defeat Braves, 4-0
2000: Yankees defeat Mets, 4-1

1992-93 Blue Jays
1992: Blue Jays defeat Braves, 4-2
1993: Blue Jays defeat Phillies, 4-2

1977-78 Yankees
1977: Yankees defeat Dodgers, 4-2
1978: Yankees defeat Dodgers, 4-2 (Adler, 2022)

There has been no repeat champion since 2000. What is the reason for that? The teams with the most amount of money was no longer winning, the teams with the big names were no longer winning, how was baseball operating differently as a business, and what data were they implementing to have these teams that were considered underdogs for the next several years to win championships in the postseason (Adler, 2022).

3. Solution and Results

3.1 Strategy for Change

The business strategy for major league baseball to operate better as a business was the use of data analytics. As the evolution of data and technology evolved, general managers, coaches, and other staff members of a franchise began to utilize data differently, compared to how it was used back then. Initially, the success and the future of the franchise were based on who was on the team and for how long. Nowadays, baseball as a business is beginning to look for smarter general managers, when it comes to the use of Data Analytics. A franchise can be considered safe if they have the correct general manager, who utilizes all the tools in data regardless of the amount of money they have.

3.2 Evolution of Data and Data Analytics in Major League Baseball

The use of statistics in baseball can be traced back to around 1950. That was the time when people began to notice that the conventional way of rating and scouting a player did not reflect the individual's potential. Scouts and coaches would just look at a player with a blind eye to their performance statistics. (Bechtold, 2021) In the 1980s, a baseball journalist and fan Bill James attempted to investigate the statistics that were on the back of baseball cards. He called it the "ever-expanding line of numerical analysis."

"Because of his work that introduced statistical innovations such as runs created, range factor, win shares, Pythagorean winning percentage, game score, similarity scores and secondary average, he would become known as the Godfather of Sabermetrics – the Society for American Baseball Research (SABR)."

-Bechtold, 2021

James also motivated others to showcase Data Analytics in baseball (e.g., Thorn et al), and his innovation would allow other individuals to generate statistics, formulas, and articles on their own. The new use of statistics would continue to develop in the 1990s and skyrocketed thereafter. During this time, it became clear that stats were no longer tracked just for fantasy leagues (Bechtold, 2021).

The collection of data in baseball today is changing the way major-league baseball operates as a business not only as a whole but within each franchise in the MLB. After the powerful introduction of the use of Data Analytics in 2002, that approach is now spreading out to every franchise in the business. Technology is evolving day by day, hence there are more statistics that can be used when making business decisions for the franchise. There are several ways in which data analytics has changed baseball and how it is evolving baseball from a business standpoint, including data collection and analysis. Data can be collected in approximately 20 different ways for just one single pitch every game. Data include "arm angle, release point of the baseball, and exit velocity off of the bat if the batter makes contact" (Woodhouse, 2018). This will be able to help maximize and find the team's success through evaluating strengths and weaknesses. This will help the business during the season, by changing the approach of the game, depending on their opponent, based on collected data. This is an in-season business decision. How successful a team is during the season dictates the future of the Data collected from the season prior will help assess a player's value in their current team, or this will determine whether that player is best suited for a role in another franchise (Woodhouse, 2018). This new approach in baseball is now becoming the standard way of scouting not only players but coaches/general managers as well. This approach with the help of data has completely turned the business around as it is becoming a race to who can get the player that is best suited for the franchise at the best price. For example, a franchise can sign a player and leave others questioning that decision. But then you break down the data collected on this player who will then become a key role for the team in the future, which is a business decision.

With the evolution of technology and statistics, it was a matter of time who would use the data given differently than other franchises in baseball to make the best business decisions for their franchise. In 2002, the Oakland Athletics management were asked by ownership to completely tear the team down and build from the ground up while slashing the team's payroll (Woodhouse, 2018). If this were done 20 years before that time, the team as a business would have had no success for many years to come. The general manager at the time decided to take a different approach by using data only to evaluate players. This was a disruption to the baseball game industry. The Oakland Athletics used performance measures to create a competing team during that season, in spite of having among the smallest player pay in the business. Of course, Oakland Athletics were not the first team to use Data Analytics during this era, however, they were the first team to introduce the power of Data Analytics and remain one of the most famous examples (Posner, 2020, Wodehouse, 2018). Unfortunately, they haven't been very successful since that season; this shows how powerful data analytics can be for baseball as a business if used strategically.

