



DSC 680

# NBA ANALYSIS

Brett Sutow



## ***Introduction***

For many years in the world of professional sports we have seen a recent acceptance of data, analytics, and research for judging the abilities of players. This was something for a very long time that was not accepted, in fact many teams did not put much merit into analytics. Many times, they would cite the fact that a player could be judged based off the “eye test”. “Simply put, the eye test is a way to judge an athlete as they compete within their sport based upon your own observations. Not by statistics, but by the media or any other means other than your own two eyes” (Scarano,2009).

However, it was recently learned that the use of the “eye test” cannot be the only way to judge a player. In fact, there has been new statistics created in recent years to better judge athletes in their sports. These new statistics analyze everything from a player’s ability to win on a team to a stadium or arena they play in. “In the National Basketball Association (NBA) starting in the late 2000s, cameras were installed in all stadiums to better track player performance. The cameras tracked everything during the game. Each player's movements, shots, blocks, picks, and over 500 other moves are recognized and recorded by this software” (Cohen, 2020). The adjustments that have been made in the industry has completely changed every sport, and this is more apparent than ever.

In this paper and research analysis we will compare the modern-day NBA Legends. Modern basketball is considered to have started in the 1980s. This was due to all the rule changes that took place. Due to this we are only going to consider the six of the top ten modern players on the all-time scoring list. Excluding the four players from the list does not mean they are not statistically significant or are in fact better than some of the players we are

looking at, rather it shows that it is not analytically fair to compare the two eras of basketball.

As many of the statistics, rules, and player types have changed. Thus, this is the reason why we are looking at the following players: Dirk Nowitzki, Shaquille O'Neal, Kobe Bryant, Karl Malone, LeBron James, and Michael Jordan.

The question we are posing in this research paper is how to properly judge the six modern time NBA Legends. There has been an argument for many years of who the greatest NBA player of all-time. This especially very recently became a very heated topic with the death of Kobe Bryant. "It's the never-ending debate among today's NBA fans: Michael Jordan vs. LeBron James. Or should that be LeBron James vs. Michael Jordan? While arguments can be (and have been) made for Kareem Abdul-Jabbar, Kobe Bryant, Magic Johnson, Bill Russell and other NBA greats, the modern debate over who is the greatest since the NBA began has been boiled down to MJ vs. LeBron" (ESPN, 2020). Through data analysis, charting, and visualizations we are going to let the numbers decide. We are going to look at statistics like points per-game, offensive rebounds, steals, blocks, defensive rebounds, free-throw percentage, and field goals. Overall, the goal of this is to see where we can value these legends, where their careers peaked, and see if we can properly determine the greatest player of all-time.

### ***Player Comparison Analysis***

The first thing we need to establish with these players is the fact that they play different positions. This is a very important thing to note because it does separate the athletes by player type: Kobe Bryant(Shooting Guard, Small Forward), Dirk Nowitzki(Power Forward, Center), Shaquille O'Neal(Center), Karl Malone(Power Forward), LeBron James(Shooting Guard, Small Forward), Michael Jordan(Shooting Guard, Small Forward). These positions provide a better

idea of exactly what the players height, build, and abilities may be. Another important note to make is the fact that these are professional athletes which means they could have injuries or breaks in their careers. This means that all stats may not be accounted for in their fullest. The final aspect to consider prior to our deep dive is the fact that there will not be outliers that we will take out. This is because these are professional athletes so every season, they play matter. There were no seasons that were cut short due to things outside of the player's control. Overall, all the statistics produced by the athletes should be taken under consideration when determining the overall performance.

The first aspect we will look at is the offensive statistics of these six modern day legends. This will determine who in fact is the best overall offensive player. Which in basketball is valued as the most important overall. This will also help us to determine if any of these players have any seasons that would be considered a statistical anomaly. In this offensive statistical analysis, we will breakdown the stats of PPG, ORB, FT%, and FG. These are all a very good determiner for offensive performance.

The first stat we will look at is points per game. The PPG will be looked at over a player's career, looking at each individual season. We will then also make comparison between the players to see how they did overall PPG throughout their career. Through breaking down this comparison provides us with a good understanding of players overall scoring performance. The statistical PPG averages are as follows:

***Shaquille O'Neal Career Average Points: 25.13636363636363***

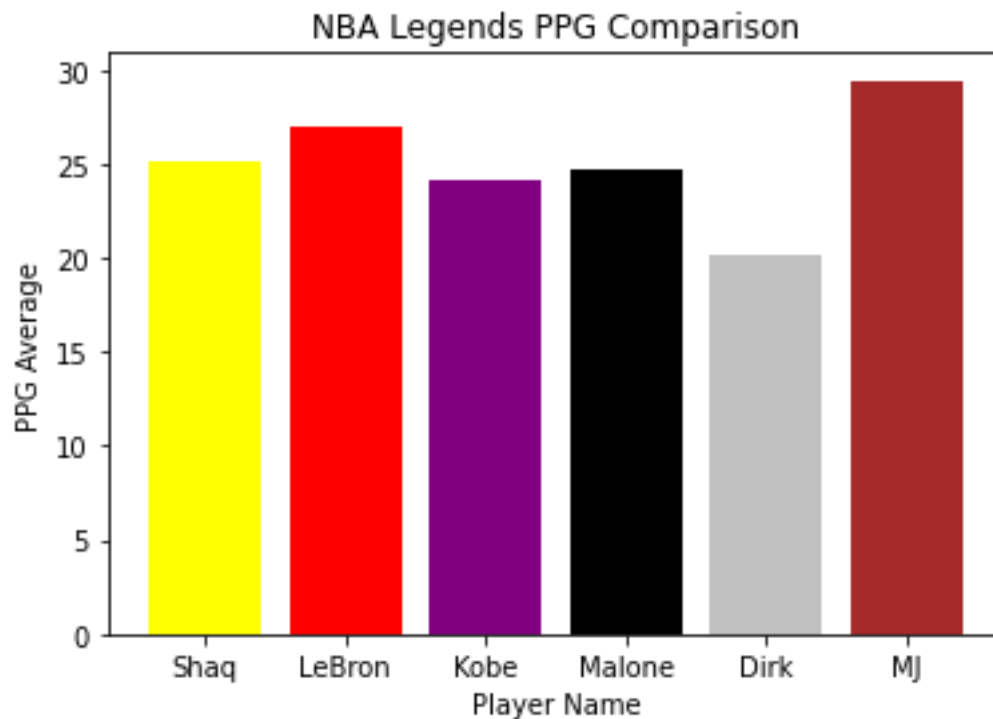
***LeBron James Career Average Points: 26.933333333333334***

