INT217-INTRODUCTION TO DATA MANAGEMENT PROJECT REPORT

(Project Semester August-December 2020)

NATIONAL BASKETBALL ASSOCITION (NBA) ANALYSIS (2003-20)

Submitted by

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Programme and Section P132: BTech- **KM068**

Course Code INT217

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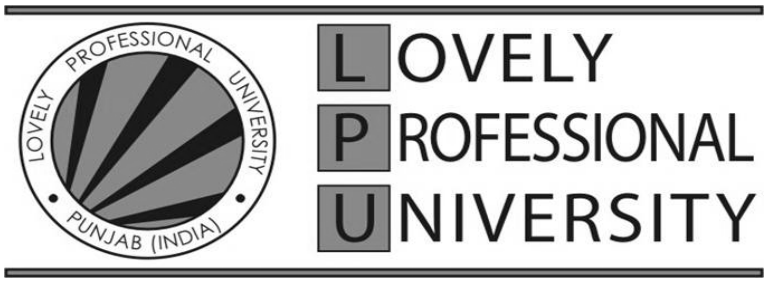

DECLARATION

I, **Raghav Sharma** student of **P-132** under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: 9TH November 2020

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Name of the student

Raghav Sharma

ACKNOWLEDGEMENT

I am are over helmed in all humbleness and gratefulness to acknowledge my depth to all those who have helped me to put these ideas, well above the level of simplicity and into something concrete. I would like to express my special thanks of gratitude to my teacher as well as our University who gave me the golden opportunity to do this wonderful project on the topic "NBA ANALYSIS 2003-2020", which also helped me in doing a lot of Research and I came to know about so many new things. I am thankful to them. Any attempt at any level can 't be satisfactorily completed without the support and guidance of my parents and friends. I would like to thank my parents who helped me a lot in gathering different information, collecting data, and guiding me from time to time in making this project, despite of their busy schedules, they gave me different ideas in making this project unique.

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INTRODUCTION

The **National Basketball Association** (**NBA**) is an American men's professional basketball league. The league was formulated in the year of 1949 with the merger of 2 major basketball leagues. So, the league is new with certain aspects kept in mind being only 74 years old. It was initially an 11-team league when it was formed, but today it has 30 teams in total. The United States is the home to 29 teams and 1 team is from Toronto, Canada. The NBA is known as the most lucrative and prestigious basketball league in the world, with the fame and fortune it offers attracting the best players from around the globe.

The Eastern and Western conferences each have eight play-off places on offer at the end of a regular season which is surely one of the most punishing in any sport. Each team plays 82 games around the country from October to April - an average of roughly three contests each week. Despite this, player rotation is not an especially prevalent idea and franchise stars are rarely rested when fit. The winners of each of the three divisions (decided by win-loss record) at the end of the season, along with the team with the next best record, are given the top four seeds in the conference. The next four teams in the conference are given the remaining places in the play-offs. An eight-team knockout format is then played out in each conference, with the top seed playing the eighth seed and so on. Each tie is a best-of-seven series of matches. The winners of the Eastern and Western conferences then advance to the NBA Finals, which is also a series of up to seven matches to determine the league champions.

The NBA boasts a total of 30 teams across two conferences and six divisions. Most areas of the USA are well represented, although the geography of the league is dominated by the Northeast, Upper Midwest and West Coast heartlands. The Toronto Raptors of Canada are the only team based outside the US. Although the origins of the league trace back to 1946, the NBA initials did not come into effect until 1949 following a merger between the Basketball Association of America and the National Basketball League.

The two most successful teams in league history are the Boston Celtics and Los Angeles (formerly Minneapolis) Lakers, who have won a total of 17 and 16 titles respectively. Lagging quite a way behind in third place are the Chicago Bulls, who won six Michael Jordan-inspired championships in eight years during the 1990s. The reigning champions are the Miami Heat.

Teams

As of 2020, the NBA consist of total or 30 teams of which 29 teams are from USA and 1 from Canada. These 30 teams are divided into 2 conferences, namely Western and Eastern Conferences, each with 15 teams.

Team	CITY
Atlanta Hawks	Atlanta
Boston Celtics	Boston
Brooklyn Nets	Brooklyn
Charlotte Hornets	Charlotte
Chicago Bulls	Chicago
Cleveland Cavaliers	Cleveland
Dallas Mavericks	Dallas
Denver Nuggets	Denver
Detroit Pistons	Detroit
Golden State Warriors	Golden State
Houston Rockets	Houston
Indiana Pacers	Indiana
Los Angeles Clippers	Los Angeles
Los Angeles Lakers	Los Angeles
Memphis Grizzlies	Memphis
Miami Heat	Miami
Milwaukee Bucks	Milwaukee
Minnesota Timberwolves	Minnesota
New Orleans Pelicans	New Orleans
New York Knicks	New York
Oklahoma City Thunder	Oklahoma City
Orlando Magic	Orlando
Philadelphia 76ers	Philadelphia
Phoenix Suns	Phoenix
Portland Trail Blazers	Portland
Sacramento Kings	Sacramento
San Antonio Spurs	San Antonio
Toronto Raptors	Toronto
Utah Jazz	Utah
Washington Wizards	Washington

These teams have excelled in their prime years for 74 years.

But the greatest number of championships won by any franchise in these years is still topped by only 3 teams.

1. **Los Angeles Lakers- 17**
2. **Boston Celtics-17**
3. **Chicago Bulls -6**

In 2020, AGAIN the Los Angeles Lakers won the championship with the leadership of LeBron James who is in his 18th season now, at the age of 35, he has broken all barriers of the naysayers who continued to predict that he will fail this season. It is phenomenal what he has done. We will further analyse his stats in this report in the coming segments.

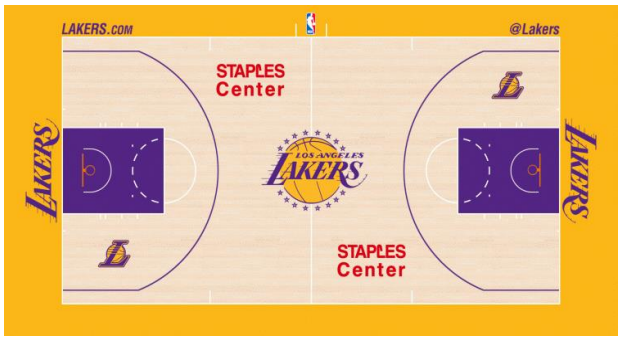
Terminologies and Court

Before we dive in to look at the stats of the players and teams over the years, it is important for us to understand what the terminologies and rules are used in the league to have a better read of the data I have worked on these past days.

- The NBA is an 82 games league starting from September-April. Each team plays minimum 82 games in the regular season, after which 16 teams qualify for the playoffs, 8 from each conference.

- A player can change teams, either by demand of himself or a trade between two teams. This can happen during a season, up till a particular date decided by the NBA; trade deadline, or in the off-season.

The Court



A basketball court consist of a million aspects but for this analysis we just need to look at just a few things, which are:

- **The 3-Point line:** The big arc beside the "STAPLES CENTER" watermark is the 3-pt line. If a player shoots the ball from or behind this line, is counted as a 3-point.

- Any shot taken from inside the 3-pt line is mapped as **2-pts**.
- If a player is fouled while shooting, he is awarded **Free Throws** (number of three throws depend on the degree of foul). A Free Throw is taken from the line behind the purple box (called the Painted Area). **A FT is 1-pt.**

The Game

- An NBA game is of a duration of **48 minutes**, divided into 4 quarters, **12 minutes each**. Although, if the score is tied at the end of a match, **multiple overtimes** can come into play until a winner is decided.
- Both teams are given total of **7 timeouts** for this duration of game which they can call to figure out the strategies between games or substitute a player from bench.
- **The game is of 5 vs 5 player during the game**, but the team can have **6 players substitutes** sitting on the bench who they can swap multiple times with the starters during course of the game.

Basic terms used in the data used

G	Games played
Min	Minutes played
FGA	Field-goal attempts
FGM	Field goals made
FTA	Free-throw attempts
FTM	Free throws made
3PA	Three-point field goals attempted
3PM	Three-point field goals made
Reb	Rebounds
Ast	Assists
Blk	Blocked shots
Stl	Steals
TO	Turnovers

FG% - Field Goal Percentage; the formula is FGM / FGA

FT% - Free Throw Percentage; the formula is FTM / FTA.

3P% - 3-Point Field Goal Percentage

PTS/GM- Points scored per game.

AST/GM- Assists per game.

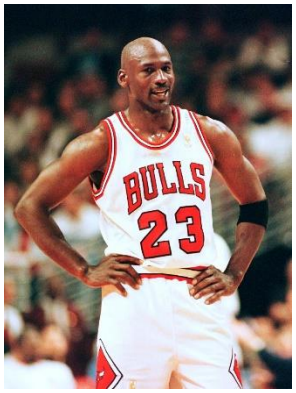
REB/GM- Rebounds per game.

MIN/GM- Minutes played per game.

Players

Superstars in this league has always been changing with changing decades over the years but some of the players who left a mark on their games are still talked about even today.

1. **Michael Jordan** (Retired)



Everyone has heard this name, at least once in their entire lifetime. Jordan played in the NBA from 1984 to 2003 and DOMINATED THE LEAGUE FOR 15 years. Known for his KILLER INSTICNT mentality, **Jordan bought the first championship to the city of Chicago, for the team Chicago Bulls in 1991 and then bought 5 MORE.** He earned total of 6 chips to the city of Chicago in his career.

This is how crazy he was in his career, every time he went to the finals of the NBA, he has won. His is the only player in the history of the NBA to have a win-loss record of 6-0 in the Finals. He is still considered the Greatest to ever play the game by some people, even after 17 years of his retirement.

2. **Kobe Bryant** (Retired)

Kobe Bean Bryant, also known as ‘Mamba ’, came into the league 1996 and retired in 2016. **He was killed in a tragic incident of helicopter crash along with his daughter Gigi Bryant in January 2020**. Considered the best player of his generation, Kobe played with the same team his entire career, **Los Angeles Lakers**. He won **5 championships** with Lakers from 2000 to 2010.

In this analysis we will look at his stats over the years of his career.

3. **LeBron James**

Lebron James, also known as King James, was drafted in 2003 by the Cleveland Cavaliers. He is currently 35 years old, and **playing in the league**, and dominating like he is still 21. He has played for 3 teams in his career till now, currently in **Los Angeles Lakers.** He won the championship for the 2019-20 season with the Lakers.

In this analysis we will look at his stats over the years of his career.

4. **Dwayne Wade** (Retired)- Drafted along with LeBron James. Teammates with LeBron James (2010-2014)
5. **Giannis Antetokounmpo-** MVP of the league for the last 2 years.
6. **Kevin Durant-** Often compared to LeBron James, has won 2 championships

OBJECTIVES/ SCOPE OF ANALYSIS

I have worked with 5 csv files based on NBA league statistics for 17 years, from 2003 to 2020.

The data is of 860,000 rows and 92MB in size. Specifications of the data:

- The 5 files are very raw and need to be connected to make sense to a viewer.
- Certain columns will act as primary keys to join the data.

  What is the content of dataset?

  1. Every game since 2003-04 season till March,2020.
  2. Every detail of player that has played in these 17 years.
  3. Team details.

Objectives:

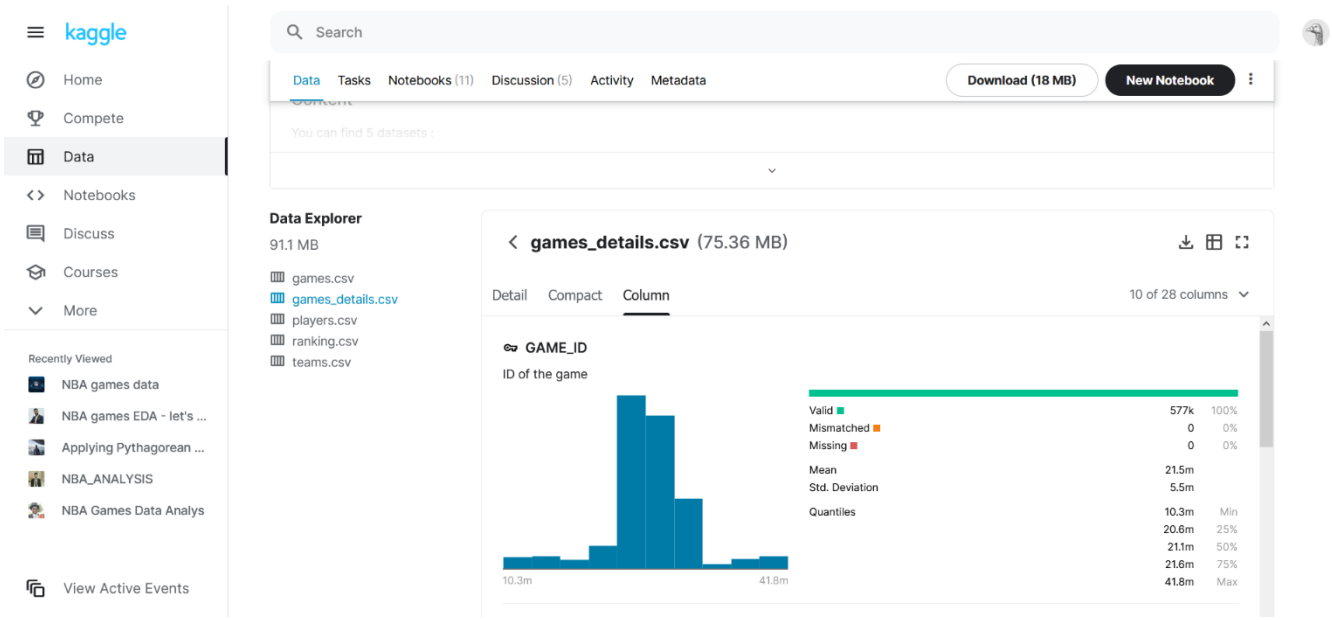
1. Cleaning the data (Tableau Prep Builder)
2. Visualizing the data (Pivot charts and dashboards)
3. Pivoting the data and looking into the stats.
4. Comparing teams.
5. Players analysis and comparison
6. Predicting the future of players' career.

SOURCE OF DATASET

I pulled the dataset from Kaggle . Kaggle is a very trusted website for looking at data, uploaded by community itself.

Link to the dataset used: https://www.kaggle.com/nathanlauga/nba-games.

Last Updated 8 months ago, it provides 5 csv files which contains all the data about player and team stats in the past 17 years.



ETL PROCESS

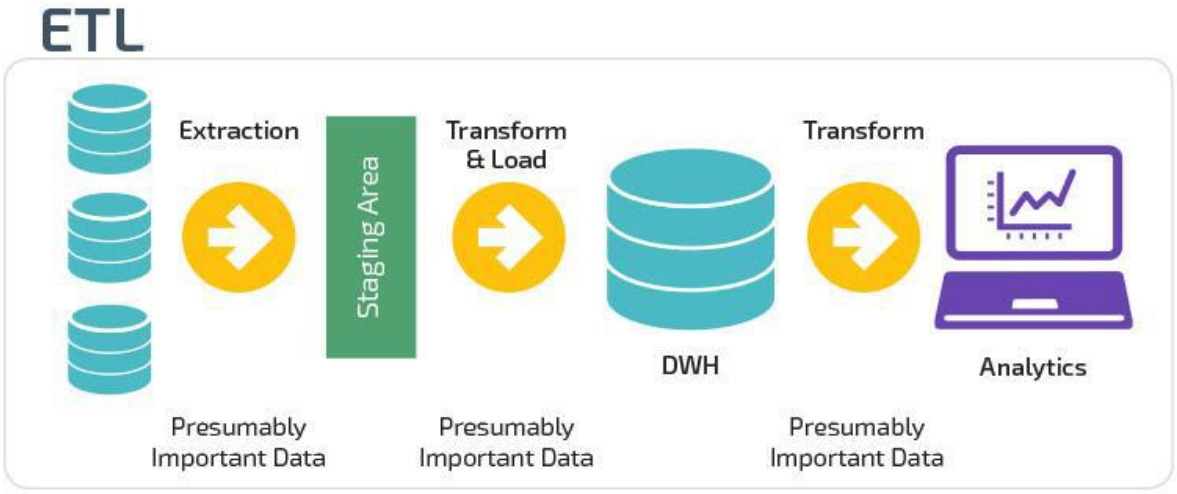
ETL is a process that extracts the data from different source systems, then transforms the data (like applying calculations, concatenations, etc.) and finally loads the data into the Data Warehouse system. Full form of ETL is Extract, Transform and Load.

