COSC3000 – Visualization, Computer Graphics & Data Analysis

A performance analysis of Kevin De Bruyne

Student Number :44575986
Student Name : Yuzhe Jie

source: https://www.sportsmole.co.uk/football/man-city/news/de-bruyne-belgium-cannot-use-man-city-tactics_321705.html

Contents

1. Introduction

1.1 Aim

"Football matches are like modern gladiatorial battles." - Philip Lahm (Former captain of the German national football team)

Football will always feel like a gladiatorial battle and over these few years, data is the new weapon in a team's armory. Data analytics is football's rising star, but it has come to play important roles in many fields in football industry. On the training ground, Trainers along with players are gathering and using training data to improve the training effect; Coaches as well as match analysts are investigating the opponent's match data to find the best tactics putting on the tactical board. The club's sports supervisor is analyzing tremendous players' data – their market value, their performance…, in order to make better signings for the club next season. And, perhaps more widely, to the football fans, what is the most straightforward and exciting way to know news in football world? Looking at the visualization of data! That is also what sports media will present on their daily topics.

This report will examine the performance data of a single football player – Kevin De Bruyne from Season 2008/2009 to 2019/2020. It will uncover the growing process of him and also provide the analysis of his technical characteristics. It is an introduction to readers who are new to football or unfamiliar with this player, it is also worthy for fans and football professionals who want to have a deep understanding of his playing style.

1.2 Background

Kevin De Bruyne is a 28-year-old Belgian professional football player who plays for Manchester city football club and Belgian national team. His usual position on the pitch is midfielder, he also played as left or right forward, or second striker sometimes. Kevin began his professional career at KRC Genk in 2009, starting to play in Belgian Pro League. In 2012, he joined the English club Chelsea. Only 6 months later, he was loaned to Werder Bremen in German for a season. Returned at July 2013, he suffered from a knee injury and hardly play games for Chelsea. In January 2014, German club Wolfsburg signed him for 3 years

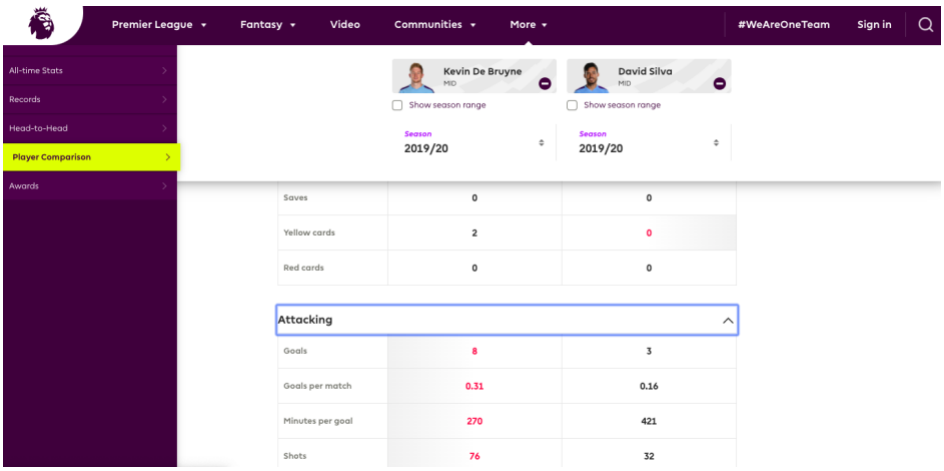
and this period was when his performance grabbed most people's eyes. In 30 August 2015, Kevin transferred to Manchester city club with a 6-year contract. From then on, his performance recognized him as one of the world's best football midfielders, even the one of the world's best football players.

Kevin has won many team and individual honours. These includes 2 English Premier League champions (with Manchester City), 2018 FIFA World Cup 3rd place (with Belgium), twice UEFA Champions League of the Season, Premier League Playmaker of the season 2017-2018 and many other awards.

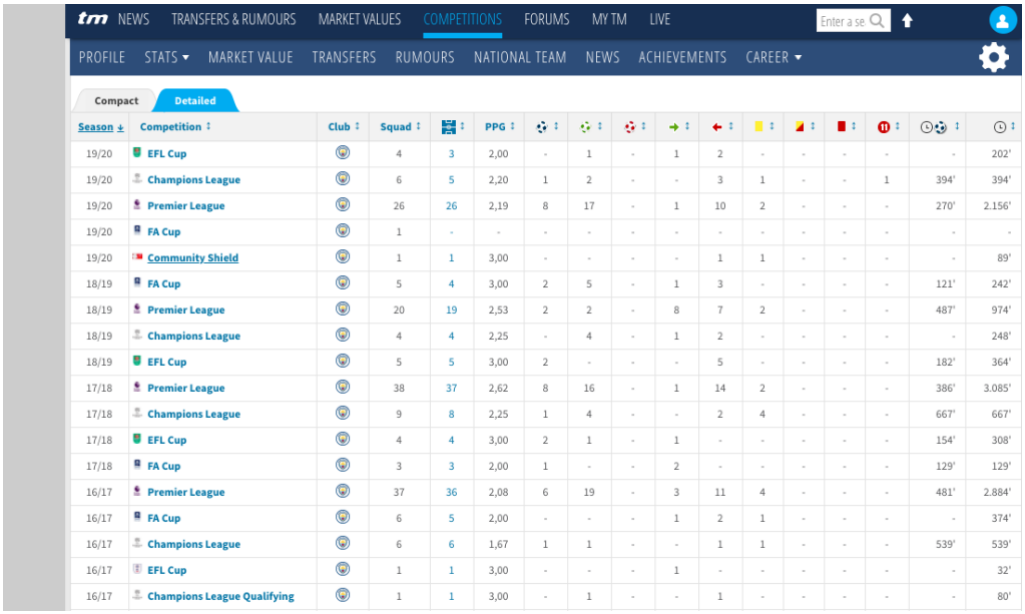
2. Methods

Kevin De Bruyne's performance data analyzed in this report are from 5 sources:

- Official site of English Premier League



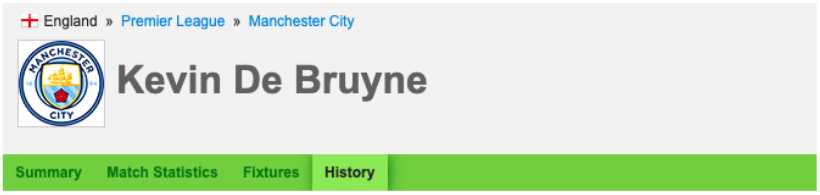
- Transfer Market Website
  This is a German-based website containing very detailed football statistics and Transfer news



Season	Competition	Club	Squad		PPG										
19/20	EFL Cup		4	3	2,00	-	1	-	1	2	-	-	-	-	202'
19/20	Champions League		6	5	2,20	1	2	-	-	3	1	-	-	1	394'	394'
19/20	Premier League		26	26	2,19	8	17	-	1	10	2	-	-	-	270'	2.156'
19/20	FA Cup		1	-	-	-	-	-	-	-	-	-	-	-	-	-
19/20	Community Shield		1	1	3,00	-	-	-	-	1	1	-	-	-	-	89'
18/19	FA Cup		5	4	3,00	2	5	-	1	3	-	-	-	-	121'	242'
18/19	Premier League		20	19	2,53	2	2	-	8	7	2	-	-	-	487'	974'
18/19	Champions League		4	4	2,25	-	4	-	1	2	-	-	-	-	-	248'
18/19	EFL Cup		5	5	3,00	2	-	-	-	5	-	-	-	-	182'	364'
17/18	Premier League		38	37	2,62	8	16	-	1	14	2	-	-	-	386'	3.085'
17/18	Champions League		9	8	2,25	1	4	-	-	2	4	-	-	-	667'	667'
17/18	EFL Cup		4	4	3,00	2	1	-	1	-	-	-	-	-	154'	308'
17/18	FA Cup		3	3	2,00	1	-	-	2	-	-	-	-	-	129'	129'
16/17	Premier League		37	36	2,08	6	19	-	3	11	4	-	-	-	481'	2.884'
16/17	FA Cup		6	5	2,00	-	-	-	1	2	1	-	-	-	-	374'
16/17	Champions League		6	6	1,67	1	1	-	-	1	1	-	-	-	539'	539'
16/17	EFL Cup		1	1	3,00	-	-	-	1	-	-	-	-	-	-	32'
16/17	Champions League Qualifying		1	1	3,00	-	1	-	-	1	-	-	-	-	-	80'

- [WhoScored.com Website]

  This website specializes in the in-depth analysis of detailed football data.



Historical Participations

Season	Team	Tournament	Apps	Mins	Total	OutOfBox	SixYardBox	PenaltyArea	Rating
2019/2020	Manchester Ci..	EPL	26	2156	2.9	1.7	-	1.2	7.92
2019/2020	Manchester Ci..	UCL	5	394	1.4	0.6	-	0.8	7.59
2018/2019	Manchester Ci..	EPL	19	978	1.6	1.1	-	0.5	7.05
2018/2019	Manchester Ci..	UCL	4	247	1.8	1.3	-	0.5	7.37
2017/2018	Manchester Ci..	UCL	8	667	2.1	1.6	-	0.5	7.66
2017/2018	Manchester Ci..	EPL	37	3085	2.5	1.9	-	0.6	7.80
2016/2017	Manchester Ci..	UCL	6	539	1.7	1	0.2	0.5	7.19
2016/2017	Manchester Ci..	EPL	36	2885	2.4	1.5	0.1	0.8	7.55
2018	Belgium	WC	6	540	2.2	1.5	-	0.7	7.65
2015/2016	Wolfsburg	GB	2	165	2	0.5	-	1.5	6.69
2015/2016	Manchester Ci..	UCL	10	712	1.4	0.7	-	0.7	6.90
2015/2016	Manchester Ci..	EPL	25	2004	2	1.1	-	0.8	7.45
2014/2015	Wolfsburg	GB	34	3052	2.8	1.6	-	1.2	7.95
2014/2015	Wolfsburg	UEL	11	982	3.5	2.1	-	1.4	7.95
2016	Belgium	UEC	5	450	4.2	3.2	-	1	7.97
2013/2014	Chelsea	UCL	3	26	-	-	-	-	6.08
2013/2014	Wolfsburg	GB	16	1420	2.1	1.2	-	0.9	7.71
2013/2014	Chelsea	EPL	3	132	1.3	1.3	-	-	6.62
2014	Belgium	WC	4	360	2.5	2.3	-	0.3	7.31
2012/2013	Werder Bremen	GB	33	2966	2.7	1.5	0.1	1.2	7.57

- https://understat.com/

This is a football statistical website focusing on creating precise method for shot

Quality evaluation using trained neural network prediction algorithms.

- 2 + 2 = 11 football blog

This is a blog provide visualisations of shots and passes of players

Because data of a single player is needed, and also because the first 4 database websites are powerful enough for users to search and query data on their own demands, it did not need to download the full dataset, nor it requires to apply other techniques to parse them. All need to do were finding the discrete and scattered data that is important and populating to an excel file, so a Python script can read it. Some data however were calculated by Excel's function. For example, the key passes per game was calculated by taking the average of total key passes and games played. Python programming language, plus the Matplotlib and Numpy packages are used as the visualization tools.