***Kobe Bryant Career Average Points: 24.200000000000006***

***Dirk Nowitzki Career Average Points: 20.109523809523814***

**Michael Jordan Career Average Points: 29.45333333333333**

**Karl Malone Career Average Points: 24.689473684210526**



Looking at these numbers we can see that highest PPG average for a career comes from Michael Jordan, or averaged a little over 29 points per game, with the second closest average coming from LeBron James at ~27 PPG. Scoring wise the player who came out with the lowest points scored was Dirk Nowitzki with ~20 PPG. Through this we can clearly see that in the category of PPG Michael Jordan is clearly the superior scorer, with Karl Malone, Shaquille O'Neal, and Kobe Bryant all falling within 1pt of each other.

Taking this analysis to the next level, we will now look at the statistically significant season or seasons that stand out in this category. Looking at the statistics the best season that we saw from one of our players is Michael Jordan's 1986-1987 season with the Bulls where he averaged 37.1 PPG. The next closest season that we see is from Kobe Bryant in 2005-2006 with

the Lakers where he averaged 35.4 PPG. The best scoring season that comes in as the lowest statistic we see comes from Dirk Nowitzki in 2005-2006 where he averaged 26.6 PPG with the Mavericks. As we can see from this there is a large discrepancy between Nowitzki and the rest of the modern-day NBA Legends. This is something important to consider as we dive further into the statistics.

The next offensive statistic we will look at is offensive rebounds per game average. Offensive rebounds give us a good understanding of how player follows up on shots and where they are on the court. This is a statistic that bigger athletes tend to perform better in. In breaking down the comparison we can see where each of these NBA Modern Legends fall. This gives us a better understanding of an all-around offensive performance, and how a player adjusts on the court.

***Shaquille O'Neal Career Average Offensive Rebounds: 3.64545454545455***

***LeBron James Career Average Offensive Rebounds: 1.16111111111111***

***Kobe Bryant Career Average Offensive Rebounds: 1.065000000000002***

***Dirk Nowitzki Career Average Offensive Rebounds: 0.933333333333332***

***Michael Jordan Career Average Offensive Rebounds: 1.513333333333332***

***Karl Malone Career Average Offensive Rebounds: 2.389473684210526***

Looking at these statistics we can see in the offensive rebound category Shaquille O'Neal leads the players with ~3.65 offensive rebounds per game, the second leader in the category is Karl Malone with ~2.4 offensive rebounds. Kobe Bryant, LeBron James, and Michael Jordan all averaged over 1 offensive rebound per game, with Dirk Nowitzki falling below 1. Again, this shows us that Dirk Nowitzki is not on the same level offensively as these other players listed.

Looking at the individual seasons the best performing season as no surprise came from Shaquille O'Neal, who in 1993-1994 averaged 4.7 offensive rebounds per game. O'Neal in his first three seasons in the NBA averaged above 4 offensive rebounds per game, he would go on to average above 3 every season until his 2005-2006 season with the Miami Heat where he finally fell under the threshold. No other player on our list falls in this category, thus showing that Shaquille O'Neal is the superior offensive rebounding player in comparison to the rest.

The next offensive statistic we will break down is free throw percentage. Which is the ability to shoot and score when a player is placed on the foul line. This provides us with a good understanding of a player's ability to shoot a ball and score when under little to no pressure. Foul shooting is an important and very overlooked statistic in the field of basketball. In basketball teams consistently foul which means opportunities to go to the line to shoot free throws. In turn because each of these players were the best on their respective teams, they would have had more opportunity to have the ball in their hands. Which would mean they would have most likely had the most chances or a leader on the team for foul shots. Off this information we can theorize that the best players shooting the foul shots could directly impact a team's overall performance. "So, while free throws may not directly tie to a team's success, they definitely can play an important role" (Graham, 2020).

***Shaquille O'Neal Career Average Free Throw Percentage Made: 0.5339090909090909***

***LeBron James Career Average Free Throw Percentage Made: 0.7296666666666666***

***Kobe Bryant Career Average Free Throw Percentage Made: 0.8349499999999999***

***Dirk Nowitzki Career Average Free Throw Percentage Made: 0.8707142857142858***

***Michael Jordan Career Average Free Throw Percentage Made: 0.8309333333333334***

***Karl Malone Career Average Free Throw Percentage Made: 0.7344736842105263***

When we observe the various statistics regarding free throw percentage, we can see the clear loser here would be Shaquille O'Neal, and if you knew basketball you would understand that. O'Neal was a horrendous free throw shooter from his early college basketball days until his final days in the NBA. The best free throw shooter that we see is Dirk Nowitzki was a ~87% shooter from the line, with Kobe Bryant and Michael Jordan both behind him around ~83%. These are important to note because it is the first category that Nowitzki led in, even though he struggled greatly in the prior comparisons.