1. In the first step extraction, data is extracted from the source system into the staging area. In this we have extracted the data from the dataset downloaded from kaggle.com in the form of 5 csv files and used for further steps. Refer **SOURCE OF DATASET** for more information regarding this.

2. In the transformation step, the data extracted from source is cleansed and transformed with **Tableau Prep, flow chart of which will be attached in this report.** Cleaned data resulted in 4 xlsx files which are further loaded into Excel for analysis and visualization.

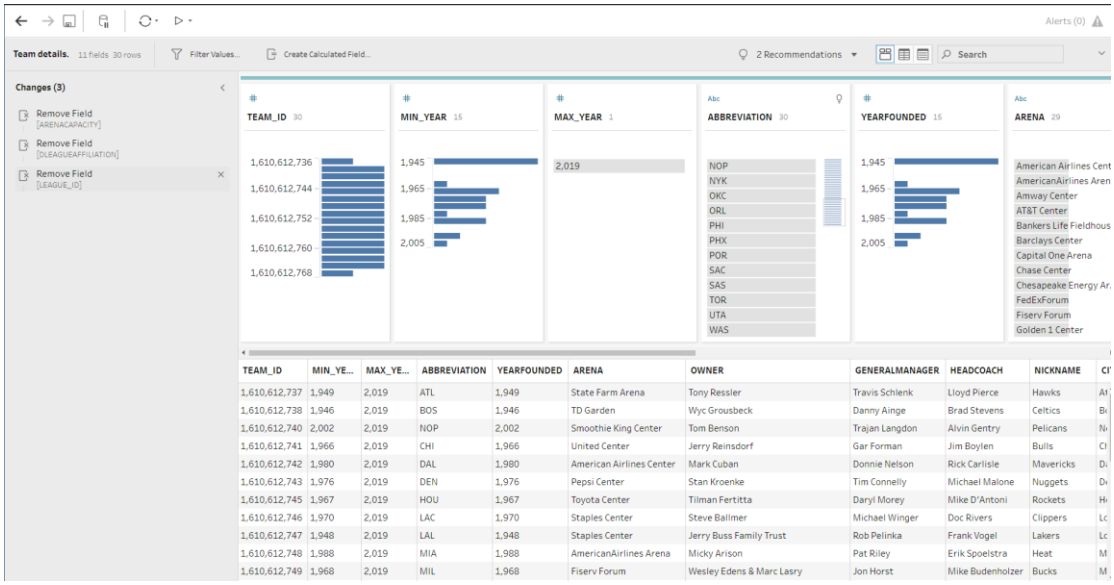
3. **Loading** data into the target tables is the last step of the ETL process. In this we create pivot tables based on the relations mentioned in the objectives to help us analyze the data hence getting the result and visualizing the results in form of charts and graphs.

4. The **charts and graphs** are then turned to into an interactive **dashboard** to display all the results to the user at the same time hence giving the eventual **result of the analysis** to the user.

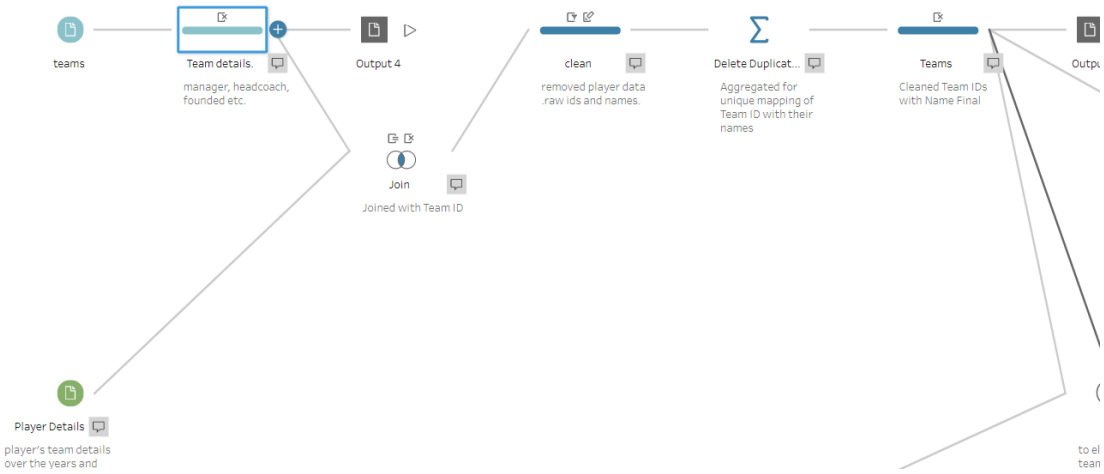


TRANSFORMATION: Tableau Prep Builder Usage

1. Extracting team names from Team IDs



From the first two files the only relevant information for us was the team names, their abbreviation, nicknames and maybe the head coach. The first column Team ID is very raw, and we need to link this to the 2nd file for their names.



The final output resulted in all 30 teams with respect to their team IDs

TEAM_ID	Team
1,610,612,760	Oklahoma City Thunder
1,610,612,744	Golden State Warriors
1,610,612,742	Dallas Mavericks
1,610,612,765	Detroit Pistons
1,610,612,750	Minnesota Timberwolves
1,610,612,754	Indiana Pacers
1,610,612,761	Toronto Raptors
1,610,612,737	Atlanta Hawks

2. The 3rd file is the details about the games and their results basically. Let us have a look at the uncleaned data first.

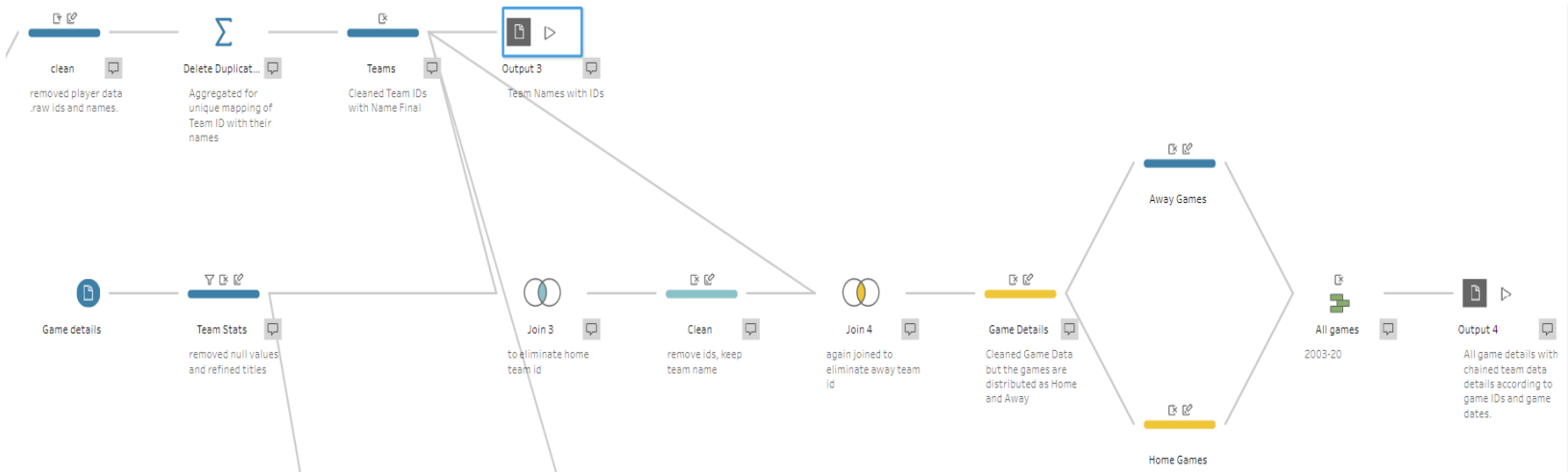
GAME_DATE_EST	GAME_ID	GAME_STATUS_TEXT	HOME_TEAM_ID	VISITOR_TEAM_ID	SEASON	TEAM_ID_home	PTS_home	FG_PCT_home	FT_PCT_home	FG3_PCT_home	AST_home	REB_home	TEAM_ID_away	PTS_away	FG_PCT_away	FT_PC
3/1/2020	21900895	Final	1610612766	1610612749	2019	1610612766	85	0.354	0.9	0.229	22	47	1610612749	93	0.402	
3/1/2020	21900896	Final	1610612750	1610612742	2019	1610612750	91	0.364	0.4	0.31	19	57	1610612742	111	0.468	
3/1/2020	21900897	Final	1610612746	1610612755	2019	1610612746	136	0.592	0.805	0.542	25	37	1610612755	130	0.505	
3/1/2020	21900898	Final	1610612743	1610612761	2019	1610612743	133	0.566	0.7	0.5	38	41	1610612761	118	0.461	
3/1/2020	21900899	Final	1610612758	1610612765	2019	1610612758	106	0.407	0.885	0.257	18	51	1610612765	100	0.413	
3/1/2020	21900900	Final	1610612740	1610612747	2019	1610612740	114	0.421	0.818	0.219	24	52	1610612747	122	0.515	
3/1/2020	21900901	Final	1610612744	1610612764	2019	1610612744	110	0.472	0.708	0.321	25	52	1610612764	124	0.488	
2/29/2020	21900887	Final	1610612752	1610612741	2019	1610612752	125	0.553	0.697	0.4	29	50	1610612741	115	0.461	
2/29/2020	21900888	Final	1610612737	1610612757	2019	1610612737	129	0.548	0.864	0.429	34	36	1610612757	117	0.5	
2/29/2020	21900889	Final	1610612748	1610612751	2019	1610612748	116	0.451	0.833	0.368	27	45	1610612751	113	0.465	
2/29/2020	21900890	Final	1610612739	1610612754	2019	1610612739	104	0.482	0.85	0.227	30	36	1610612754	113	0.54	
2/29/2020	21900891	Final	1610612763	1610612747	2019	1610612763	105	0.453	0.818	0.323	27	51	1610612747	88	0.409	
2/29/2020	21900892	Final	1610612738	1610612745	2019	1610612738	110	0.39	0.76	0.31	22	54	1610612745	111	0.418	
2/29/2020	21900893	Final	1610612759	1610612753	2019	1610612759	114	0.524	0.75	0.452	28	31	1610612753	113	0.488	
2/29/2020	21900894	Final	1610612756	1610612744	2019	1610612756	99	0.41	0.826	0.414	24	40	1610612744	115	0.471	

SO MESSY! NOT UNDERSTANTABLE.

As we can notice, this file has some columns that are important but not in their best representation. There are 3 inferences we can take from the file,

- Team IDs, home and away will be mapped (**using JOIN**) with the result of Step 1 above.
- Null values need to be replaced of removed according to our needs.
- Although this is a combined for two teams at a time but for analysis, we need their data to be chained rather than in one row, so we divide the data into HOME and AWAY games and then combine again so that each team even for one game has individual row. And for finding out which game played was played on a particular date, **GAME DATE AND GAME IDs** must be kept in the data.
- Column heading can be named better for our understanding.

FLOW:



We joined the first output file with our 2nd raw file with TEAM IDs two times to eliminate the home and away ids with their names. Then divided the data into home and away data then again merged them to chain them into one long team data.

The final output of this clean up:

SEASON	GAME_ID	GAME DATE	Team	PTS	FG_PCT	FT_PCT	FG3_PCT	AST	REB
2019	21900895	3/1/2020	Milwaukee Bucks	93	0.402	0.762	0.226	20	61
2019	21900896	3/1/2020	Dallas Mavericks	111	0.468	0.632	0.275	28	56
2019	21900897	3/1/2020	Philadelphia 76ers	130	0.505	0.65	0.488	27	37
2019	21900898	3/1/2020	Toronto Raptors	118	0.461	0.897	0.263	24	36
2019	21900899	3/1/2020	Detroit Pistons	100	0.413	0.667	0.429	23	42
2019	21900900	3/1/2020	Los Angeles Lakers	122	0.515	0.9	0.371	23	36
2019	21900901	3/1/2020	Washington Wizards	124	0.488	0.889	0.667	24	34
2019	21900887	2/29/2020	Chicago Bulls	115	0.461	0.696	0.486	26	33
2019	21900888	2/29/2020	Portland Trail Blazers	117	0.5	0.714	0.286	14	42
2019	21900889	2/29/2020	Brooklyn Nets	113	0.465	0.739	0.364	30	44
2019	21900890	2/29/2020	Indiana Pacers	113	0.54	0.786	0.348	30	38
2019	21900891	2/29/2020	Los Angeles Lakers	88	0.409	0.583	0.25	26	45
2019	21900892	2/29/2020	Houston Rockets	111	0.418	0.778	0.273	17	53
2019	21900893	2/29/2020	Orlando Magic	113	0.488	0.696	0.405	28	41
2019	21900894	2/29/2020	Golden State Warriors	115	0.471	0.75	0.3	30	49
2019	21900877	2/28/2020	Minnesota Timberwolves	125	0.484	0.667	0.386	27	33

NICE AND CLEAN! BUT SO MUCH MORE TO DO AFTER LOADING.

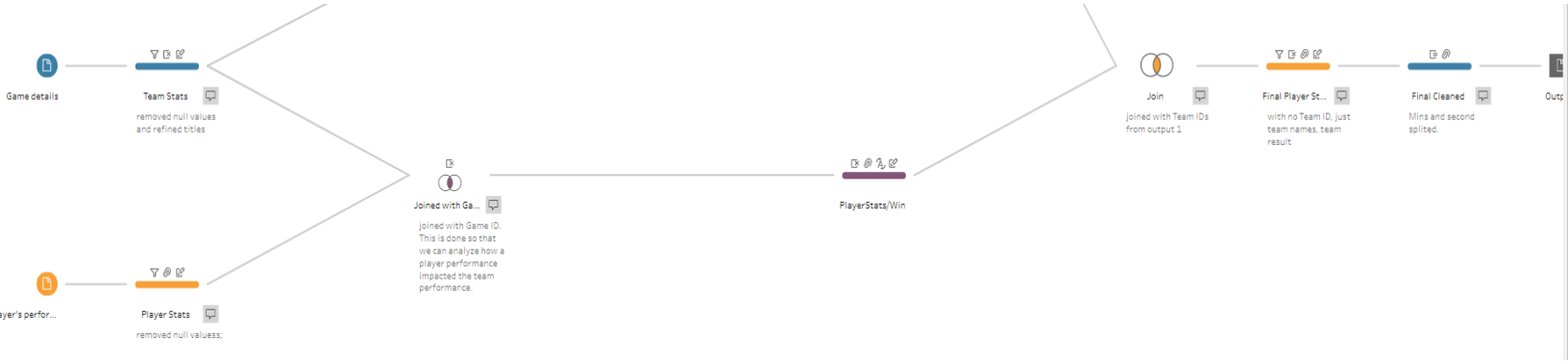
3. Moving to the 4th file, "**PLAYERS PERFORMANCE**". Let us have a look into what the raw file looks like.

GAME_ID	TEAM_ID	TEAM_ABBREVIATION	TEAM_CITY	PLAYER_ID	PLAYER_NAME	START_POSITION	COMMENT	MIN	FGM	FGA	FG_PCT	FG3M	FG3A	FG3_PCT	FTM
21900895	1610612749	MIL	Milwaukee	202083	Wesley Matthews	F		27:08:00	3	11	0.273	2	7	0.286	0
21900895	1610612749	MIL	Milwaukee	203507	Giannis Antetokounmpo	F		34:55:00	17	28	0.607	1	4	0.25	6
21900895	1610612749	MIL	Milwaukee	201572	Brook Lopez	C		26:25:00	4	11	0.364	1	5	0.2	7
21900895	1610612749	MIL	Milwaukee	1628978	Donte DiVincenzo	G		27:35:00	1	5	0.2	0	3	0	0
21900895	1610612749	MIL	Milwaukee	202339	Eric Bledsoe	G		22:17	2	8	0.25	0	1	0	0
21900895	1610612749	MIL	Milwaukee	1626192	Pat Connaughton			24:52:00	2	5	0.4	1	4	0.25	1
21900895	1610612749	MIL	Milwaukee	201577	Robin Lopez			13:18	1	5	0.2	0	0	0	0
21900895	1610612749	MIL	Milwaukee	1628425	Sterling Brown			18:10	1	2	0.5	1	2	0.5	0
21900895	1610612749	MIL	Milwaukee	101107	Marvin Williams			19:37	0	1	0	0	1	0	0
21900895	1610612749	MIL	Milwaukee	201588	George Hill			25:43:00	4	11	0.364	1	4	0.25	2
21900895	1610612749	MIL	Milwaukee	203648	Thanasis Antetokounmpo		DNP - Coach's Decision								
21900895	1610612749	MIL	Milwaukee	101141	Ersan Ilyasova		DNP - Coach's Decision								
21900895	1610612749	MIL	Milwaukee	1628391	D.J. Wilson		DNP - Coach's Decision								
21900895	1610612766	CHA	Charlotte	1628970	Miles Bridges	F		35:15:00	3	13	0.231	1	7	0.143	0
21900895	1610612766	CHA	Charlotte	1629023	P.J. Washington	F		31:52:00	5	14	0.357	1	8	0.125	1

Before moving further, we need to address that this file is huge, approx. 80 MB (600,000 rows) so prep will take a lot of time to refine this file. Let us note the inferences from this file.