	A	B	C	D	E	F	G	H
1								
2	Premier League 17/18 – 19/20							
3								
4			De Bruyne	David Silva	Ozil	Pogba	Eriksen	
5	Apperance		82	81	68	69	92	
6								
7	Goals		18	18	10	19	20	
8	Goals per match		0.22	0.22	0.15	0.28	0.22	
9	Shooting accuracy		50.34%	53.19%	58.97%	54.07%	60.00%	
10	Shoots on target		74	50	23	73	78	
11	shoots per game		2.45	1.69	0.87	2.83	2.24	
12	freekicks scored		1	1	0	0	2	
13								
14	Passes per match		59.61	66.73	55.34	61.65	52.22	
15	pass successful rate		82.96%	88.23%	87.51%	83.83%	81.56%	
16	through ball per game		0.9	0.58	0.4	0.51	0.58	
17	Key pass		238	168	166	110	192	
18	key pass per game		2.9	2.07	2.44	1.59	2.09	
19	Crosses		583	176	27	72	411	
20	Crosses per match		7.11	2.17	0.4	1.04	4.47	
21	Crosses Accuracy		25.04%	20.57%	29.72%	12.07%	22.87%	
22	big chances created		53	37	17	12	28	
23	assists		34	26	7	21	24	
24	touches		6670	6410	4643	5543	6321	
25	pass forward		1368	1407	998	1312	1434	
26	dispossessed		99	74	88	145	115	
27	Distance per match (km)		6.24	7.47	6.67	8.82	8.62	
28								
29	Tackles		118	81	49	91	111	
30	Tackle winning rate		64.41%	60.49%	53.06%	64.84%	56.76%	
31	interceptions		40	48	21	42	58	
32	clearances		34	24	10	66	38	
33	Aerial battles won		31	41	7	125	37	
34	blocks		7	7	3	10	5	
35	fouls		63	62	42	107	40	
36	yellow cards		6	8	7	11	8	
37								

3. Results & Discussion

3.1 Growing over the 10 years

To analyse the growth of a player, an obvious way is to look at the appearance records as well as the contribution made to the team. A young and inexperienced player usually does not own much playing time, but players who are experienced and play as the mainstay of the team definitely deserve more appearance and playing time. Contribution is another aspect which can reflect a player's growth. There are different forms of contribution, In this section number of goals and assists are considered. In a word, growing from a novice to a mature player, one needs to learn to improve performance so that more contribution can be made to the team, while he is making more contributions, the coach has no reason to reduce his playing time.

Note that since growth relates to time, performance data in this section are visualized against time. However not calendar years but seasons are used as the timeline, it is because football matches are played as form of seasons, most European football leagues starts their season in August and finishes in May the next year.

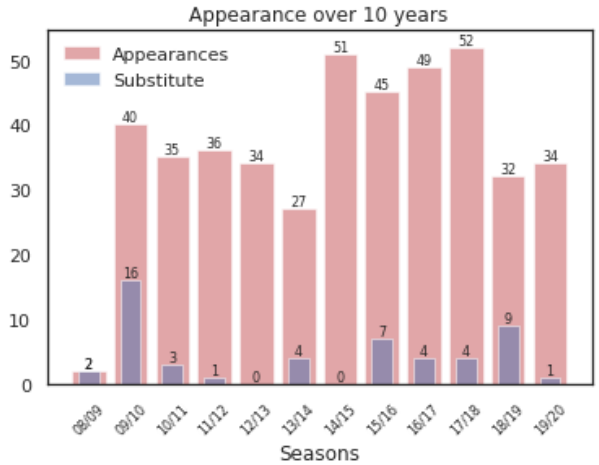


Figure 1

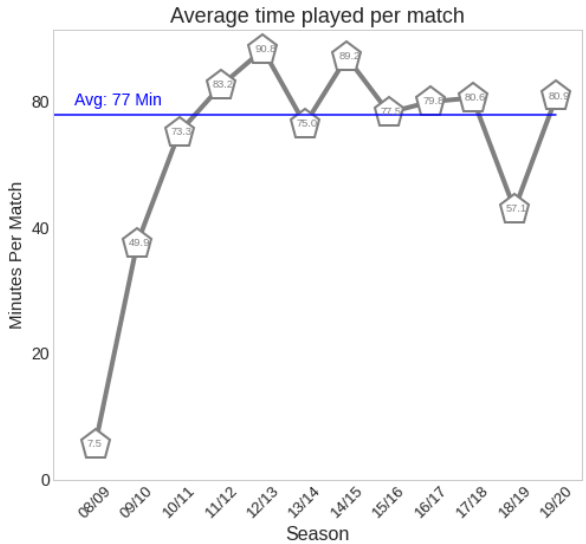


Figure 2

Look at Kevin De Bruyne's appearance data first. Here bar graph was used to indicate the total appearance in each season. A player come to play either in starting line up or as a substitute. The number of substitutes among the appearances were also plotted. 08/09 is the first season of Kevin's career, but just in the second year Kevin made a big difference

which hugely increase his appearances, that is the time he starts to play roles in the team Genk. From 14/15 season, Kevin’s appearances increased again, at around 50 games per season over the following years. That is largely because he joined a stronger team which had the qualification to participate in the European League (League across countries in Europe, only best teams of each league have qualifications) where he can play more matches. Owing to the knee injury, Kevin missed most games in 18/19 season. In current 19/20 season, the league halts from March because the COVID-19 virus.