The final offensive statistic that we can look at is field goals made. For proper understanding of what a field goal is, it is essentially any shot that is made during the game. "The term basketball field goal can cover a wide range of shots, from a dunk to a three-point shot" (Electro-Merch). Thus, this will give us a good understanding of a player's ability to score, not necessary the points that they put up, but how many successful attempts that they had per game. This will also give you an understanding of what type of shooter each player was.

***Shaquille O'Neal Career Average Field Goals Made: 10.018181818181818***

***LeBron James Career Average Field Goals Made: 9.838888888888887***

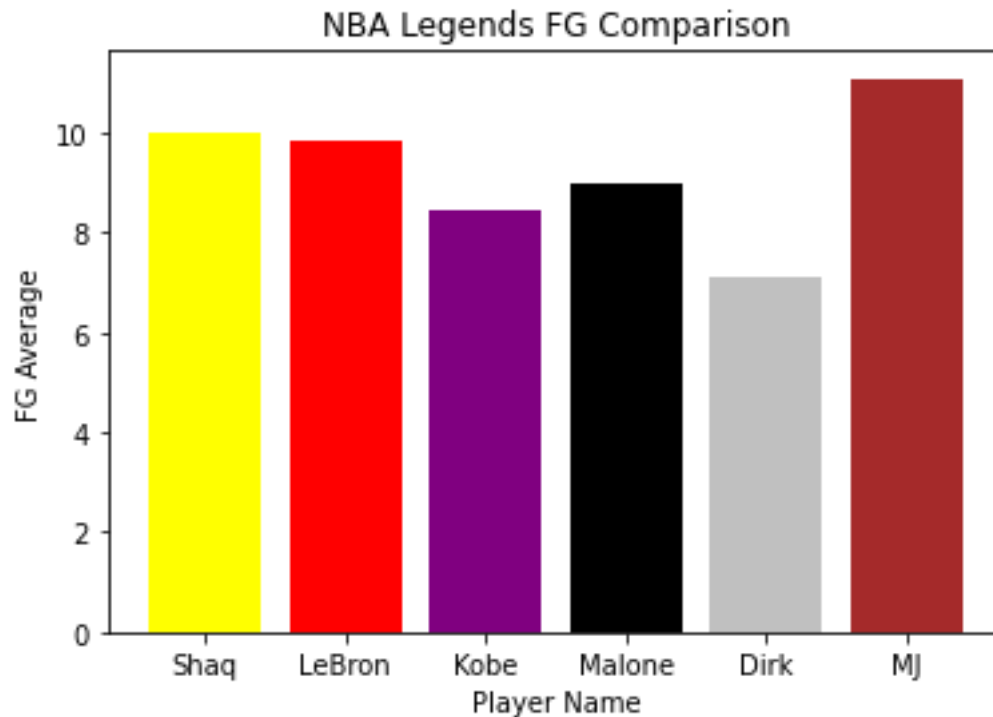
***Kobe Bryant Career Average Field Goals Made: 8.45***