- Again, we see the TEAM IDs that we need to replace with team names. We do not really need the team abbreviation since we will JOIN the team names with the first output.
- There are large number of null values that need to address, remove, or replace.
- The MIN column is not formatted, and it will be very difficult to calculate the average minutes played if this is not cleaned.

FLOW:



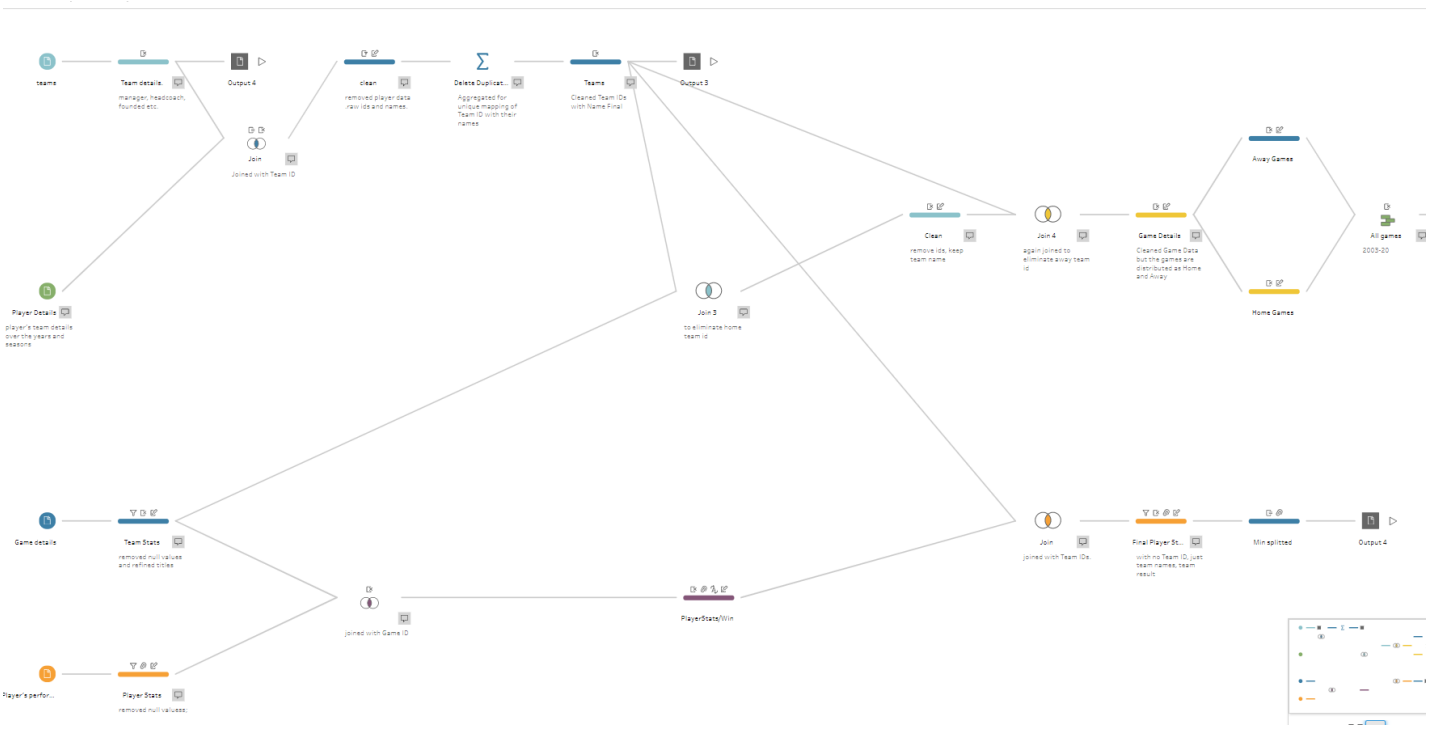
The final output of the clean-up:

SEASON YEA	Team	PLAYER_NAME	START_POSITIO	MINsplitm	MINsplits	M	PT	FGI	FG	FG	3P	3P	3PM	FTI	FT	FT	ORE	DRE	RE	AS	ST	BL	T	P	PLUS_MINU	Team Resu	Health Remarks
2016	Houston Rockets	Eric Gordon	Two-way/ Bench	30	17	30:17	10	4	12	0.333	2	7	0.286	0	1	0	1	2	3	4	1	1	0	3	36	Win	<No comments>
2014	Los Angeles Clippers	Jamal Crawford	Two-way/ Bench	20	40	20:40	23	10	18	0.556	1	7	0.143	2	2	1	0	1	1	6	1	0	1	3	37	Win	<No comments>
2019	Milwaukee Bucks	Pat Connaughton	Two-way/ Bench	18	18	18:18	14	5	7	0.714	4	6	0.667	0	0	0	0	4	4	3	0	0	0	0	36	Win	<No comments>
2014	Boston Celtics	Isaiah Thomas	Two-way/ Bench	29	47	29:47	34	10	16	0.625	4	8	0.5	10	11	0.909	2	1	3	6	0	0	2	0	35	Loss	<No comments>
2016	Washington Wizards	Bojan Bogdanovic	Two-way/ Bench	25	44	25:44	17	6	12	0.5	0	3	0	5	5	1	0	7	7	2	1	1	2	0	35	Win	<No comments>
2014	San Antonio Spurs	Boris Diaw	Two-way/ Bench	23	40	23:40	11	4	9	0.444	2	5	0.4	1	1	1	1	3	4	4	2	1	1	0	37	Loss	<No comments>
2014	Cleveland Cavaliers	Dion Waiters	Two-way/ Bench	26	55	26:55	9	4	11	0.364	1	2	0.5	0	0	0	1	0	1	8	4	0	1	0	45	Win	<No comments>
2005	Orlando Magic	Carlos Arroyo	Two-way/ Bench	27	50	27:50	17	8	12	0.667	1	1	1	0	0	0	0	3	3	7	1	0	0	0	35	Win	<No comments>
2007	Toronto Raptors	Jose Calderon	Two-way/ Bench	19	40	19:40	10	4	7	0.571	0	0	0	2	2	1	0	4	4	8	2	0	0	0	36	Loss	<No comments>
2014	Indiana Pacers	Chris Copeland	Two-way/ Bench	33	51	33:51	12	5	12	0.417	2	7	0.286	0	0	0	0	3	3	4	1	1	1	5	35	Loss	<No comments>
2016	Philadelphia 76ers	Richaun Holmes	C	19	57	19:57	17	8	11	0.727	0	1	0	1	2	0.5	2	5	7	2	2	0	2	0	35	Win	<No comments>
2014	Portland Trail Blazers	Robin Lopez	C	25	8	25:8	10	4	4	1	0	0	0	2	2	1	0	4	4	0	0	2	1	1	35	Loss	<No comments>
2014	Los Angeles Clippers	DeAndre Jordan	C	28	29	28:29	14	7	7	1	0	0	0	0	2	0	3	7	10	1	1	5	0	1	35	Loss	<No comments>
2014	Cleveland Cavaliers	Timofey Mozgov	C	28	56	28:56	8	3	5	0.6	0	0	0	2	2	1	1	3	4	2	2	2	0	1	42	Loss	<No comments>

NICE AND CLEAN!

Work of tableau prep builder here is done, and we will move to loading the data into Microsoft excel and building pivot tables, charts and dashboard for the analysis part.

FINAL FLOW DIAGRAM



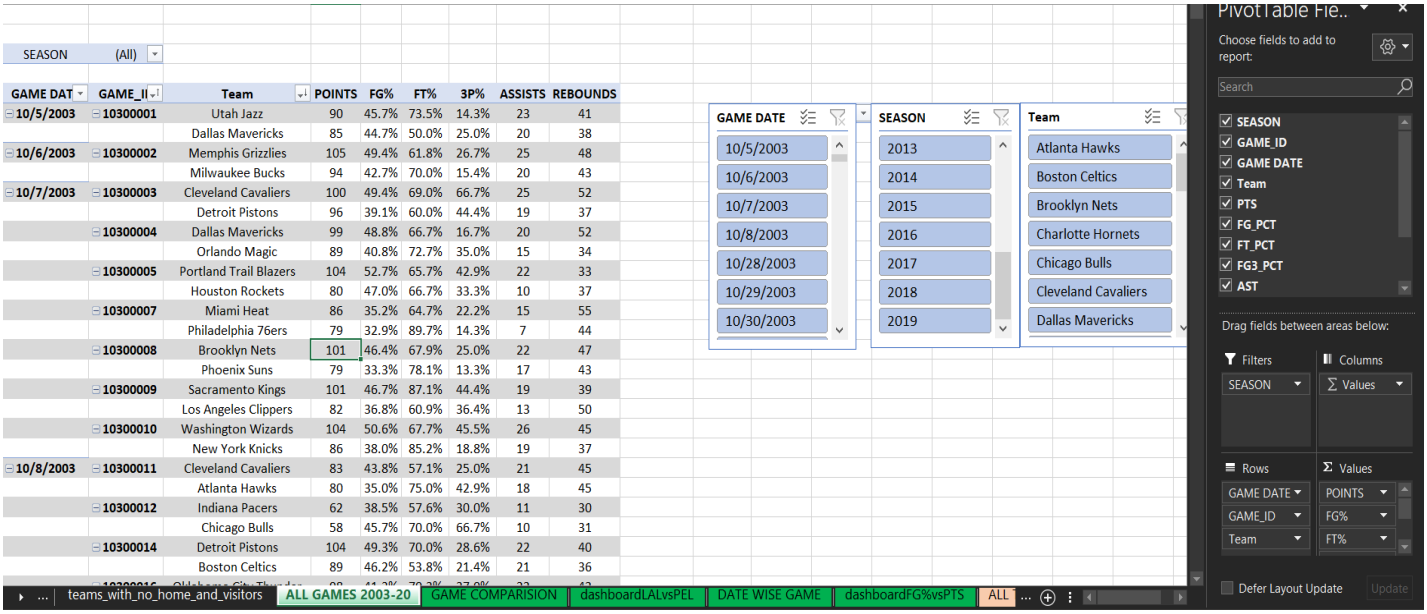
ANALYSIS ON DATASET

A. TEAM ANALYSIS

Data Used:

SEASON	GAME_ID	GAME DATE	Team	PTS	FG_PCT	FT_PCT	FG3_PCT	AST	REB
2019	21900895	3/1/2020	Milwaukee Bucks	93	0.402	0.762	0.226	20	61
2019	21900896	3/1/2020	Dallas Mavericks	111	0.468	0.632	0.275	28	56
2019	21900897	3/1/2020	Philadelphia 76ers	130	0.505	0.65	0.488	27	37
2019	21900898	3/1/2020	Toronto Raptors	118	0.461	0.897	0.263	24	36
2019	21900899	3/1/2020	Detroit Pistons	100	0.413	0.667	0.429	23	42
2019	21900900	3/1/2020	Los Angeles Lakers	122	0.515	0.9	0.371	23	36
2019	21900901	3/1/2020	Washington Wizards	124	0.488	0.889	0.667	24	34
2019	21900887	2/29/2020	Chicago Bulls	115	0.461	0.696	0.486	26	33
2019	21900888	2/29/2020	Portland Trail Blazers	117	0.5	0.714	0.286	14	42
2019	21900889	2/29/2020	Brooklyn Nets	113	0.465	0.739	0.364	30	44
2019	21900890	2/29/2020	Indiana Pacers	113	0.54	0.786	0.348	30	38
2019	21900891	2/29/2020	Los Angeles Lakers	88	0.409	0.583	0.25	26	45
2019	21900892	2/29/2020	Houston Rockets	111	0.418	0.778	0.273	17	53
2019	21900893	2/29/2020	Orlando Magic	113	0.488	0.696	0.405	28	41
2019	21900894	2/29/2020	Golden State Warriors	115	0.471	0.75	0.3	30	49
2019	21900877	2/28/2020	Minnesota Timberwolves	125	0.484	0.667	0.386	27	33
2019	21900878	2/28/2020	Brooklyn Nets	118	0.457	0.762	0.391	30	38
2019	21900879	2/28/2020	Charlotte Hornets	99	0.436	0.72	0.433	23	58
2019	21900880	2/28/2020	Dallas Mavericks	118	0.476	0.895	0.42	25	35
2019	21900881	2/28/2020	Sacramento Kings	104	0.418	0.81	0.289	24	47
2019	21900882	2/28/2020	Oklahoma City Thunder	86	0.363	0.7	0.171	14	36

This table gives us details about EVERY SINGLE GAME EVER PLAYED SINCE 2003 TILL MARCH 2020, total of 46,000 rows so, Data is not analysis ready so needed pivot tables.



Looks so much better now that games are pivoted according to the game date and game IDs. But there is still 18-year worth of data here, so we need to further narrow it down for analysis.

*Use of **FILTERS AND SLICERS WILL HELP US HERE.***

ANALYSIS 1: LOS ANGELES LAKERS VS LOS ANGELES CLIPPERS

.

Introduction:

Los Angeles city has a very special case in the NBA, having two teams, namely Lakers and Clippers. Since decades it has been a long debate that which team is better and which team should be the team of Los Angeles.

Although Lakers have won 17 championships in the history of the game, while Clippers has won 0, some fans around the league still argue about the TEAM OF LOS ANGELES.

In this analysis we will look how Lakers and Clippers throughout the season of 2019-2020, when they met head-to-head.

General Description:

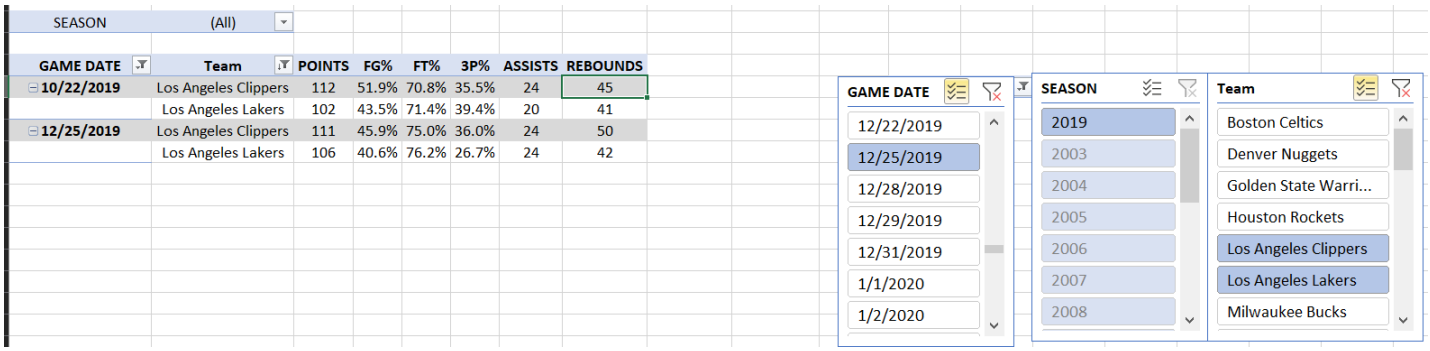
As discussed above the pivot table generated is very huge containing the data of 17 years. So, what we can do is investigate the games of the recent seasons and compare the results.

Specific Requirements:

PIVOT TABLE-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
Pivot tables are a technique in data processing. They arrange and rearrange (or "pivot") statistics to draw attention to useful information.
PIVOT CHARTS-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
Pivot tables are a technique in data processing. They arrange and rearrange (or "pivot") statistics to draw attention to useful information.
SLICERS-: Slicers provide buttons that you can click to filter tables, or PivotTables. In addition to quick filtering, slicers also indicate the current filtering state, which makes it easy to understand what exactly is currently displayed.
ARITHMETIC OPERATORS-: Various arithmetic operators are being used like percentage, addition, division, ratio etc.
FILTERS-: The filters are used to the data in the table according to the requirements of the users.

Results:

1. We pivoted the chart using the cleaned data and found that in 2019-20 season, these two teams met only two times. And both the Los Angeles Clippers won.