Figure 1 also shows that Kevin played most his matches as starting player. Figure 2 shows that the average playing time per match at his third season was already close to the career’s average. In 12/13 and 14/15 seasons when he played for Genk and Wolfsbrug respectively , he played all matches as staring player, which means he became the vital guy in both teams. After he joined Manchester City at 2015, he was also used heavier and heavier under the management of famous Spanish coach, Pep Guardiola (Except the unlucky last year).

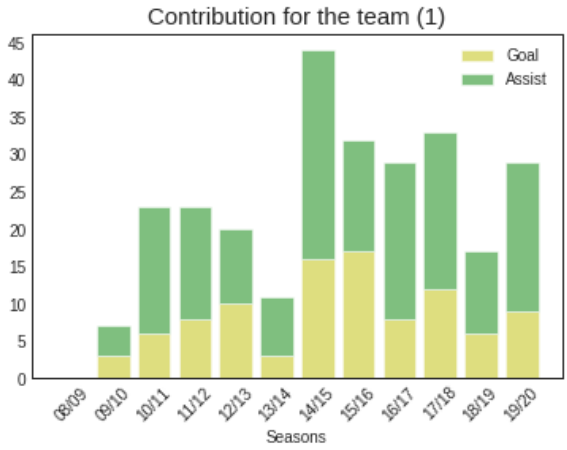


Figure3

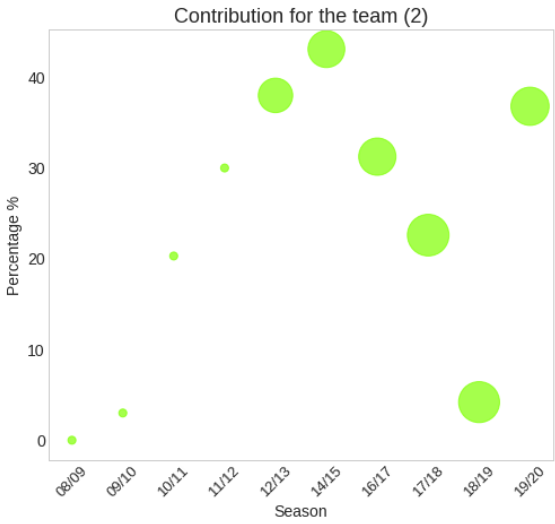


Figure4:

Figure 3 shows Kevin’s direct contribution namely goals and assists each season. As a midfielder, it is common to assists more than scoring goals. His goals increased kindly steady from 08/09 season to the first season in Manchester City (15/16). Usually when a player transfers to a new team or has a new coach, the playing style may change. Manchester City changed their head coach (from Manuel Pellegrini to Pep Guardiola) at the end of 15/16 season, from then it can be spotted that Kevin conceded less goals but delivered more assists. It was largely because under the Pep’s attacking system (known as Tiki-taka), Kevin has been the central playmaker who delivers the key passes. In Pep’s era, Kevin’s goal maintains at about 9 per season, and assists kept at a high level of around

20 per season, later section will show how good these statistics were.

Figure 4 shows the proportion of Kevin's direct contribution in the whole team. The size of the dots indicates the average points Kevin's team got per match, when he made an appearance. 3 points for a win, 1 point for a draw, and 0 points for a loss. Here 13/14 is omitted because he made a transfer and played for two teams, which made the calculation complex. Data of 15/16 season was lost. The size of the dots also reflects how strong the team was. The average points per match of Manchester City were way larger than his previous teams. In 17/18 season, every Kevin's appearance brought 2.62 points for his team, in 18/19 season, the contribution was 2.53 points per match. His two Premier League Champions were won in these two consecutive seasons.

Based on above figures, it can also be found that 14/15 is the most tired season for De Bruyne. He made 52 appearances without substitution (both national league and Europe League), and contribute nearly 45% goals of his team.

3.2 Shots and Passes

This and next section will visualize and analyze De Bruyne's technical characteristics, for readers to have a better understanding of his playing style. It is actually hard to analyze all aspects of player's technical characteristics, since it requires huge amount of data. Meanwhile, some characteristics cannot be identified and visualized by data, especially for midfield players. Generally speaking, the role of a midfielder is to transmit the ball from defenders to forward players so that the attacking is unfolded, and he may also takes heavy defending tasks to efficiently block the opposite's attacking. A good midfielder is the commander and "brain" who controls the rhythm of the team and, if they were to win, the rhythm of the match. Hence, performance of a midfielder cannot be simply judged by number of goals, assists and interceptions. Sometimes their awareness of the game matters a lot! One with a good sense and awareness of the game can make a usual running or a simple pass to be threatening enough.

However, shots and passes are still be used here to show Kevin's playing style, because he mostly played as an Attacking Midfielder (a subtype of midfielder, others are roughly Central Midfielder, Defending Midfielder) so shooting is one of his tasks. In addition, as mentioned above, passing is to transmit the ball so is of vital importance.