***Dirk Nowitzki Career Average Field Goals Made: 7.133333333333333***

***Michael Jordan Career Average Field Goals Made: 11.093333333333332***

***Karl Malone Career Average Field Goals Made: 9.010526315789475***

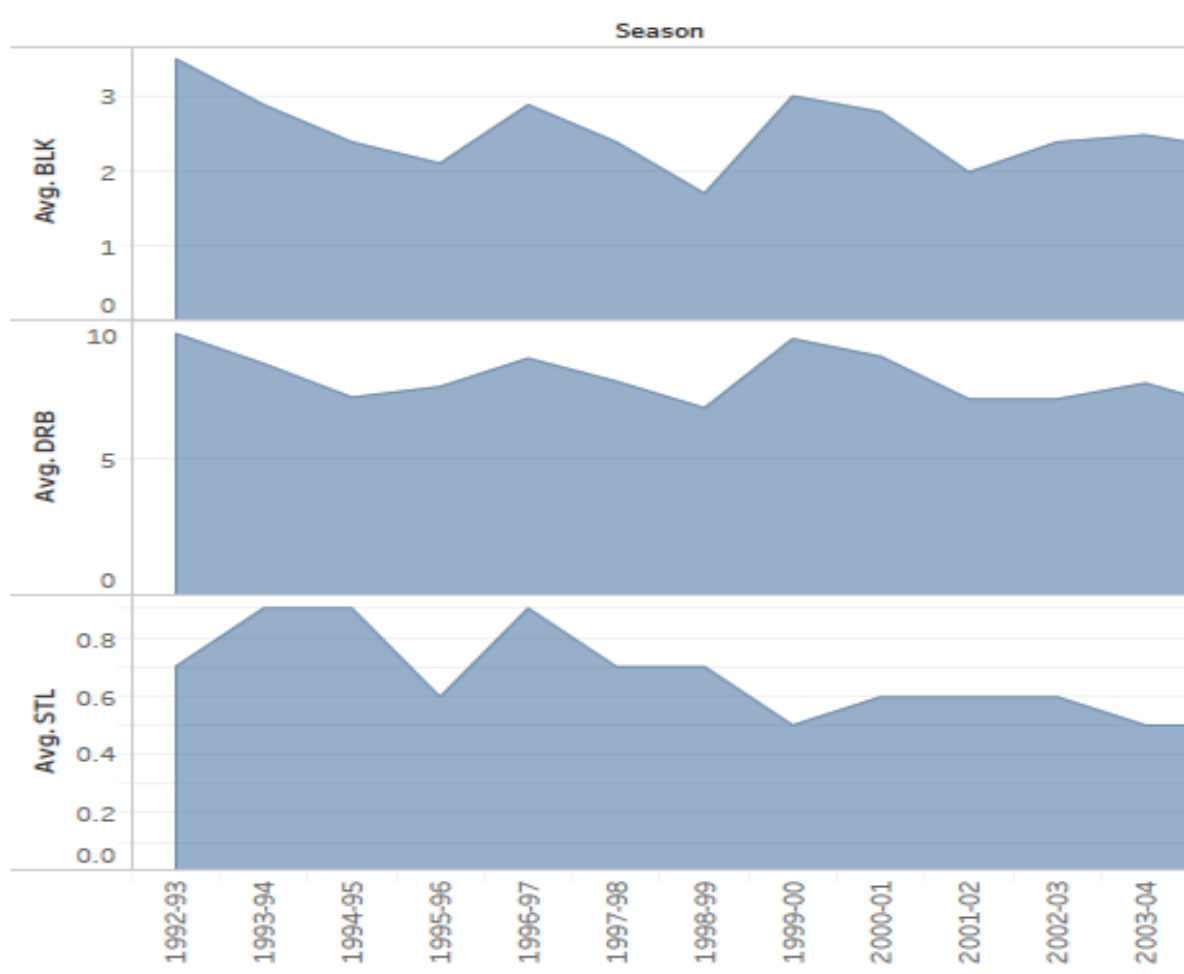




As we can see from these statistics and the graphs provided in the appendix, the highest amount of successful field goals came from Michael Jordan with ~11 per game during his career. The next closest came from Shaquille O’Neil with ~10, with Dirk Nowitzki having the lowest number of successful field goals with ~7. This gives a very good understanding of the number of shots that these players took throughout a game and can be compared back to their other offensive statistics.

We also performed an analysis on three key defensive statistics blocks, defensive rebounds, and steals. However, since offense is valued at a higher rate than defense in basketball we will not go into full details of this analysis and the data can be found in the appendix. Shaquille O’Neal was the leader in the average blocks and defensive rebound fields. Michael Jordan leads in the steal category.

## Shaq O'Neal Defensive Career Season Averages



### **Peak Age**

The other statistic we analyzed in this research project was peak NBA player age. All these players were active during the era when you could get drafted directly out of high school and forego college, which is no longer allowed. Which means all these players may have various starting ages for the NBA, some may be at 18 others a later age out of college.

Looking at 4 of the 6 players we analyzed Kobe Bryant, Shaquille O'Neal, Karl Malone, Dirk Nowitzki; each had their best or career peaks between the ages of 26 and 28. This is where

they were statistically the best overall and had their best scoring years. Each having a slow decline after this until their retirement. However, Michael Jordan and LeBron James differed from the others. LeBron James peaked statistically around 21 to 22 and Michael Jordan around 22 to 23. Both continued to have good careers after this but, below their averages.

Overall, it can be theorized that most NBA careers will peak around the ages of 26 to 28, this is now even more true due to rule changes forcing players to attend college. This will automatically set a players NBA career back 1 to 4 years. If looking to sign a superstar to a contract teams should look at giving them the max between these years, and slowly taper off after that.