SEASON	(All)						
GAME DATE	Team	POINTS	FG%	FT%	3P%	ASSISTS	REBOUNDS
10/22/2019	Los Angeles Clippers	112	51.9%	70.8%	35.5%	24	45
	Los Angeles Lakers	102	43.5%	71.4%	39.4%	20	41
12/25/2019	Los Angeles Clippers	111	45.9%	75.0%	36.0%	24	50
	Los Angeles Lakers	106	40.6%	76.2%	26.7%	24	42

2. We got the percentage of how the basketball was shot by these teams and we will be able to compare these using visualization.

3. Although the Lakers have 17 championships in the past, it does not change the fact that the current Clippers team is not a match for Lakers.

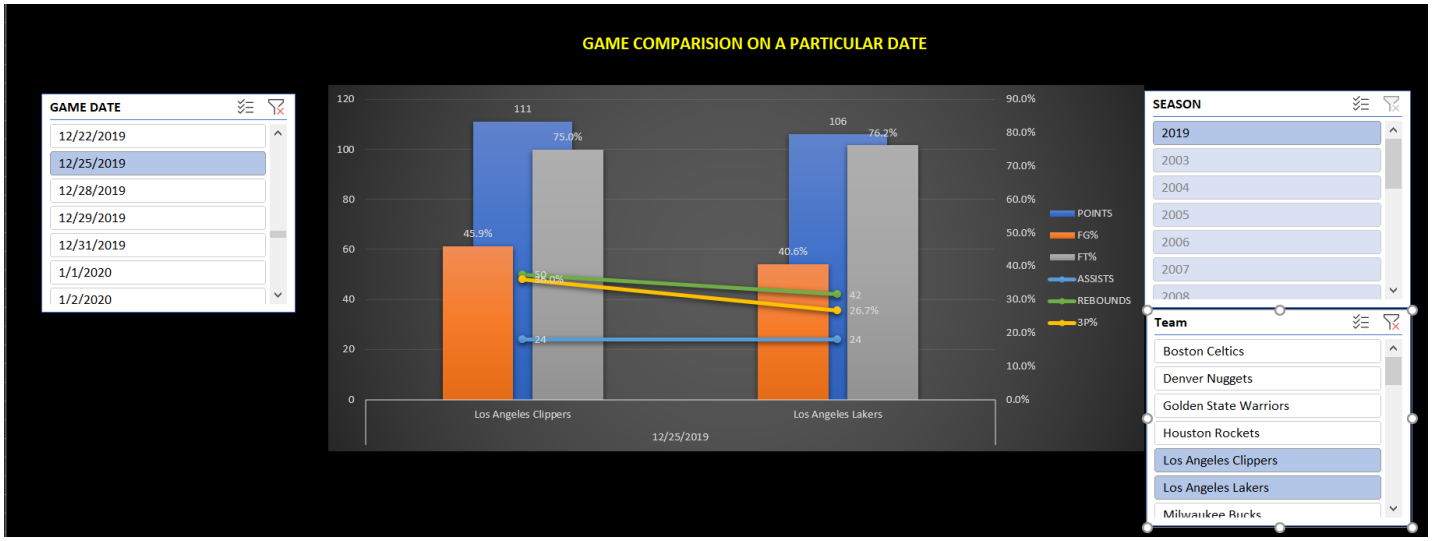
4. **PREDICTION:** Clippers plays better in a single game match with the Lakers but in the playoff, they choke because they have to play 7 game series and every single year they get eliminated. So, to infer from this, if there happens to be a playoff series of Lakers Vs Clippers, chances are that Clippers are going to win, but as the history of the game suggests, the odds of that matchup happening is very unlikely because the Clippers never made out of the 1st round of playoffs.

5. In the second matchup on 25th Dec 2019, the Lakers shot the ball better than Clippers but still lost. That tells us they shot probably less number of shots than Clippers.

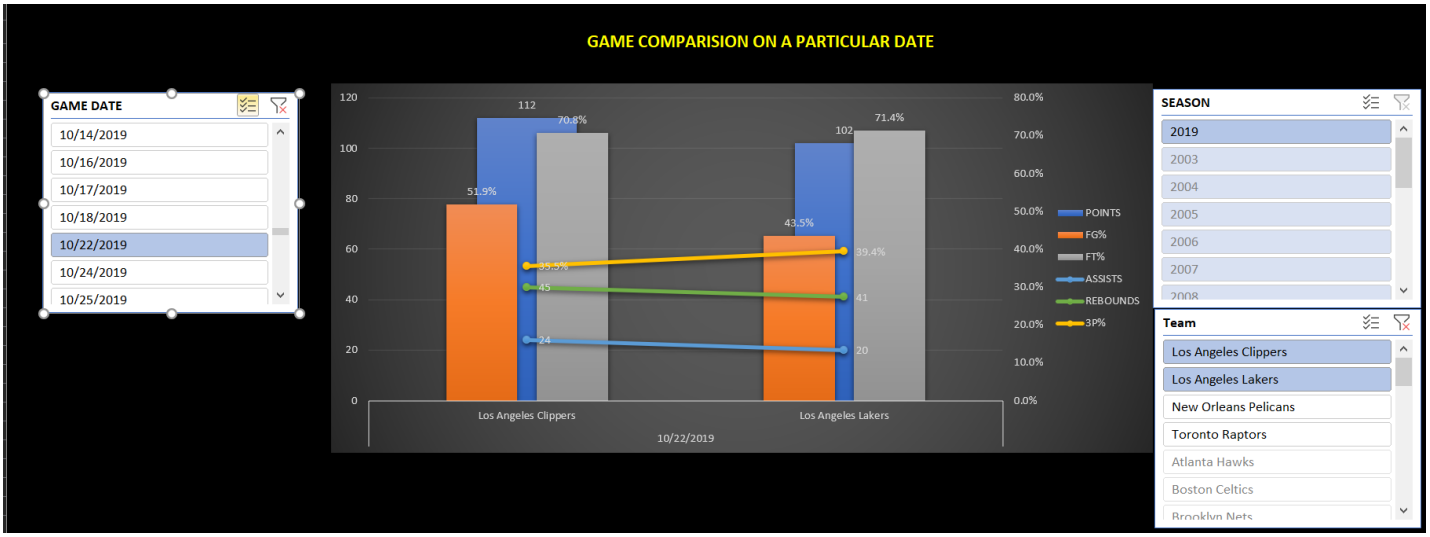
6. **PREDICTION: If the Lakers want to defeat Clippers in their next matchup, they need to take more shots and look to score the 3pt more because Clippers are a faster team in comparison.**

Visualization:

1. 25th Dec 2019- Lakers shot better Free throws and still lost.



2. 22nd Oct 2019- Lakers again shot better Free Throws, along with better 3 pointers and still lost.



ANALYSIS 2: SUPERTEAMS

Introduction:

Now we will look how the 30 teams have fashioned their stats over these 17 years. I have pivoted the same team data used for 1st analysis for this.

General Description:

For analysis we will only investigate some team, because comparing 30 teams will be difficult and quite frankly, we don't need to.

Specific Requirements:

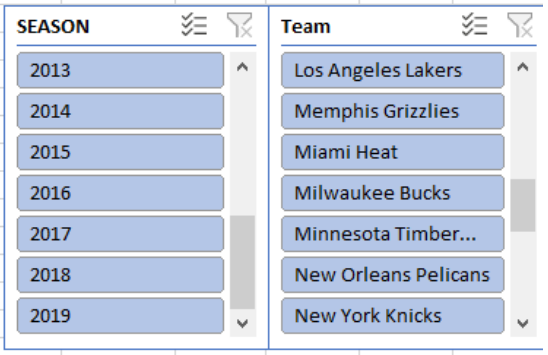
PIVOT TABLE-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
Pivot tables are a technique in data processing. They arrange and rearrange (or "pivot") statistics to draw attention to useful information.
PIVOT CHARTS-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
Pivot tables are a technique in data processing. They arrange and rearrange (or "pivot") statistics to draw attention to useful information.
SLICERS-: Slicers provide buttons that you can click to filter tables, or PivotTables. In addition to quick filtering, slicers also indicate the current filtering state, which makes it easy to understand what exactly is currently displayed.
ARITHMETIC OPERATORS-: Various arithmetic operators are being used like percentage, addition, division, ratio etc.
FILTERS-: The filters are used to the data in the table according to the requirements of the users.

Pivot Tables Used:

1. For all the teams for 17 years.

SEASON	(All

Team	PTS/GM	aFG%	aFT%	a3P%	AST/GM	REB/GM
Atlanta Hawks	99.2	45.2%	75.6%	34.8%	22.3	41.6
Boston Celtics	100.1	45.9%	77.2%	35.4%	22.6	41.6
Brooklyn Nets	98.1	44.4%	75.6%	34.3%	21.8	41.9
Charlotte Hornets	97.7	43.9%	75.0%	34.2%	21.3	41.8
Chicago Bulls	98.4	44.3%	75.9%	35.7%	22.1	44.1
Cleveland Cavaliers	99.8	45.0%	74.3%	35.2%	21.2	42.9
Dallas Mavericks	102.0	45.7%	78.5%	35.7%	21.7	42.6
Denver Nuggets	105.1	46.1%	75.0%	34.6%	23.4	43.7
Detroit Pistons	97.3	44.7%	73.2%	34.5%	21.3	42.5
Golden State Warriors	106.7	46.5%	76.3%	37.0%	24.3	43.2
Houston Rockets	102.9	45.0%	75.9%	35.4%	21.4	43.3
Indiana Pacers	99.2	44.7%	76.8%	35.4%	21.1	43.0
Los Angeles Clippers	101.6	46.0%	74.4%	35.0%	22.4	42.4
Los Angeles Lakers	102.5	45.5%	74.2%	34.3%	22.3	43.6
Memphis Grizzlies	98.2	45.2%	75.2%	34.2%	20.8	41.6
Miami Heat	99.0	46.5%	73.5%	35.4%	20.8	41.4
Milwaukee Bucks	100.3	45.3%	75.3%	35.4%	22.5	42.4
Minnesota Timberwolves	100.4	45.1%	77.2%	34.3%	22.0	42.5
New Orleans Pelicans	99.3	45.2%	76.4%	35.3%	21.8	42.3
New York Knicks	99.5	44.6%	76.2%	35.0%	20.4	42.4
Oklahoma City Thunder	103.4	45.7%	77.7%	34.9%	20.7	43.7
Orlando Magic	99.2	45.5%	73.4%	35.4%	20.9	42.5
Philadelphia 76ers	98.8	44.8%	74.2%	34.1%	22.1	42.6
Phoenix Suns	105.2	46.6%	76.4%	36.2%	22.7	42.3
Portland Trail Blazers	100.2	45.2%	77.3%	35.8%	20.7	42.6
Sacramento Kings	102.0	45.4%	76.0%	35.6%	21.6	42.0
San Antonio Spurs	101.1	46.9%	76.1%	37.6%	22.6	42.7
Toronto Raptors	101.5	45.6%	78.3%	35.7%	21.4	41.4
Utah Jazz	99.9	46.1%	74.9%	34.7%	22.5	42.5
Washington Wizards	100.8	45.0%	75.0%	34.8%	21.5	42.2



To narrow it down, we will only investigate 7 super teams for the 2019-20 teams. Pivot data of these teams are:

SEASON	2019

Team	PTS/GM	AST/GM	REB/GM
Boston Celtics	113.2	23.1	46.1
Dallas Mavericks	115.9	24.4	47.3
Houston Rockets	119.1	21.5	45.4
Los Angeles Clippers	115.0	24.1	47.6
Los Angeles Lakers	113.8	26.1	46.0
Miami Heat	113.0	25.8	44.9
Milwaukee Bucks	119.7	26.3	52.0
Philadelphia 76ers	108.9	25.9	46.0
Portland Trail Blazers	112.9	20.0	45.6
Utah Jazz	111.5	22.1	45.5

SEASON	2019

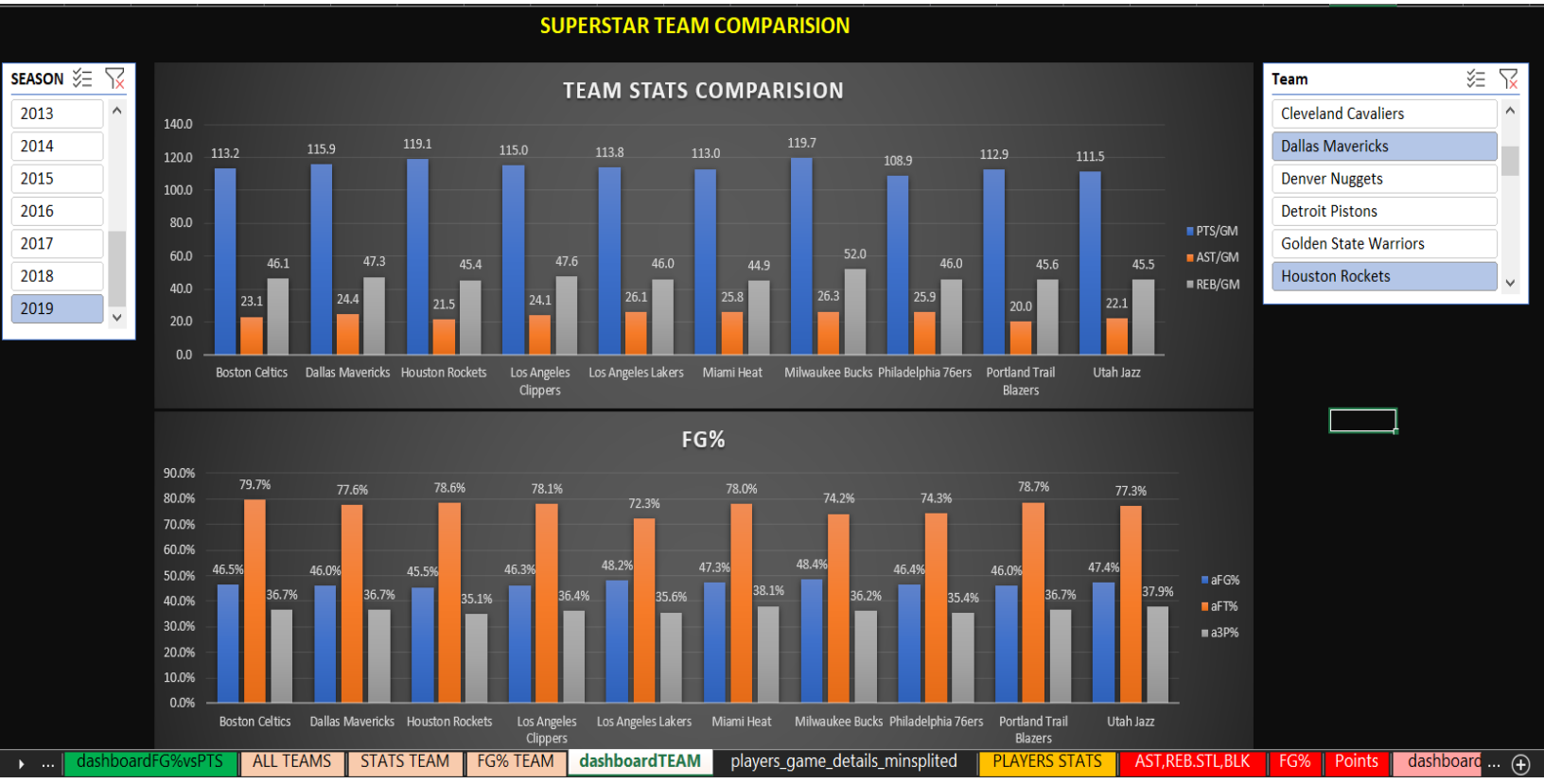
Team	aFG%	aFT%	a3P%
Boston Celtics	46.5%	79.7%	36.7%
Dallas Mavericks	46.0%	77.6%	36.7%
Houston Rockets	45.5%	78.6%	35.1%
Los Angeles Clippers	46.3%	78.1%	36.4%
Los Angeles Lakers	48.2%	72.3%	35.6%
Miami Heat	47.3%	78.0%	38.1%
Milwaukee Bucks	48.4%	74.2%	36.2%
Philadelphia 76ers	46.4%	74.3%	35.4%
Portland Trail Blazers	46.0%	78.7%	36.7%
Utah Jazz	47.4%	77.3%	37.9%

Results:

1. Milwaukee Bucks were the scoring leaders per game of the 2019-20 season.
2. Los Angeles Lakers led the league in Assists per game in 2019-20 season
3. Milwaukee Bucks won the Rebounds per game in 2019-20 season.
4. Bucks shot the best basketball with 48.4% in 2019-20.
5. Miami Heat of south beach shot best from the 3-point line in 2019-20. (38.1%)
6. Celtics shot the best Free Throw% in 2019-20. (79.7%)

Visualization:

Dashboard Created:



B. PLAYER ANALYSIS

Data Used:

GAME_DA	SEASON YEA	Team	PLAYER_NAME	START_POSITIO	MI	PT	FGN	FG/	FG%	3PN	3P/	3PM%	FTN	FT/	FT%	OREI	DREI	REI	AS	ST	BL	TO
3/9/2009	2008	Washington Wizards	Mike James	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/7/2009	2008	Washington Wizards	Juan Dixon	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/7/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/7/2009	2008	Washington Wizards	Etan Thomas	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6/2009	2008	Washington Wizards	Caron Butler	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/4/2009	2008	Washington Wizards	Caron Butler	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/4/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/4/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2009	2008	Washington Wizards	Caron Butler	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2009	2008	Washington Wizards	Juan Dixon	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2009	2008	Washington Wizards	Javaris Crittenton	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/28/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2009	2008	Washington Wizards	Juan Dixon	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/27/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/25/2009	2008	Washington Wizards	Juan Dixon	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/25/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/25/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/21/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/20/2009	2008	Washington Wizards	Juan Dixon	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/20/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/20/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/17/2009	2008	Washington Wizards	Juan Dixon	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/17/2009	2008	Washington Wizards	Oleksiy Pecherov	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2/17/2009	2008	Washington Wizards	DeShawn Stevenson	Two-way/ Bench	0:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

players_game_details_minsplited | PLAYERS STATS | AST,REB.STL,BLK | FG% | Points | dashboardAllPlayersComparision | 3PM% OVER THE YEARS OF PLAYERS | STEPH CURRY 3P%

This cleaned data we got from Tableau Prep contains 600,000 rows and have the data of EVERY PLAYER THAT HAS PLAYED IN THE NBA SINCE 2003 TILL 2020.