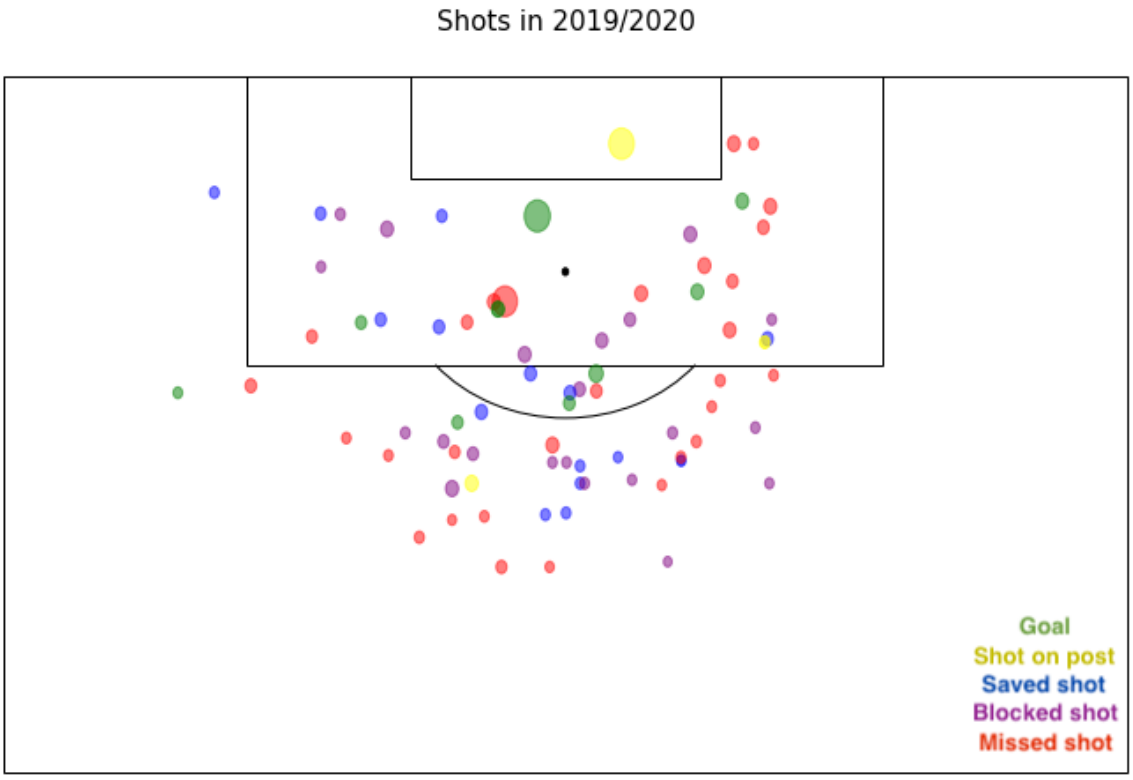


Figure 5 Kevin De Bruyne's Shooting maps

A shooting map is adopted to visualize all the shots of Kevin De Bruyne in 19/20 season (so far). Shooting positions as well as the result of each shooting attempt are shown in this map. What is more, the size of each dots represents the expected goal of shooting attempt (xG, from 0 to 1), larger size implies this shot had higher chance to end in a goal, and vice versa.

It can be observed that over a half of shots were attempted outside of the penalty box (the rectangle with arc on its top), even though most goals were scored in the box (5 out of 8). Most outside-box shots faced directly to the goal and that is where most shooting angles are available to attempt. Many people recognize that Kevin is good at long shot, from this map, it is right in terms of the number of tries, but wrong in terms of the successful rate. Inside the penalty box, when facing tighter defending, there were less directly-facing shooting chances, most shots were attempted either at left or right, deviating from the goal. Notice that De Bruyne is a right foot player, the amount of shooting dots on the right inside the box show that he would rather sacrifice the shooting angle and shoot with his habitual foot. (When moving at right with ball on the right foot, it is harder for defenders in front to intercept directly, so shoot with right foot there will be comfortable, but that will reduce the shooting angles) The chances of those right shots were indeed higher than those on the

left. On the left the shots seemed to be arranged in two horizontal lines, that somehow indicate his dribble route in that area. (the playing style of dribble and shot)