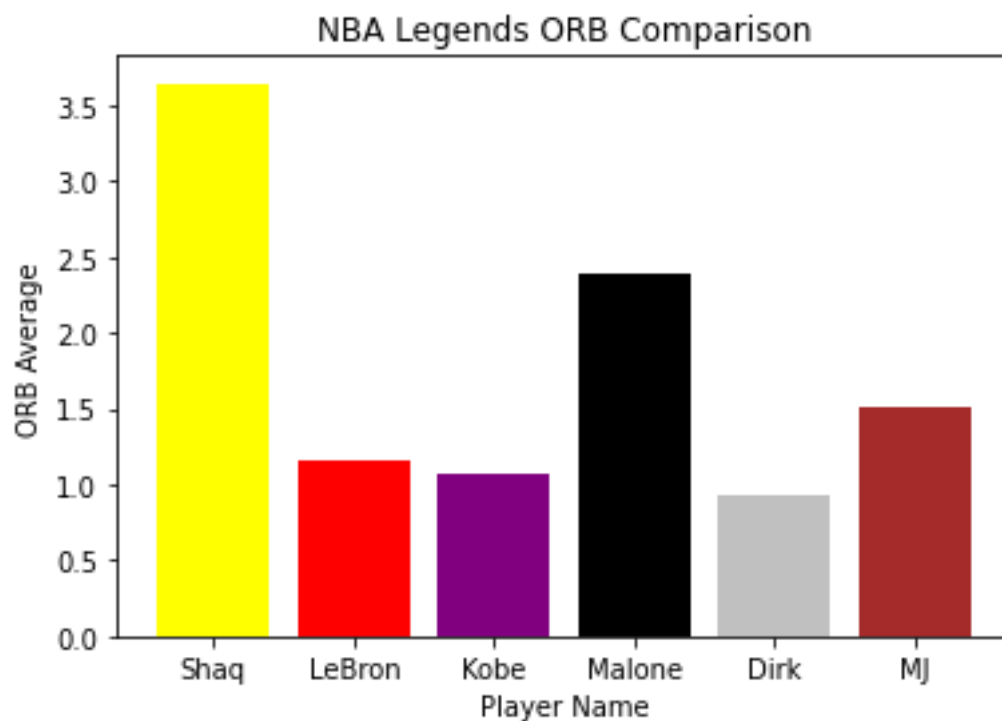
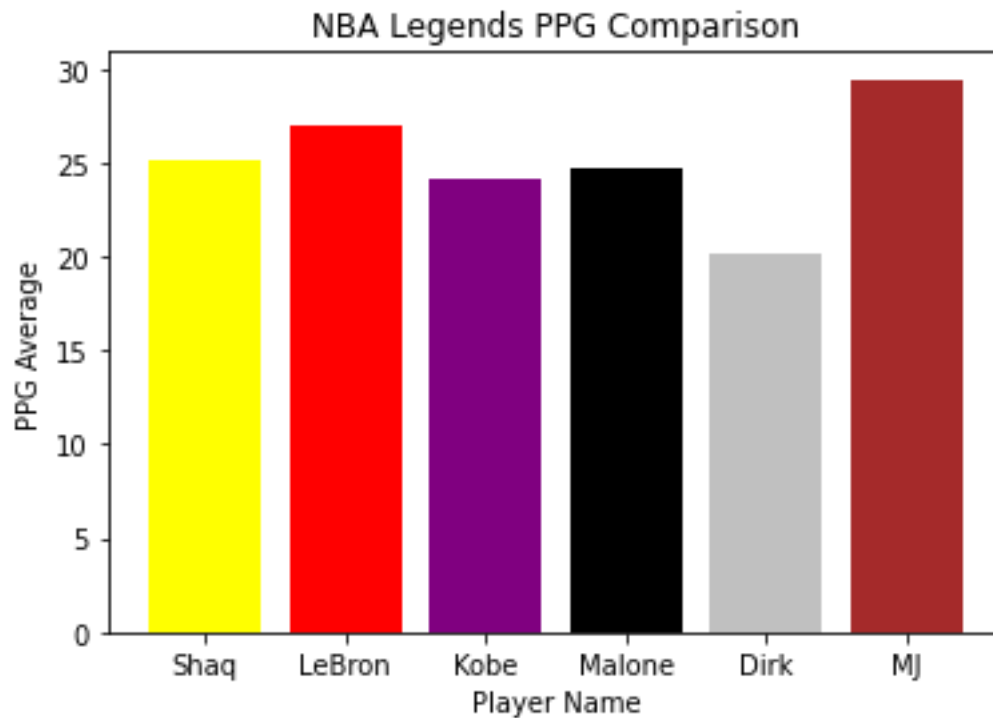
### ***Results***

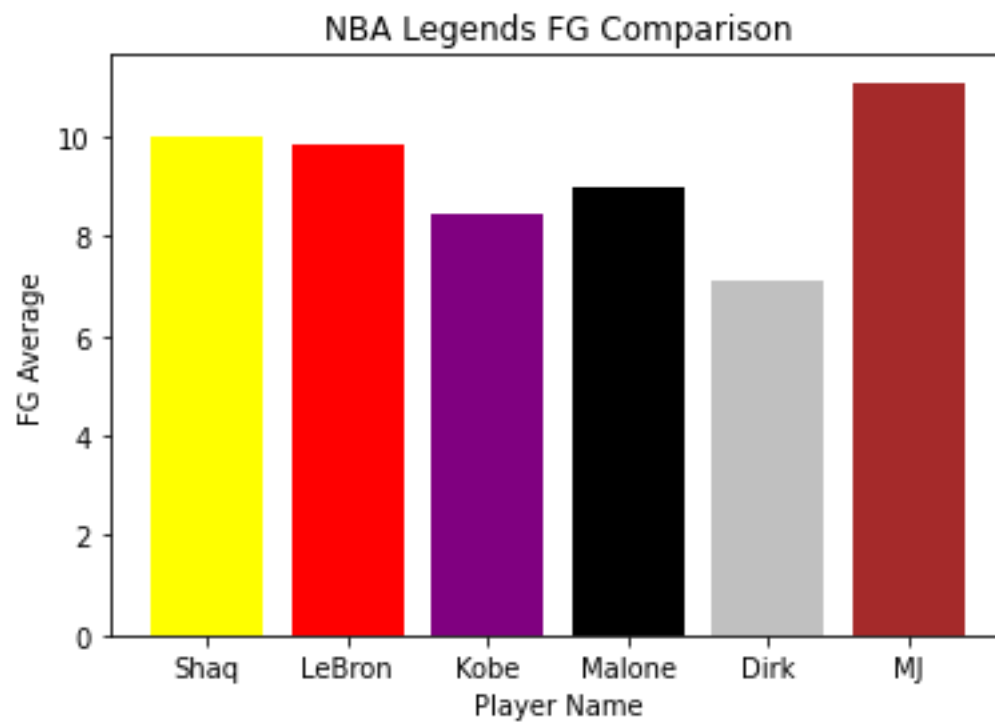
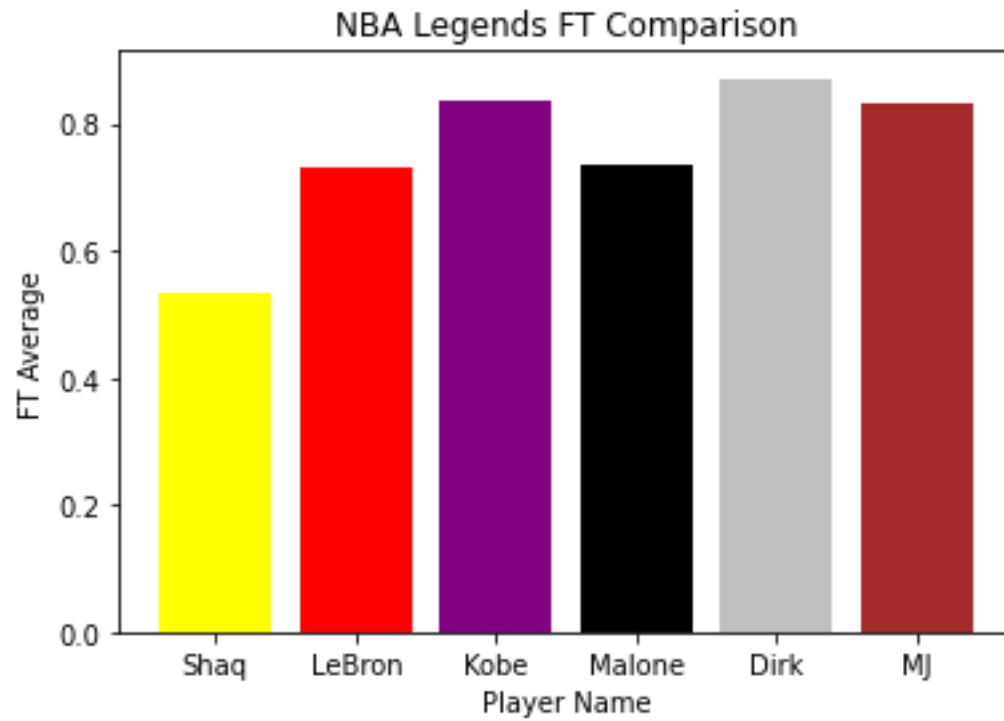
Overall, based off the data and information that we analyzed we can see that this is a very close call of who should be considered the greatest NBA player of the modern era. Each one of these players had unbelievable careers and helped take their teams to the next level. We can say there is one clear loser of the bunch and that would be Dirk Nowitzki, he only led in one category and underperformed significantly in the rest.