Although this data is clean per say, but we cannot, or do not want to see random stats of random players, so we create a ***Pivot Table.***

SEASON YEAR	(All)
GAME_DATE	(All)
Team	(All)

PLAYER_NAME	GP	Total Mins Played	Total Points	Total FGM	aFG%	Total 3PM	a3PM%	Total FTM	aFT%	Total REB	Total AST	Total STL	Total BLK
LeBron James	1607	59123	41974	15228	48.9%	2265	29.0%	9253	69.7%	11726	11243	2521	1213
Carmelo Anthony	1341	43631	29308	10455	41.3%	1583	27.4%	6815	70.9%	8106	3593	1288	603
Dwyane Wade	1367	43436	28102	10256	45.0%	688	16.4%	6902	67.7%	6081	6809	1993	1093
Kevin Durant	1062	37898	28011	9538	48.8%	1961	37.0%	6974	84.5%	7341	4201	1154	1141
Dirk Nowitzki	1379	43674	27927	9908	45.4%	1552	32.0%	6559	75.9%	9934	3213	997	1068
Kobe Bryant	1102	37586	27287	9411	41.1%	1636	26.5%	6829	74.7%	5417	5041	1491	392
James Harden	1015	33283	24268	7150	42.7%	2690	35.1%	7278	80.1%	5217	6094	1575	506
Russell Westbrook	1048	34418	23307	8223	41.7%	1145	24.9%	5716	74.6%	6996	8303	1765	306
LaMarcus Aldridge	1203	38151	21974	8852	45.6%	203	9.1%	4067	67.6%	9351	2196	825	1254
Joe Johnson	1341	45477	21772	8290	42.2%	2113	33.6%	3079	59.1%	5276	5238	1115	249
Chris Paul	1288	40539	21715	7604	42.6%	1601	30.3%	4906	71.6%	5340	11051	2579	155
Tony Parker	1420	40346	21612	8663	44.9%	474	16.9%	3812	57.5%	3674	7519	1094	105
Dwight Howard	1339	41830	21338	7709	55.6%	10	0.7%	5911	51.3%	15628	1802	1172	2502
Paul Pierce	1291	38062	21191	6900	40.3%	1777	30.9%	5614	66.1%	6164	4109	1283	518
Pau Gasol	1366	40953	20819	7971	46.3%	199	8.1%	4678	63.7%	11532	4093	634	1931
Stephen Curry	897	29298	20392	6999	45.3%	3106	40.4%	3288	75.4%	3957	5619	1486	207
Vince Carter	1465	37941	20371	7209	38.2%	2037	30.1%	3916	53.3%	5550	3918	1241	601
Tim Duncan	1210	36408	20177	7908	48.7%	18	1.4%	4343	62.5%	11800	3355	808	2286
Jamal Crawford	1377	38801	19918	6848	37.0%	2251	29.9%	3971	65.2%	2909	4420	1174	249
Zach Randolph	1231	36527	19786	7881	43.0%	221	9.1%	3803	60.5%	10883	2221	890	324
Chris Bosh	1075	36184	19544	7057	47.9%	382	14.2%	5048	71.3%	8670	2015	867	1081
DeMar DeRozan	945	30800	18283	6549	44.1%	388	14.4%	4797	74.1%	3957	3177	921	259
Rudy Gay	1086	33038	17297	6534	42.6%	1050	28.4%	3179	62.6%	5963	2233	1233	790
Ray Allen	1008	33133	16975	5873	43.6%	2235	37.4%	2994	73.1%	3535	2765	959	178
Amar'e Stoudemire	961	26313	16811	6191	48.9%	32	2.6%	4397	63.9%	6649	1065	650	1104
Manu Ginobili	1292	31210	16803	5440	41.3%	1798	32.1%	4125	65.7%	4470	4786	1595	370
Kevin Garnett	1114	31883	16780	6735	46.7%	56	3.9%	3254	59.0%	9812	3240	1210	1164
Damian Lillard	711	24713	16506	5436	42.2%	1948	34.5%	3686	81.7%	2876	4380	688	210
Monta Ellis	998	31407	16180	6228	40.9%	817	22.3%	2907	60.8%	3122	4220	1550	300
David West	1283	33166	16080	6513	46.8%	69	4.3%	2985	55.0%	7565	2657	884	993

SEASON ...: 2003, 2004, 2005, 2006, 2007, 2008

PLAYER_NAME: A.J. Guyton, Aaron Brooks, Aaron Craft, Aaron Gordon, Aaron Gray, Aaron Harrison

Team: Portland Trail Blazers, Sacramento Kings, San Antonio Spurs, Toronto Raptors, Utah Jazz, Washington Wizards

players_game_details_minsplited | PLAYERS STATS | AST,REB.STL,BLK | FG% | Points | dashboardAllPlayersComparision | 3PM% OVER THE YEARS OF PLAYERS | STEPH CURRY 3P%

ANALYSIS 3: SUPERSTARS OF THE LEAGUE

Introduction:

In this analysis we will compare stats of 8 players, who are considered the best of their era, even the greatest of all time. These players are:

1. *Damian Lillard*
2. *Giannis Antetokounmpo*
3. *James Harden*
4. *Kawhi Leonard*
5. *Kevin Durant*
6. *Kobe Bryant*
7. *LeBron James*
8. *Stephen Curry*

General Description:

The pivot table created in the previous page is still of 2500 rows of DISTINCT PLAYERS. So, we need to create a similar table but for our 8 players according to our need.

Specific Requirements:

PIVOT TABLE-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
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ARITHMETIC OPERATORS-: Various arithmetic operators are being used like percentage, addition, division, ratio etc.

FILTERS-: The filters are used to the data in the table according to the requirements of the users.

Pivot tables and Results:

SEASON YEAR	(All)

PLAYER_NAME	Total BLK	Total STL	Total REB	Total AST
Damian Lillard	210	688	2876	4380
Giannis Antetokounmpo	780	691	5147	2473
James Harden	506	1575	5217	6094
Kawhi Leonard	423	1135	4287	1690
Kevin Durant	1141	1154	7341	4201
Kobe Bryant	392	1491	5417	5041
LeBron James	1213	2521	11726	11243
Stephen Curry	207	1486	3957	5619

SEASON YEAR	(All)

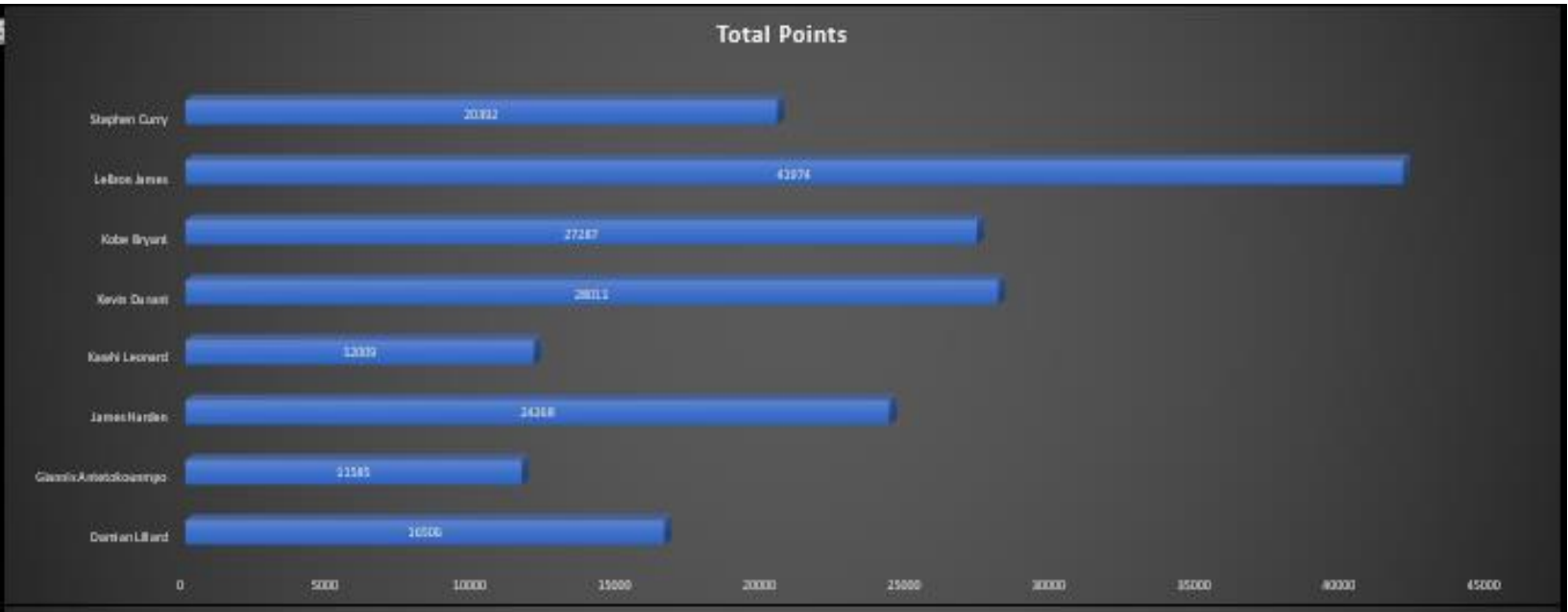
PLAYER_NAME	Total Points
Damian Lillard	16506
Giannis Antetokounmpo	11585
James Harden	24268
Kawhi Leonard	12009
Kevin Durant	28011
Kobe Bryant	27287
LeBron James	41974
Stephen Curry	20392

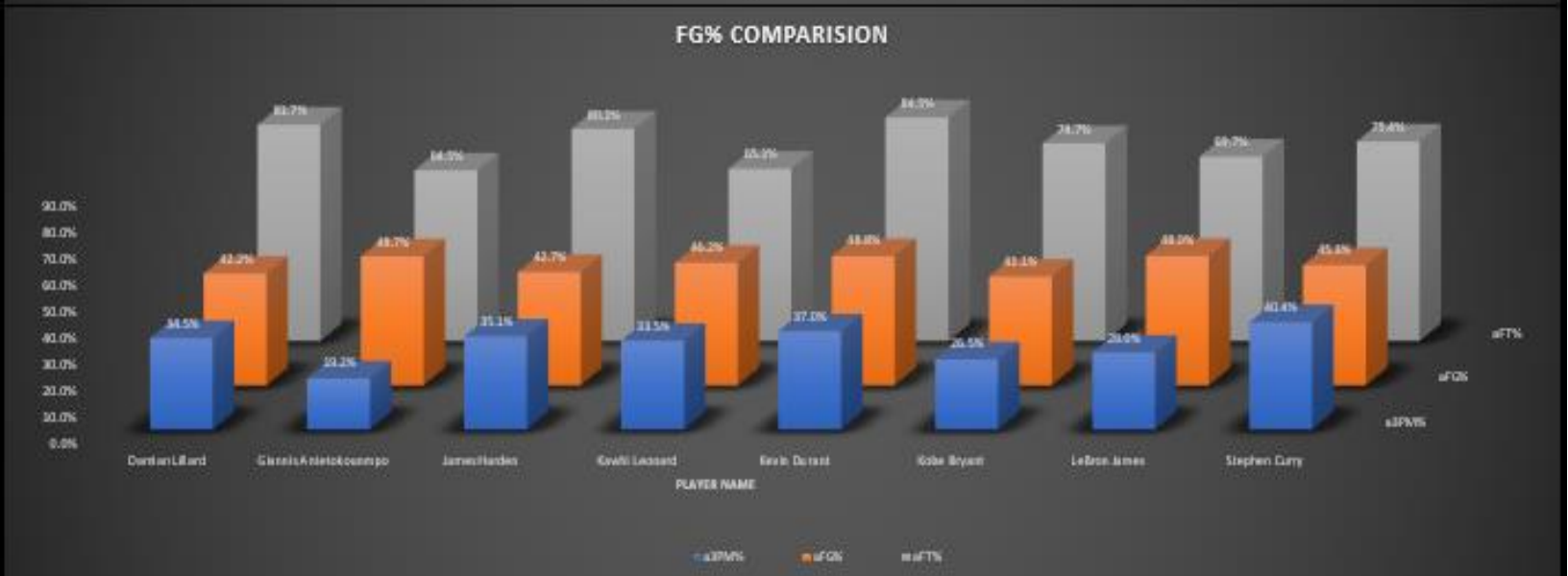
SEASON YEAR	(All)

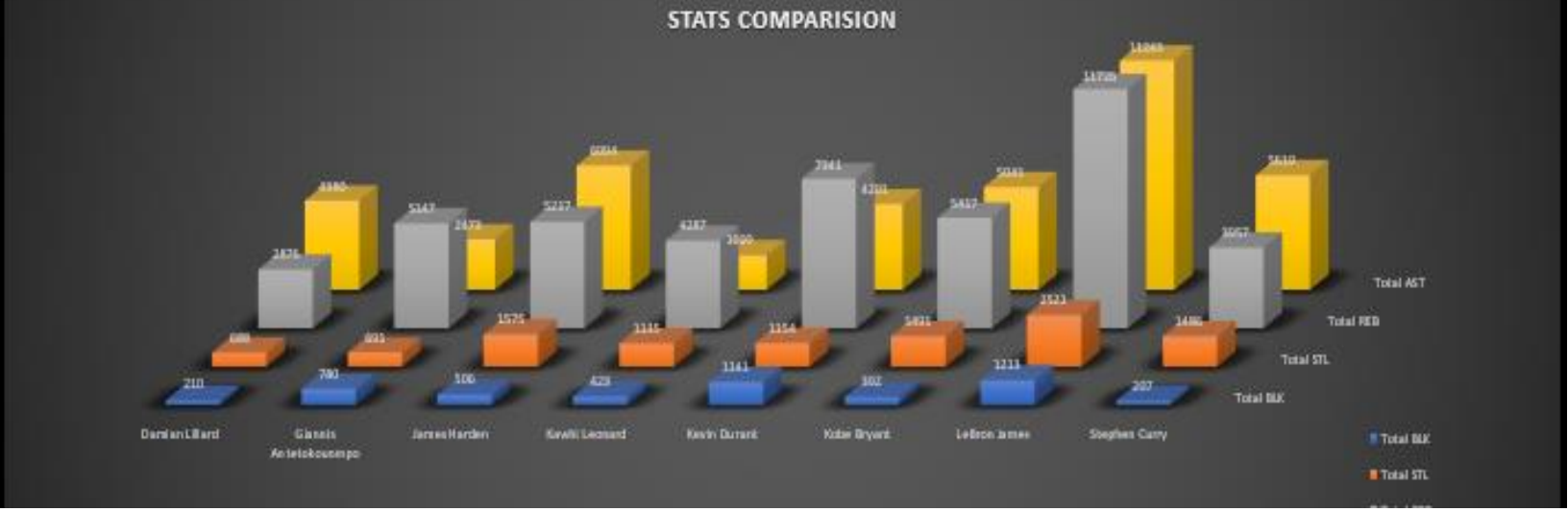
PLAYER_NAME	a3PM%	aFG%	aFT%
Damian Lillard	34.5%	42.2%	81.7%
Giannis Antetokounmpo	19.2%	48.7%	64.5%
James Harden	35.1%	42.7%	80.1%
Kawhi Leonard	33.5%	46.2%	65.1%
Kevin Durant	37.0%	48.8%	84.5%
Kobe Bryant	26.5%	41.1%	74.7%
LeBron James	29.0%	48.9%	69.7%
Stephen Curry	40.4%	45.3%	75.4%

1. Giannis Antetokounmpo, who has just recently started showing his prime career, already in discussion with players like LeBron James and Kevin Durant in terms of total blocks, rebounds, steals, and total points scored.
2. **PREDICTION:** Giannis is a poor 3- pointer shooter and free throw shooter, maybe because is 7 feet tall, and his game mostly depend on playing close to the hoop and dunking the ball.
3. Obviously, Lebron is an elite in every category, but what is surprising is that he is 6'9 tall and leads the league in total assists, blocks, steals and STILL has the most POINTS EVER SCORED IN THE PAST 2 DECADES!
4. Lebron has almost 10x more assist than Kawhi, who plays the same position as him, so GM would want Lebron over Kawhi any day as he helps his teammates, while playing his top tier game!
5. Lebron James, no matter how great he is, is a below average Free throw shooter with just below 69%
6. Stephen Curry is the best 3-point shooter with almost 41% from the 3-pt line.
7. Kobe Bryant, who retired in 2016, had the best years of his career after 2003, clearly because he won 5 championships with the Lakers with just around 30000 points.