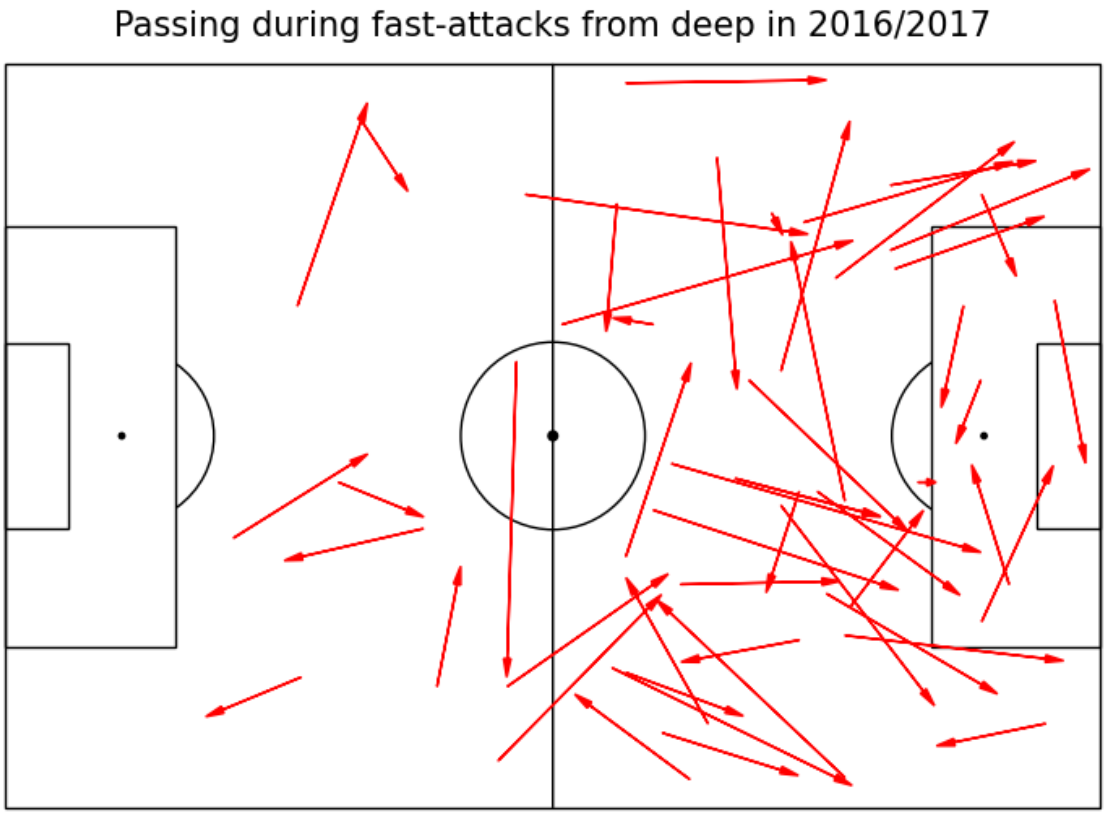


Figure 6 Kevin De Bruyne's passing during fast-attacks from deep in 16/17

Visualization and analyzing passing is also a difficult task. Passing data itself is dry and meaningless, for better analysis, the way is to visualize in a passing map. Another difficulty is how to choose the passing data since the amount is titanic. Data from a single game is not representative enough, data from the whole season will almost mess up the map. The particular passing data chosen here are De Bruyne's passes during fast-attacks from deep in 16/17 season. Fast-attacks just means the attacking is unfold quickly, often seen in counter-attack (an efficient and fast way to attack right after destroying opponent's attack.). "From deep" means the attacking starts from a deep position in the attacking team's own half (close to their post). This attacking style is applied widely and frequently by many great teams (of course Manchester City). These data were chosen to be representative enough to visualize Kevin's passing style and his passing mind, under the fast-changing and stressful game situation.

Each arrow indicates the start position, end position of the pass and length it covered.

The map shows that most passes are forward pass which advance the fast-attacks. Also notice the length and the position it passes to. Either Kevin made long ball transfer to the side of the pitch, or he just deliver the ball straightly to dangerous areas like the front of the penalty box, inside the penalty box and the 6 inch boxes (about 40%). This corresponds with the role of him mentioned above: Kevin is the playmaker of Manchester City, being the attacking midfielder, he needs to make smart but gambling choices to deliver the ball to teammates in dangerous area, most of such passes were through balls or crosses (will discuss in next section), which are considered as key passes if they are successful.

3.3 Player comparison

Player comparison is a good method demonstrate advantages and technical characteristics. The players to compare with Kevin are top attacking midfielders in English Premier League, they are David Silva (Kevin's teammate, also plays for Manchester City), Mesut Özil (plays for Arsenal), Paul Pogba (plays for Manchester United) and Christian Eriksen (Once plays for Tottenham Hotspur, now plays for Inter Milan). Data from last 3 seasons (17/18 to 19/20) in Premier League were collected to make the comparison. Radar chart is used to visualize the comparisonal effects, it is useful to compare different numerical features among players, often seen in electronic games like EA Sports FIFA. 3 aspects namely attacking, teamplay & dicspline, defending will be analysed.

It is noted that over the last 3 Premier League seasons, Kevin De Bruyne played 82 matches, David Silva played 81 matches, Özil played 68 matches, Pogba played 69 matches, and Eriksen played 92 matches.