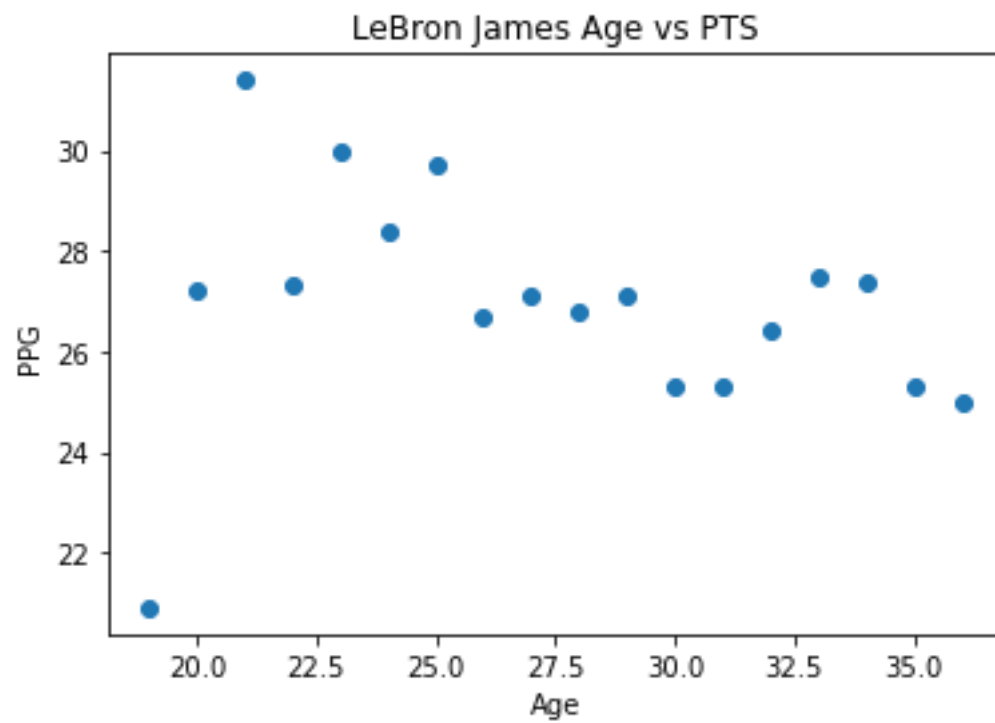
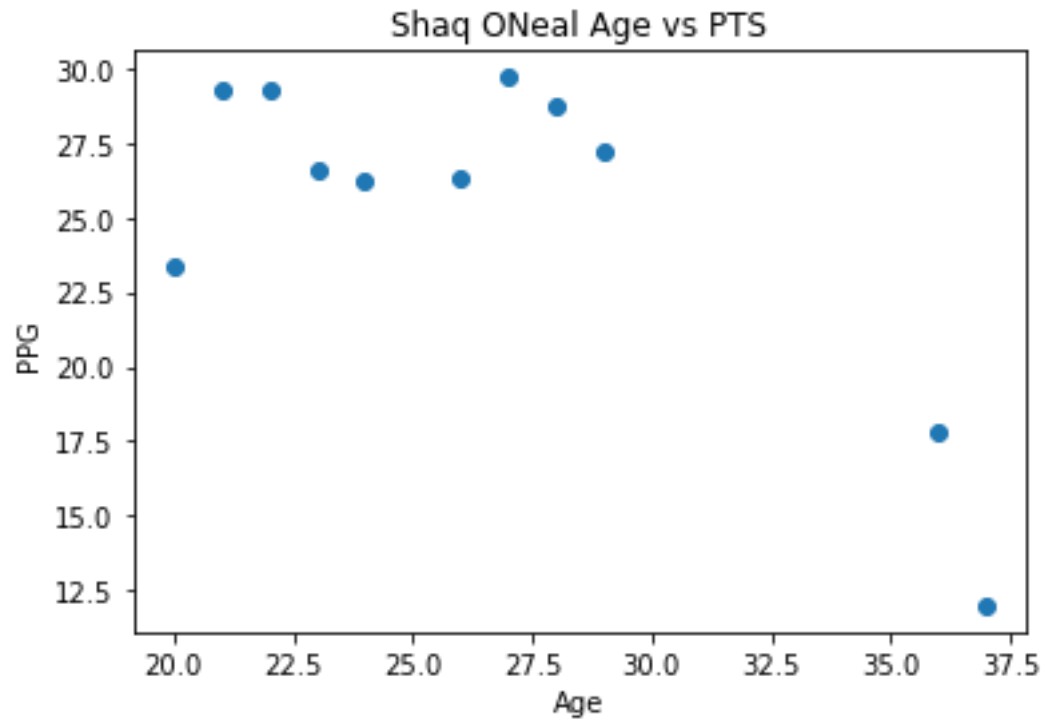
Observing the various statistics, charts, and visuals I would say one player stands out above the rest offensively and that is Michael Jordan. Jordan consistently overperformed the other players, even with missing various seasons due to retirement. When taking both offense and defense into account the top two players of the modern era would be Michael Jordan and Shaquille O'Neal. However, it is important to note that LeBron James NBA career is not over yet, and if he continues to play, he could surpass Jordan on this list. In all this research project provided valuable insights on how to properly judge an NBA superstar.