There are several other franchises that have been successful with the analytic approach. The Boston Red Sox have won four championships since hiring Tim Tippet, who was fully invested in developing a prototype for the team's analytic computer program. After winning the championship in 2007, the Boston Red Sox were finding themselves as a powerhouse team that was not producing many wins. In 2012, the Red Sox made a questionable trade at the time but ended up working out in their favor. Again, you'd initially think the team that would be the most successful was the team that had the most amount of money. However, the Red Sox unloaded a $258 million salary at the time. This allowed the franchise to have more flexibility to sign several players for lower pay, among those who were best suited for the franchise. This business decision resulted in their winning the World Series in 2013. This decision was based on the current statistics and data of the players they traded (Browne, 2021).

The Houston Astros and Chicago Cubs became highly successful franchises after hiring general managers that were data-driven. However, the Astros and the Cubs endured losing seasons, which eventually allowed them to draft high-value players. (Wodehouse, 2018). The 2020 Tampa Bay Rays are a perfect example of a franchise maximizing their team given their current payroll. This year, they were ranked 27 out of 30 in payroll. Their most expensive player that year was a pitcher who would see the field every five days. So how exactly did one of the cheapest teams in baseball beat the number one team in payroll that year? The answer is Data Analytics. They were the most innovative team that year in baseball. This was done by the unconventional approach to franchise building, and the desire to maximize the effect of Data Analytics. They were known to put players in certain roles of the game that they normally aren't in. Again, these decisions were based on data collected during the year. These business decisions led the Rays to a historic playoff run while being the third most economical team (Lee & Schoenfield, 2020, Posner 2020).

Ranging from the players' potential to develop over time which means if you see potential that others might not see you may get someone with talent that just needed to be brought out. With that being the case, you are optimizing resource allocation, because getting that player would not cost as much but once you have them, they generate income for the franchise. For example, Jimmy Butler was drafted at the end of the first round with a basic 4-year contract (Raje, 2023), and now, through hard work dedication and signs contracts that bring in over $150 million not to mention the talent and leadership that he brings to the Miami Heat. This shows that when a team is scouting an athlete there are many factors that they need to consider making the most appropriate use of their funds. They should check for future potential on the field, and injury reports to see the likelihood of recovery (e.g., MLB, n.d., b), how they act in their social life, meaning whether are they troublemakers, and their potential to earn (which comes from how they perform). Granted that contracts go up over time when the player has earned the money, if you get a player for a lower price when they are considered an underdog and watch them grow then the purchase will then be worth it. It is not about the money you spend on an individual, it is simply about the individual. If you have the right individuals on a team, then some players might take less money to play on a team with them. This all goes back to statistics on the compatibility of players and how they will produce with each other. It is true that players want more money but at the end of the day it is about competition - everyone wants to win which will, in turn, bring in more revenue.

Another example would be of the Pittsburgh Steelers. When the team lost the AFC championship game in 2004, running back Jerome Bettis, a potential retiree, took a pay of 1.5 million instead of $4,484,000 - a cut of $3 million - for an extra season, enabling managers to work within the salary cap. To stay on in the same team a year earlier, when team management took on Duce Staley as running back, Bettis took a salary cut of $2.7 million (Cote, 2013).

Ever since the powerful introduction of Data Analytics in 2002, there has been a huge upside for major league baseball as a business. This new era of baseball and technology is resulting in a new contender every year. Despite your payroll, the correct use of data will be a huge factor in the success of a franchise as a business. Since 2002, there have been no repeat champions. From that year, there seems to be a surprise for a franchise to be in the playoff hunt given their current success as a franchise and payroll.

The use of Data Analytics is not without its limitations. There is some trial and error when it comes to this new data. There have been several times when a team makes in-the-game business decisions based solely on the data and completely goes wrong. The 2020 Tampa Bay Rays again are a perfect example. During a crucial game, the manager took out the player based on his numbers and relied solely on the statistics of the new players he was bringing in. Despite the player, he took out being unhittable this business decision ultimately resulted in them losing and had people questioning the decision. Managerial experience is crucial, and successful franchises in baseball have a fine balance between the use of data and traditional ways of winning.

4. Conclusion

The induction of Jackie Robinson into the sport of baseball, followed by other players of color, highlights the role of diversity in enhancing organizational effectiveness, as well as driving a cultural shift. Many more lessons can be learned from our study in the context of how information is processed and used in baseball. It indicates that you do not just have to have the most expensive powerhouses for success in the sport. The power of Data Analytics goes a long way and can be broken down into many categories. Data Analytics has been a game changer in not only the MLB, but all sports alike. This tool provides a fair playing field for all teams to recruit talent in the pool. Any team you can think of has some talented players because of this tool, they might not be a powerhouse, but they have talent, nonetheless. Innovation through Data Analytics resulted in competitive advantage, and set MLB on the path to rapid growth innovation of certain individuals, there is only progression in the future for the MLB. Our study has practical and managerial implications for students, sportspersons, sports franchises, Management Information Systems, as well as Sports Management and Marketing.

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