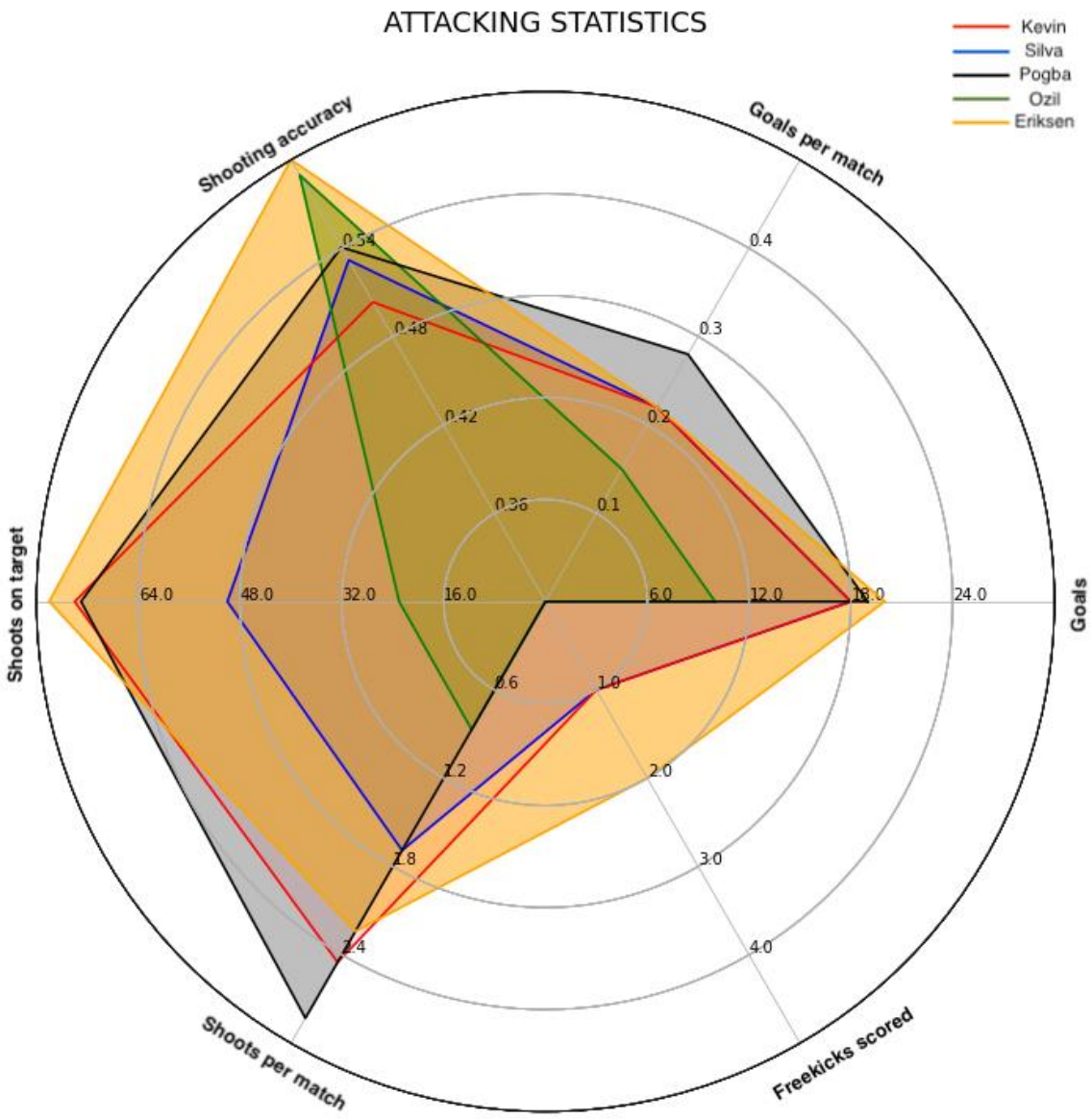


Figure 7

The attacking statistics contains several aspects shown in the graph. In terms of goals, there are not much difference between Kevin (18), Silva (18), Pogba (19) and Eriksen (20). Özil (10) was a bit behind. Eriksen owning 60% had the highest shooting accuracy and most number of shots on target (78, Kevin with 74 was not behind too much). In terms of shoots per game, Kevin ranked at second (2.45) and Pogba actually shoots most in each game (2.83). All of them are not good at scoring freekicks directly, Kevin only scored 1 freekick during that time. From this chart it can be found that 4 players are similar in attacking and Kevin did not outperform others in these fields.