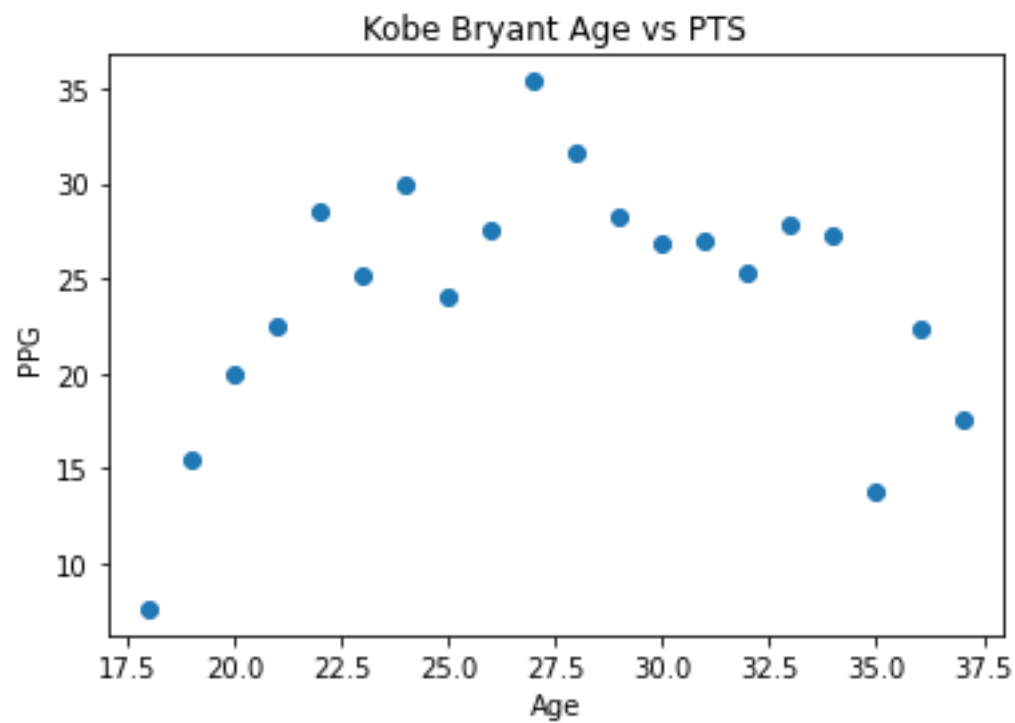
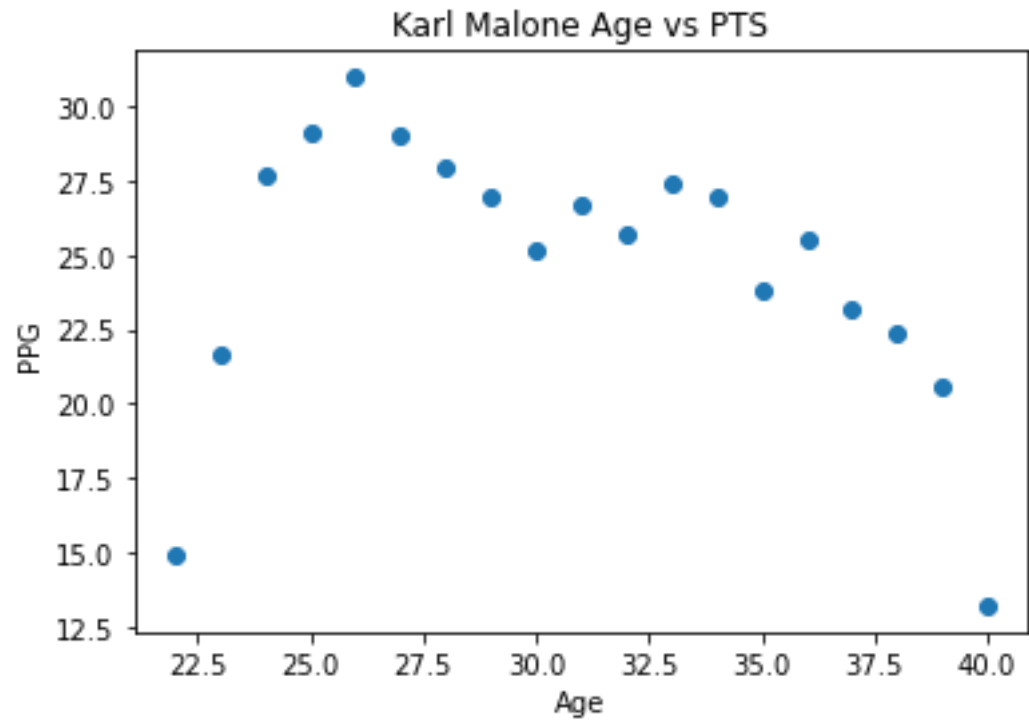
**Appendix**