Visualization:







ANALYSIS 4: EVOLUTION OF 3 POINTER (STEPHEN CURRY)

Introduction:

Back in the 1990s, the 3-point line was not used with the same frequency as it is now a days in the NBA, the game was more played around the hoop, with layups and dunking. But in the last 2 decades this has changed to a lot extent to the point that if a team in today's NBA do not shoot 3s, they are probably going to lose the game.

One of biggest reason of this change has been players like **STEPHEN CURRY.**

Curry was drafted in 2009 and came into the league with a scorching 3 pointer that forced other player like DAMIAN LILLARD to shoot more 3s to balance out the winning of games and overall NBA.

In this analysis we will look at the fashion at which the 3 pointers have evolved since 2003.

General Description:

3PA- 3 pointers attempted.

3PM- 3 pointers made.

3P%= Total 3PM/Total 3PA

Specific Requirements:

PIVOT TABLE-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
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ARITHMETIC OPERATORS-: Various arithmetic operators are being used like percentage, addition, division, ratio etc.

Pivot tables used:

1. Season stats over these years

SEASON YEAR	TOTAL 3PA	TOTAL 3PM	a3PM%
2003	38349	13245	12.7%
2004	42879	15219	13.4%
2005	45568	16241	13.4%
2006	48015	17082	14.0%
2007	50382	18193	14.8%
2008	51246	18695	15.6%
2009	51170	18081	15.3%
2010	50642	18075	15.2%
2011	40008	13854	14.0%
2012	56341	20082	15.2%
2013	60853	21774	16.2%
2014	63810	22272	16.2%
2015	68061	23954	17.4%
2016	75488	26895	18.8%
2017	79818	28772	19.9%
2018	87770	31040	20.9%

2. Stephen Curry career 3-point shooting.

Team	(All)
PLAYER_NAME	Stephen Curry

SEASON YEAR	a3PM%	3PA/GM	3PM/GM
2009	37.6%	4.5	1.9
2010	42.9%	4.6	2.0
2011	30.0%	3.4	1.5
2012	41.1%	7.4	3.3
2013	39.6%	7.6	3.2
2014	42.9%	8.2	3.6
2015	42.4%	10.5	4.7
2016	39.6%	9.7	4.0
2017	40.6%	9.8	4.1
2018	42.5%	11.4	4.8

3. Damian Lillard career 3-point shooting.

Team	(All)
PLAYER_NAME	Damian Lillard

SEASON YEAR	a3PM%	3PA/GM	3PM/GM
2012	35.6%	6.1	2.2
2013	36.9%	6.7	2.6
2014	30.8%	6.7	2.2
2015	34.2%	8.1	3.0
2016	34.2%	7.4	2.7
2017	33.4%	8.2	2.9
2018	37.0%	8.0	3.0
2019	32.8%	8.6	3.4

Visualization and Results:

1. There is a gradual increase in % of 3 pointers since 2003 from 12% to nearly 25% around the league. This means that players finally understood that shooting 3s, no matter how difficult it is, gives more 3 points on the scoreboard with less game planning at a faster rate with less energy required.
2. There is a dip in 2011, because the season was halted due to the Depression.
3. After 2011, the pace of increase in 3P% increased dramatically, part of reason being Stephen Curry, who's stats show that in 2012 he ATTEMPTED MORE 3S AND MADE MORE 3S PER GAME than in 2010, at almost the same shooting percentage of 41%. This forced players like Damian Lillard, who play the same position as Curry in his team, to shoot more 3s.
4. As we can see in 2015, Curry attempted 10.5 threes and almost made 5 of them per game, that is nearly half of those shots. This caused a rattle around the league that one player is DESTROYING THE LEAGUE WITH HIS UNIMAGINABLE TALENT. But he was doing nothing illegal, so Damian Lillard also started taking more threes as his past season, made more, at a higher clip than his previous seasons.
5. This provoked other star players like Lebron James and Kevin Durant to change their style of play to keep up with these Point "Gods".

ANALYSIS 5: Is LeBron James the Greatest Player to ever live?

Introduction:

LeBron James, 36 years old currently, in 18th year of his career, was drafted in 2003 and has dominated the NBA ever since. He is 6'9 of height and can play almost every position in basketball possible. That is very impressive given his height and weight, he moves like a point guard of height 6' and defends like Centre of height 7'. He has won 4 championships, the recent one with the Lakers. The most talked about athlete in the past 2 decades, he is a centre of media attention has often been compared to the Great Michael Jordan. In this analysis we will compare him to his other colleagues because there is no way to compare him to someone who played in the NBA 30 years ago. Game has changed a lot.

General Description:

3PA- 3 pointers attempted.

3PM- 3 pointers made.

3P%= Total 3PM/Total 3PA

Specific Requirements:

PIVOT TABLE-: A **pivot table** is a table of statistics that summarizes the data of a more extensive table (such as from a database, spreadsheet, or business intelligence program). This summary might include sums, averages, or other statistics, which the pivot table groups together in a meaningful way.
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Pivot tables used:

1. Lebron with other Great players; Kobe Bryant, Dwayne Wade

SEASON YEAR	(All)					
PLAYER_NAME	**PTS/GM**	**aFG%**	**a3PM%**	**aFT%**	**REB/GM**	**AST/G**
Dwyane Wade	20.6	45.0%	16.4%	67.7%	4.4	5.0
Kobe Bryant	24.8	41.1%	26.5%	74.7%	4.9	4.6
LeBron James	26.1	48.9%	29.0%	69.7%	7.3	7.0

2. Career compared to an average good player in the NBA; Vince Carter

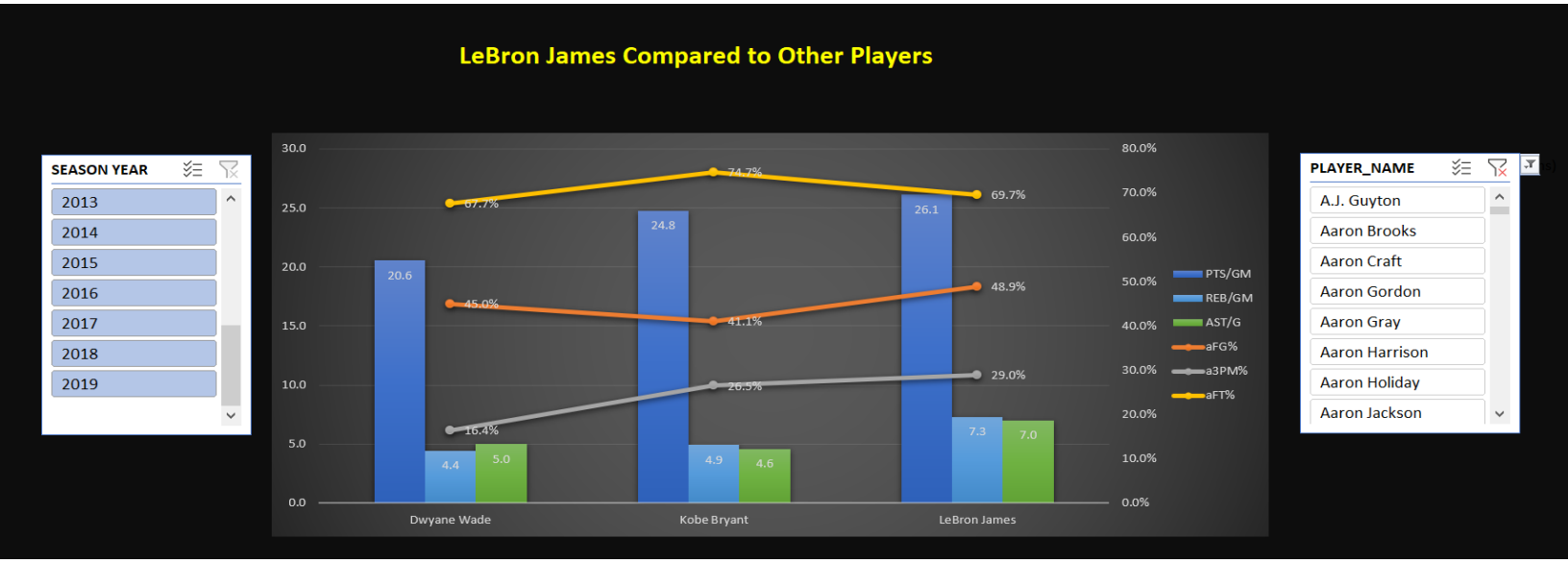
PLAYER_NAME	SEASON YEAR	Team	PTS/GM	AST/G	REB/GM	aFG%
LeBron James	2003	Cleveland Cavaliers	20.6	5.9	5.4	40.5%
	2004	Cleveland Cavaliers	26.5	7.0	7.1	46.6%
	2005	Cleveland Cavaliers	30.8	6.3	7.0	47.8%
	2006	Cleveland Cavaliers	26.3	6.3	6.9	46.1%
	2007	Cleveland Cavaliers	27.3	6.7	7.2	44.6%
	2008	Cleveland Cavaliers	28.1	6.9	7.5	48.8%
	2009	Cleveland Cavaliers	28.6	8.1	7.2	49.1%
	2010	Miami Heat	25.5	6.5	7.4	48.8%
	2011	Miami Heat	26.7	5.7	8.0	50.3%
	2012	Miami Heat	24.6	6.7	7.5	52.5%
	2013	Miami Heat	26.5	5.9	6.8	55.8%
	2014	Cleveland Cavaliers	24.3	7.1	6.6	44.4%
	2015	Cleveland Cavaliers	24.2	6.6	7.5	50.6%
	2016	Cleveland Cavaliers	25.1	7.7	7.9	51.7%
	2017	Cleveland Cavaliers	27.9	8.8	8.5	52.5%
	2018	Los Angeles Lakers	25.6	7.7	7.9	50.0%
	2019	Los Angeles Lakers	24.0	10.0	7.3	47.6%

PLAYER_NAME	SEASON YEAR	PTS/GM	AST/G	REB/GM	aFG%
Vince Carter	2003	21.5	4.5	4.6	39.8%
	2004	23.9	4.2	5.3	43.0%
	2005	23.7	4.2	5.8	43.4%
	2006	24.4	4.7	6.0	44.6%
	2007	19.8	4.8	5.5	43.4%
	2008	20.1	4.5	5.0	42.9%
	2009	15.9	2.8	3.7	40.7%
	2010	14.1	2.0	3.7	43.2%
	2011	9.5	2.0	3.3	37.2%
	2012	13.2	2.3	4.1	42.8%
	2013	11.7	2.5	3.3	40.4%
	2014	5.6	1.1	2.2	31.4%
	2015	5.0	0.7	1.8	24.6%
	2016	7.1	1.5	2.7	34.1%
	2017	4.1	0.9	1.9	26.8%
	2018	6.8	1.0	2.5	36.2%
	2019	5.0	0.8	2.0	31.4%

3. Lebron Assist number vs points total

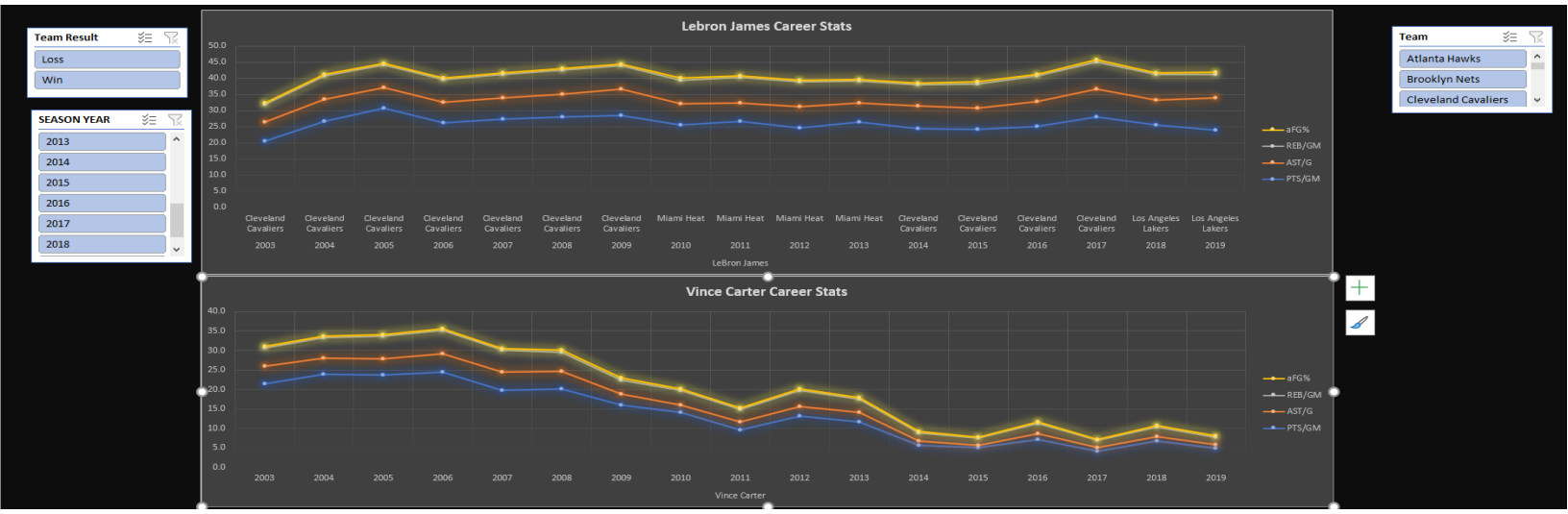
PLAYER_NAME	SEASON YEAR	Team	aAST/GM	PTS/GM
LeBron James	2003	Cleveland Cavaliers	5.9	20.6
	2004	Cleveland Cavaliers	7.1	26.5
	2005	Cleveland Cavaliers	6.3	30.8
	2006	Cleveland Cavaliers	6.3	26.3
	2007	Cleveland Cavaliers	7.1	27.3
	2008	Cleveland Cavaliers	7.0	28.1
	2009	Cleveland Cavaliers	8.2	28.6
	2010	Miami Heat	6.7	25.5
	2011	Miami Heat	6.0	26.7
	2012	Miami Heat	7.0	24.6
	2013	Miami Heat	5.9	26.5
	2014	Cleveland Cavaliers	7.5	24.3
	2015	Cleveland Cavaliers	6.9	24.2
	2016	Cleveland Cavaliers	8.4	25.1
	2017	Cleveland Cavaliers	9.0	27.9
	2018	Los Angeles Lakers	7.9	25.6
	2019	Los Angeles Lakers	10.4	24.0

Visualization and Results:



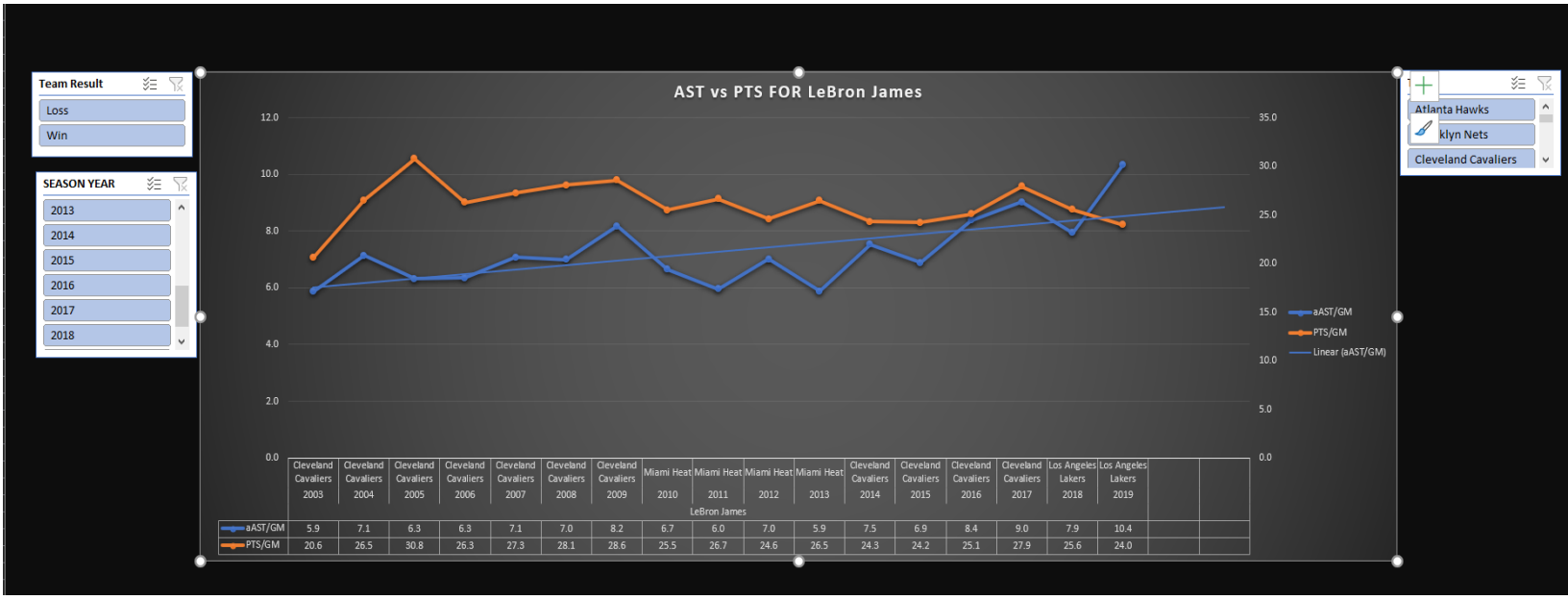
1. Dwayne Wade, was drafted along side Lebron James in 2003, is a great player throughout his career, played the same position as him. Kobe Bryant (RIP legend) played in the league for 20 years retired in 2016, also compared to Jordan often. Both players, when compared to James, gets crushed in terms on number stats. The only thing Lebron is average at is free throw shooting at the line, and that too is pretty good for an average NBA player.

2. LeBron leads both these players in- POINTS/GM, AST/GM, AND REB/GM **AND** he is still playing whereas Dwayne and Kobe are retired!



3. The bottom graph shows the career stats for Vince Carter, a great player who played along side Lebron for 18 years. We can see that how a career of a great average player descends towards retirement.

4. The first graph shows the career stats for Lebron James. It is very self-explanatory. The man is showing no signs of slowing down going into his 18th season in 2020!

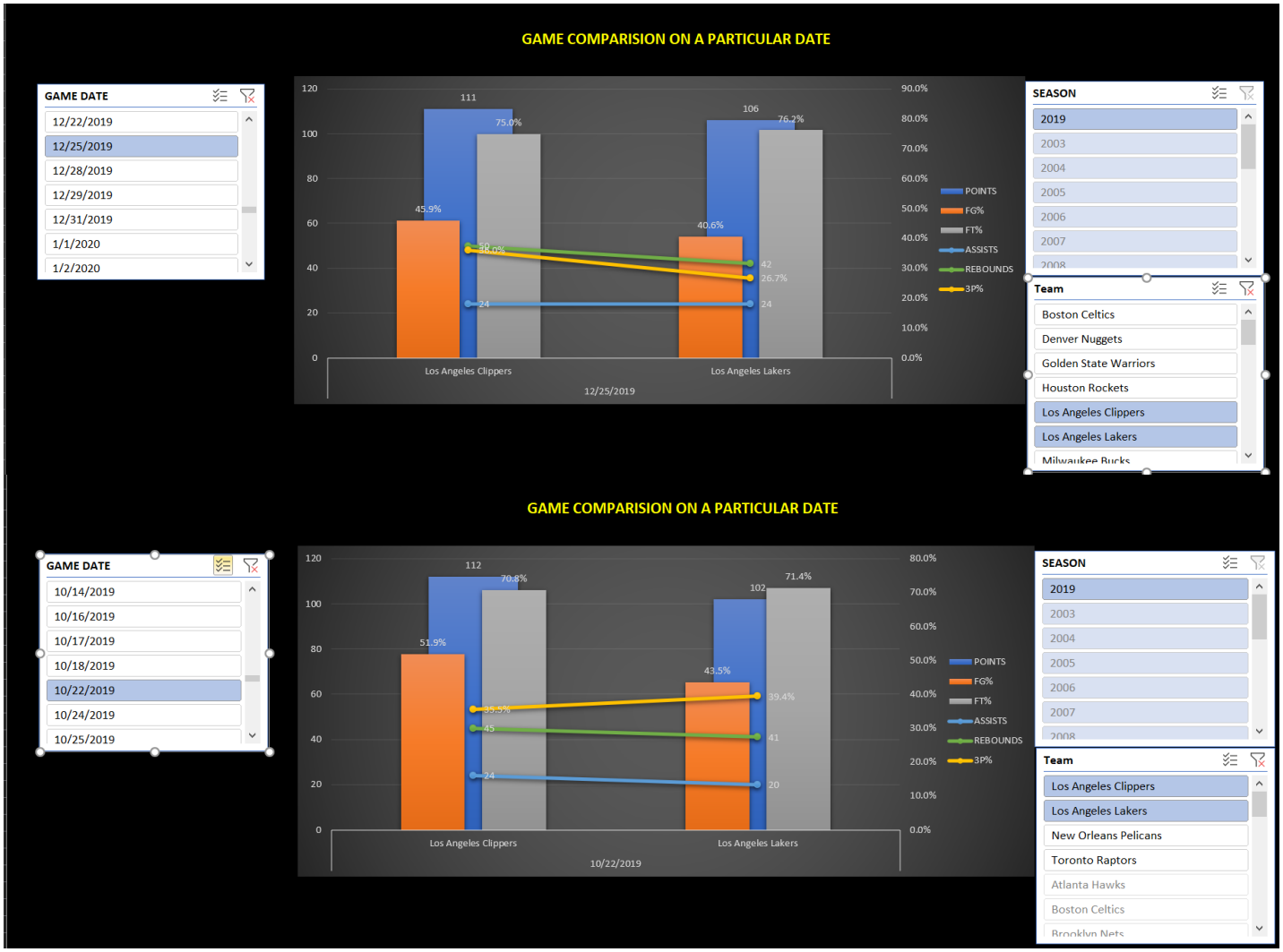


5. This graph shows how Lebron James' assist and point totals has transcended over the course of his career. Along with playing good basketball himself, he makes great plays for his teammates.

6. **PREDICTION:** In the recent season 2019-20, his Points/Game number showed a little decline, maybe because his team had a great player along side him in Anthony Davis, but his Assist/Game took a LEAP. This just indicates in how many ways he can impact the game even when he is not scoring the basketball. This also tells that, IF, he ever slows down, due to age factor, his assists number will grow and points will come down, making him unstoppable even in his late 30s.

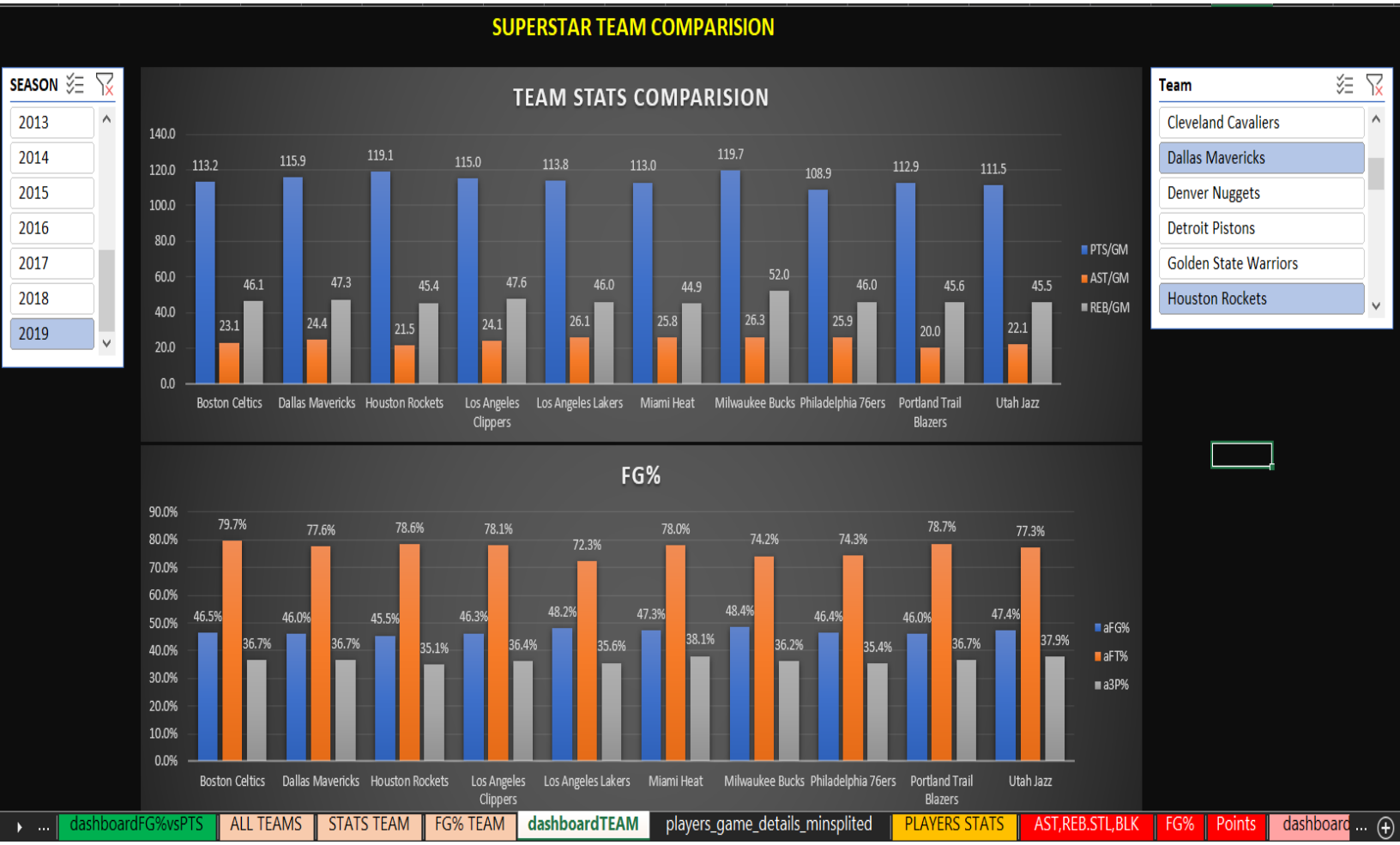
ANALYSIS RESULTS

1. Los Angeles Lakers Vs Los Angeles Clippers



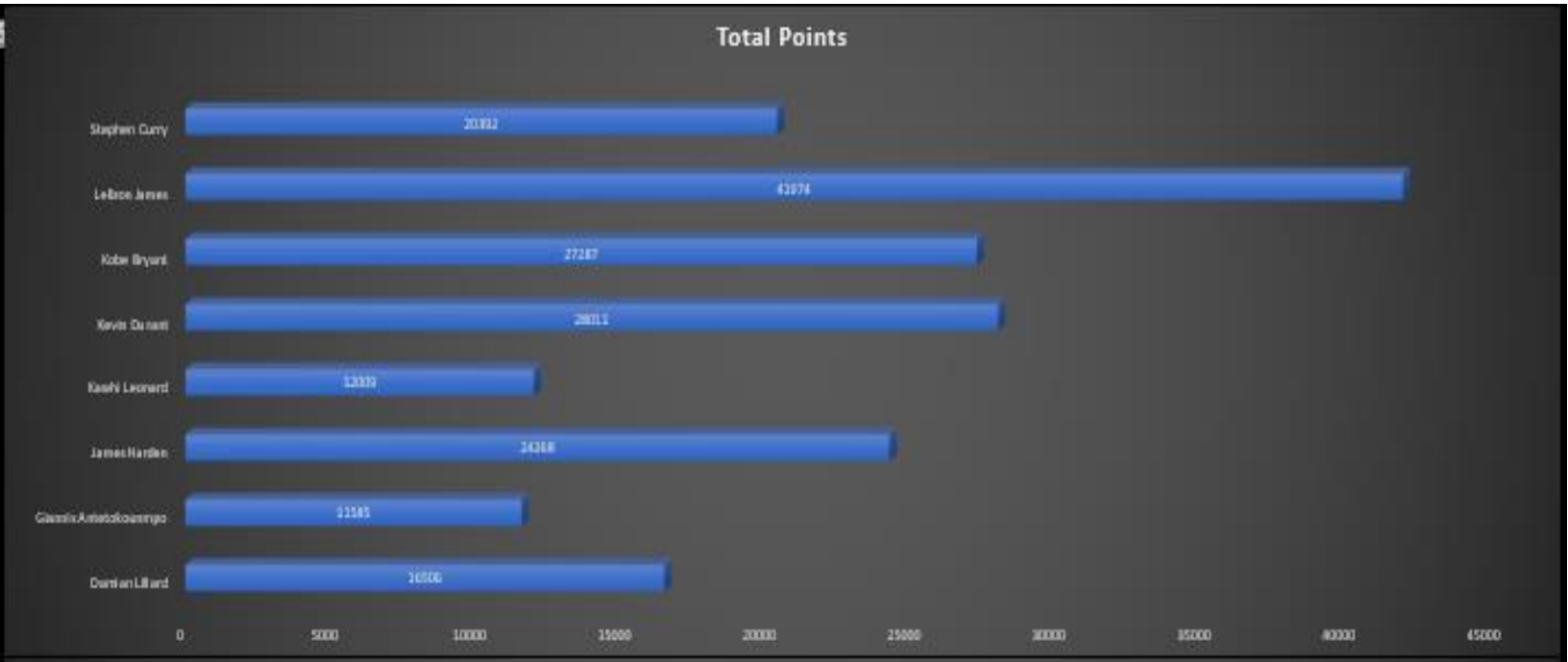
- Although the Lakers have 17 championships in the past, it does not change the fact that the current Clippers team is not a match for Lakers.
- **PREDICTION:** Clippers plays better in a single game match with the Lakers but in the playoff, they choke because they have to play 7 game series and every single year they get eliminated. So, to infer from this, if there happens to be a playoff series of Lakers Vs Clippers, chances are that Clippers are going to win, but as the history of the game suggests, the odds of that matchup happening is very unlikely because the Clippers never made out of the 1st round of playoffs.
- In the second matchup on 25th Dec 2019, the Lakers shot the ball better than Clippers but still lost. That tells us they shot probably less number of shots than Clippers.
- **PREDICTION: If the Lakers want to defeat Clippers in their next matchup, they need to take more shots and look to score the 3pt more because Clippers are a faster team in comparison**