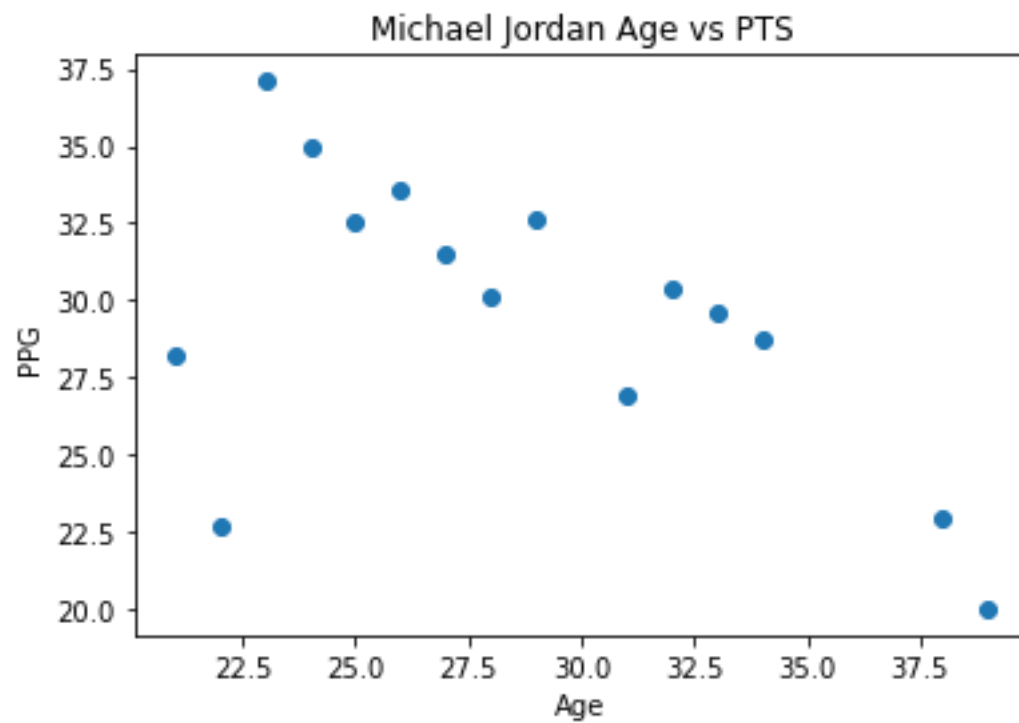
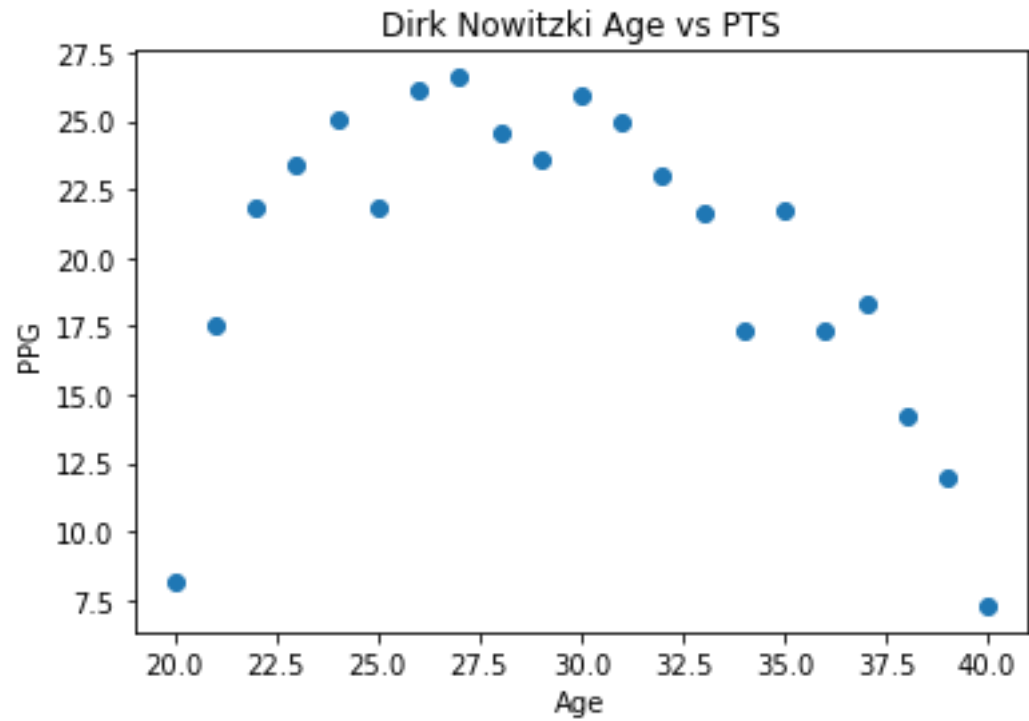
*Please also reference attached code notebook and pdf for more details. Find below graphs, charts, and other important information regarding this study. These are just the basis of which the study was built upon. The attached notebook will provide more information.*













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