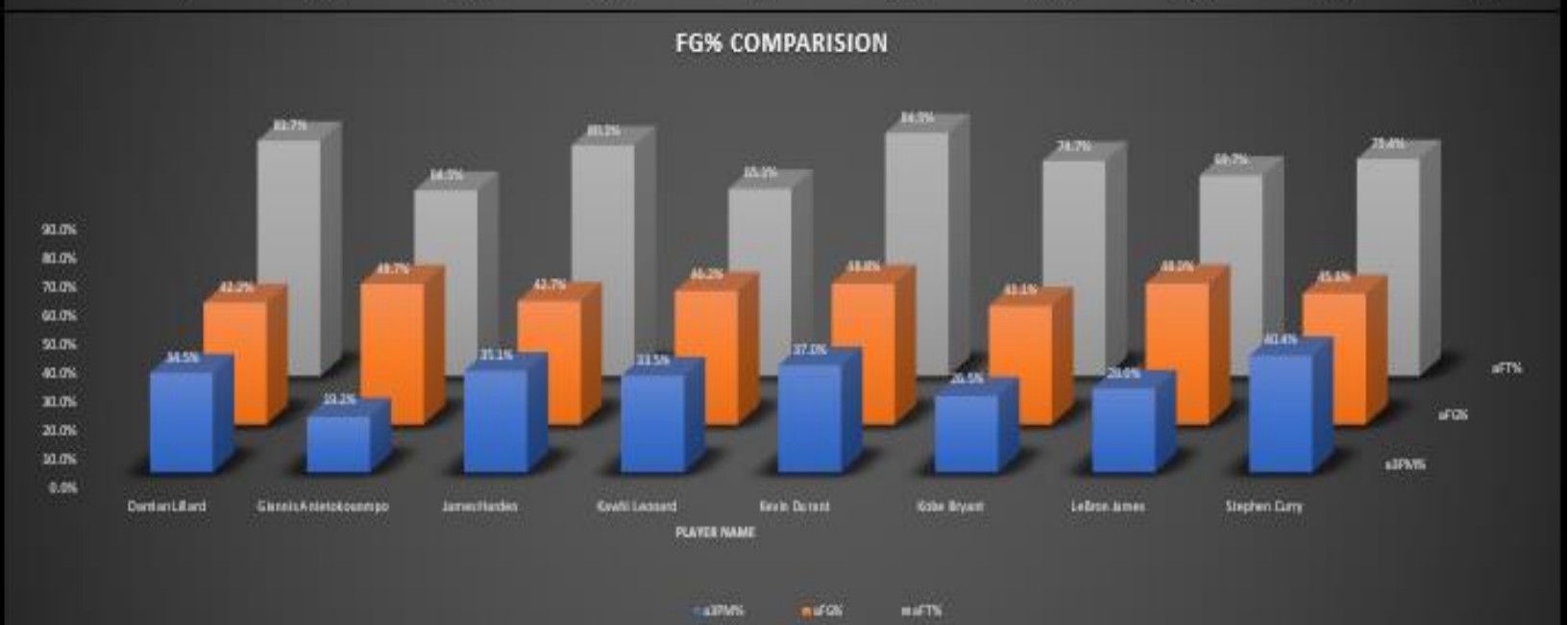
2. Super teams

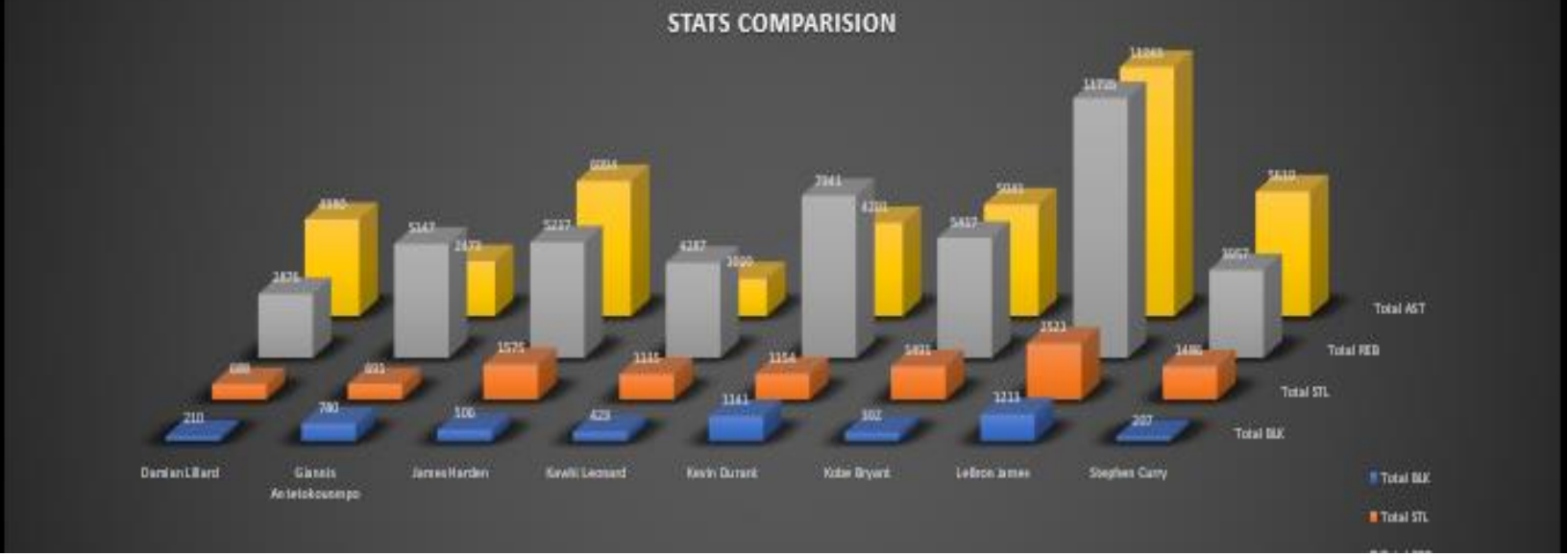


- Milwaukee Bucks were the scoring leaders per game of the 2019-20 season.
- Los Angeles Lakers led the league in Assists per game in 2019-20 season
- Milwaukee Bucks won the Rebounds per game in 2019-20 season.
- Bucks shot the best basketball with 48.4% in 2019-20.
- Miami Heat of south beach shot best from the 3-point line in 2019-20. (38.1%)
- Celtics shot the best Free Throw% in 2019-20. (79.7%)

3. Superstars of the League





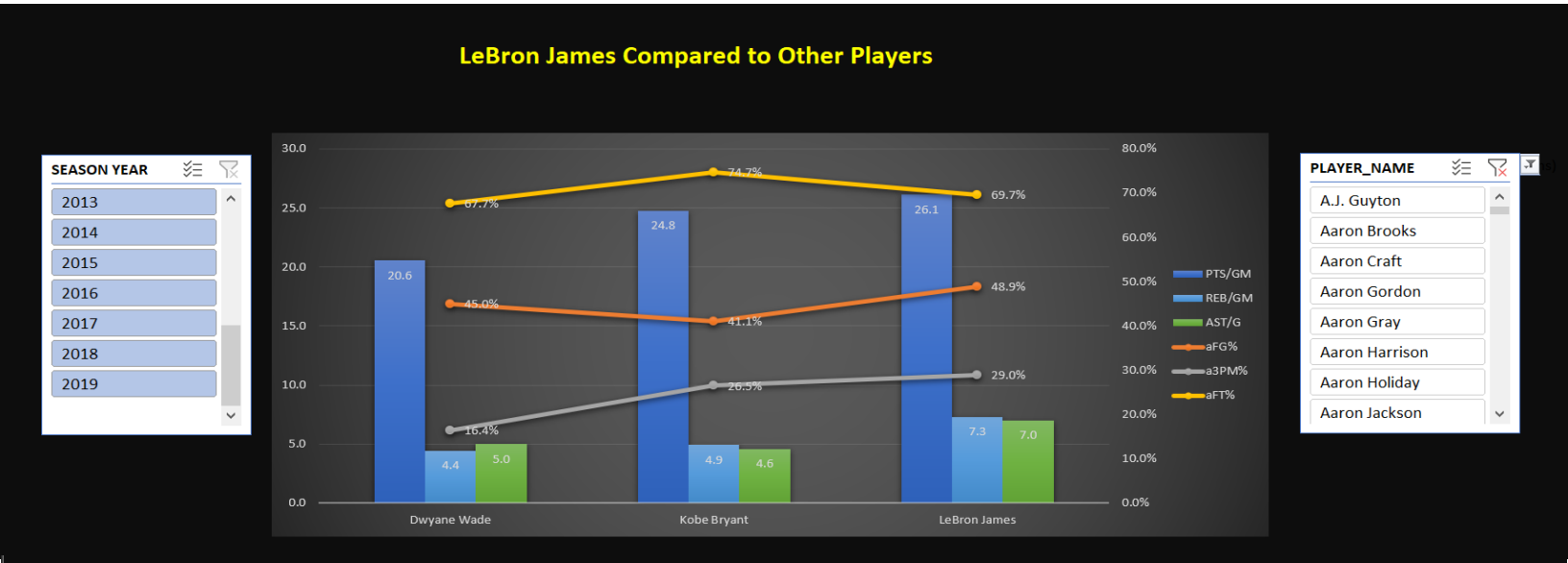


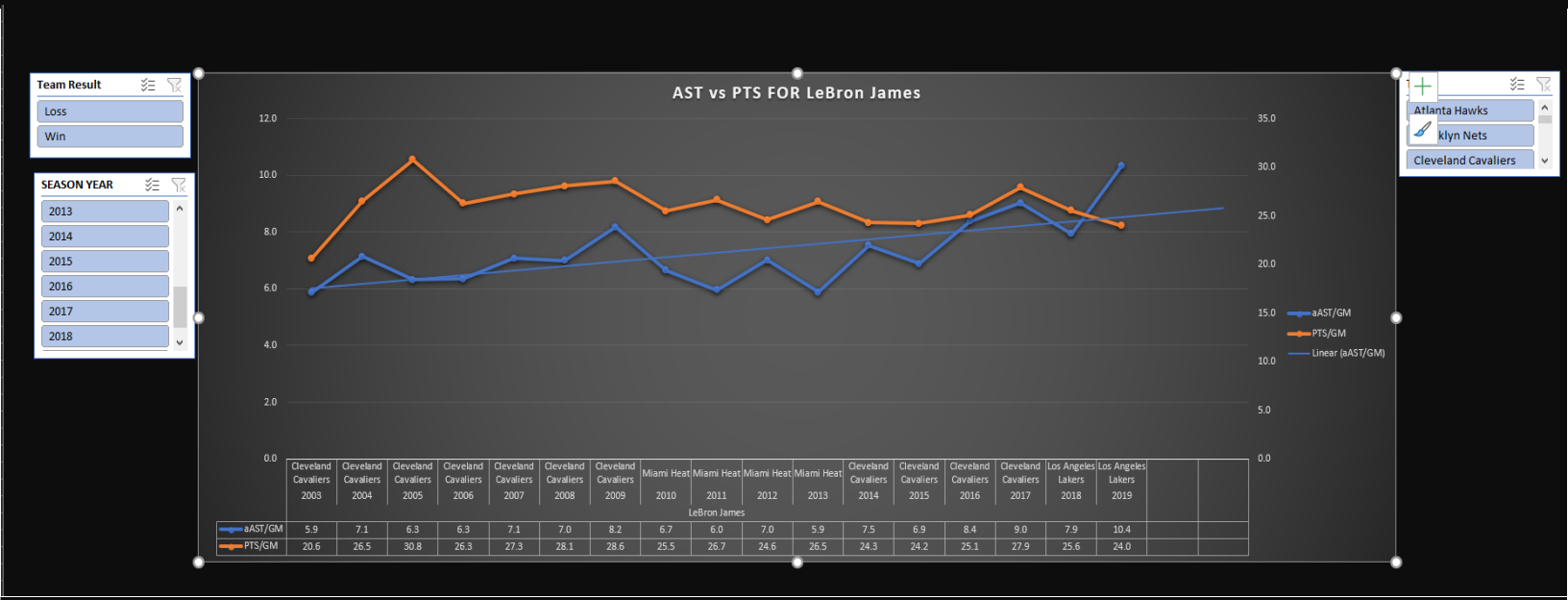
- Giannis Antetokounmpo, who has just recently started showing his prime career, already in discussion with players like LeBron James and Kevin Durant in terms of total blocks, rebounds, steals, and total points scored.
- **PREDICTION:** Giannis is a poor 3- pointer shooter and free throw shooter, maybe because is 7 feet tall, and his game mostly depend on playing close to the hoop and dunking the ball.
- Obviously, Lebron is an elite in every category, but what is surprising is that he is 6’9 tall and leads the league in total assists, blocks, steals and STILL has the most POINTS EVER SCORED IN THE PAST 2 DECADES!
- Lebron has almost 10x more assist than Kawhi, who plays the same position as him, so GM would want Lebron over Kawhi any day as he helps his teammates, while playing his top tier game!
- Lebron James, no matter how great he is, is a below average Free throw shooter with just below 69%
- Stephen Curry is the best 3-point shooter with almost 41% from the 3-pt line.
- Kobe Bryant, who retired in 2016, had the best years of his career after 2003, clearly because he won 5 championships with the Lakers with just around 30000 points.

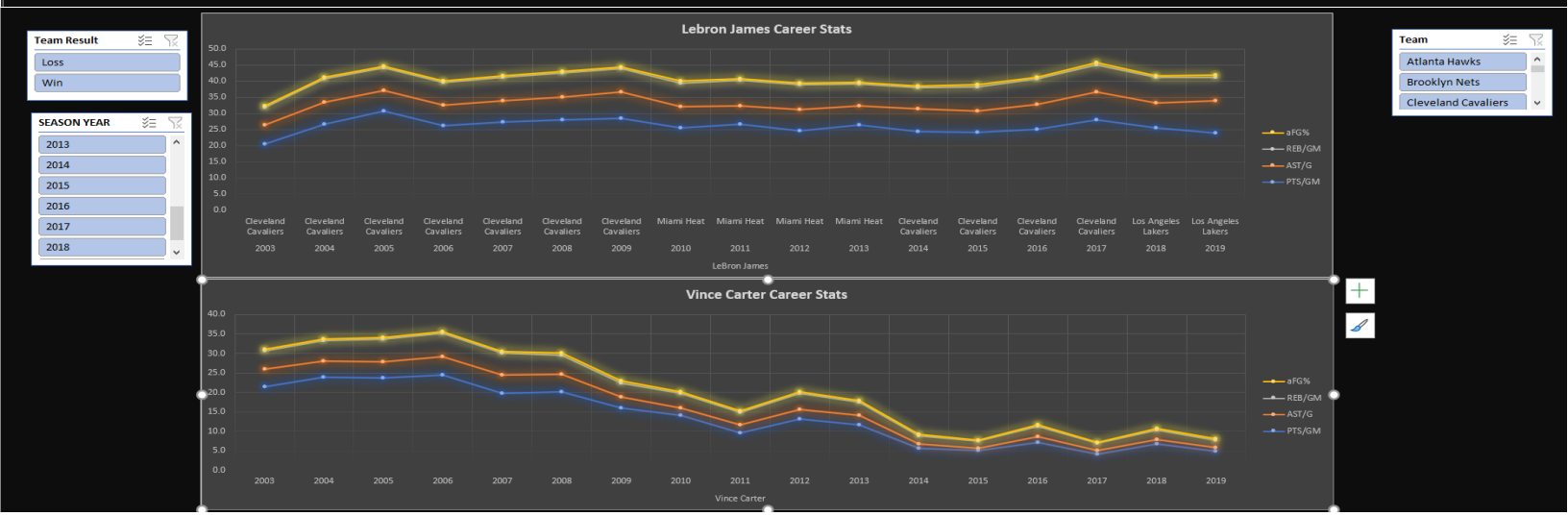
4. Evolution of 3 pointer

- There is a gradual increase in % of 3 pointers since 2003 from 12% to nearly 25% around the league. This means that players finally understood that shooting 3s, no matter how difficult it is, gives more 3 points on the scoreboard with less game planning at a faster rate with less energy required.
- There is a dip in 2011, because the season was halted due to the Depression.
- After 2011, the pace of increase in 3P% increased dramatically, part of reason being Stephen Curry, who's stats show that in 2012 he ATTEMPTED MORE 3S AND MADE MORE 3S PER GAME than in 2010, at almost the same shooting percentage of 41%. This forced players like Damian Lillard, who play the same position as Curry in his team, to shoot more 3s.
- As we can see in 2015, Curry attempted 10.5 threes and almost made 5 of them per game, that is nearly half of those shots. This caused a rattle around the league that one player is DESTROYING THE LEAGUE WITH HIS UNIMAGINABLE TALENT. But he was doing nothing illegal, so Damian Lillard also started taking more threes as his past season, made more, at a higher clip than his previous seasons.
- This provoked other star players like Lebron James and Kevin Durant to change their style of play to keep up with these Point "Gods".

5. Lebron James- Greatest Player to ever live?







FINAL DASHBOARD

NBA is a very huge league, its data is comparable with other sports, that is why it is impossible to limit this analysis to 5. There are probably 100 more analysis we can perform with data this big.

But for a user looking into this report briefly, a dashboard would be the most helpful!

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