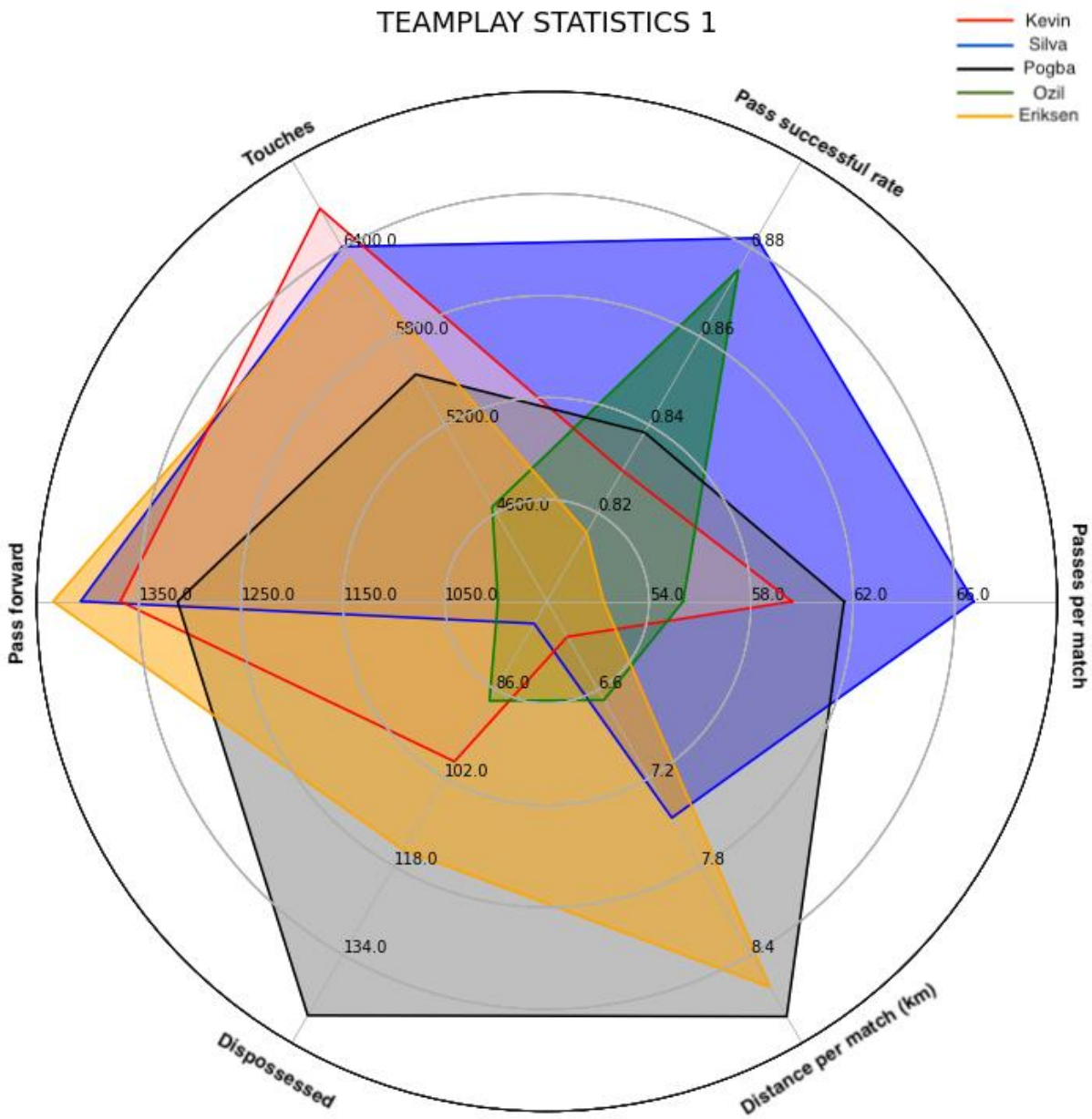


Figure 8

The first teamplay chart has 6 aspects. Kevin only had highest number of touches (kindly make sense with his roles). His teammate Silva had most passes per match (Kevin is 3rd) and highest pass successful rate (Kevin is 4th). Kevin ranked 2nd in pass forward. He is the man running shortest distances among them, which may imply that he created chances more by passing, not self-running. Here the player covering longest distance per match is Pogba, he is known as a B2B player who need to attack in the rival's box, and join in the defending line in his own team's box.

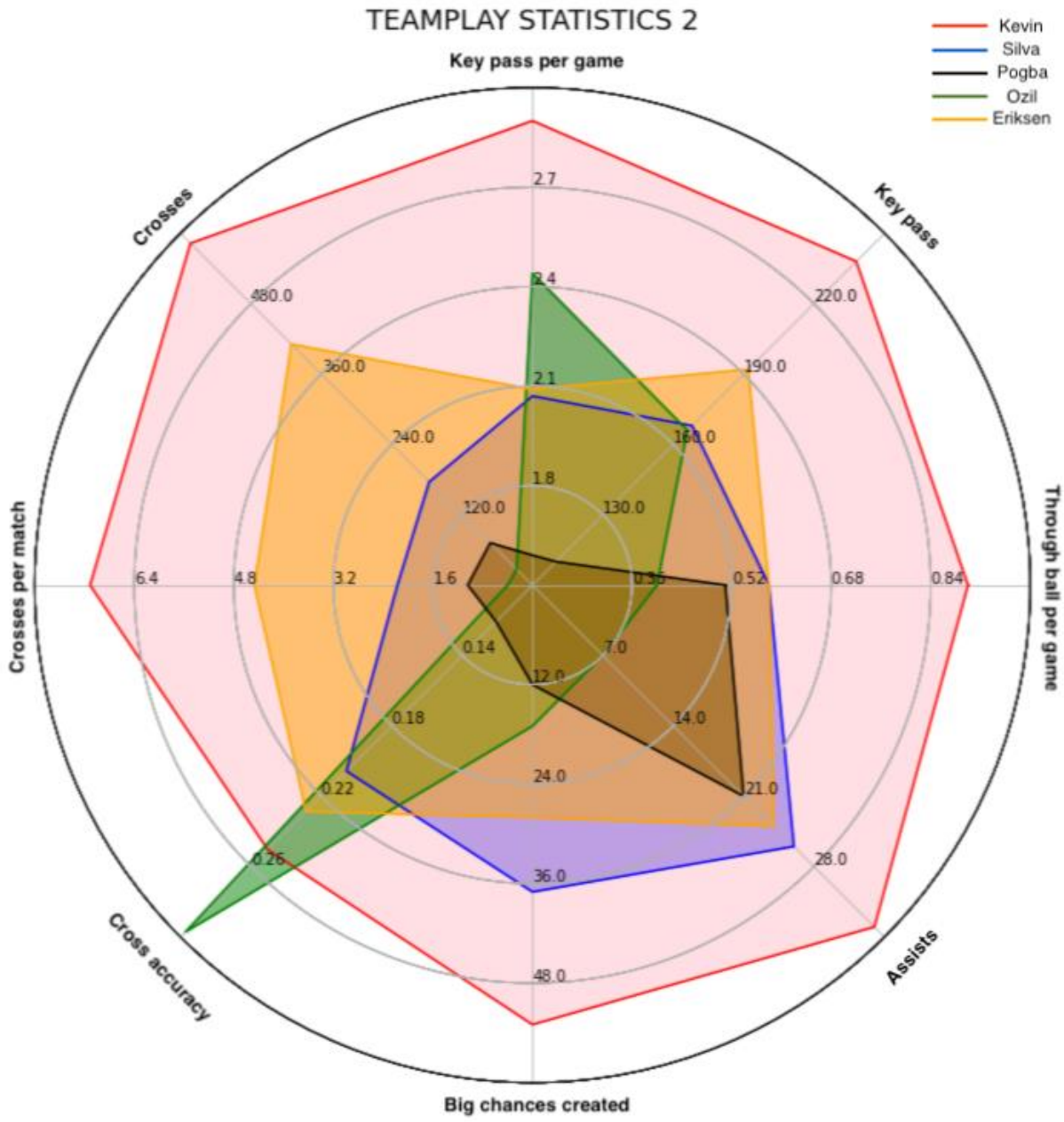


Figure 9

The second teamplay chart is all about key passes. Kevin De Bruyne largely outperformed in all aspects except cross accuracy. Cross and through ball are different potential key passes (in fact, not every attacking midfielder need to deliver crosses as much as possible, it depends on his role). Kevin delivered nearly 1 through ball and 7.11 crosses per match. Over the last 3 premier league seasons he made 238 key passes in total (2.9 per game!) and created 53 big chances, resulting in 34 assists. This perfectly shows his passing talent, being the sharp weapon of Manchester City, and biggest technical characteristics of himself.

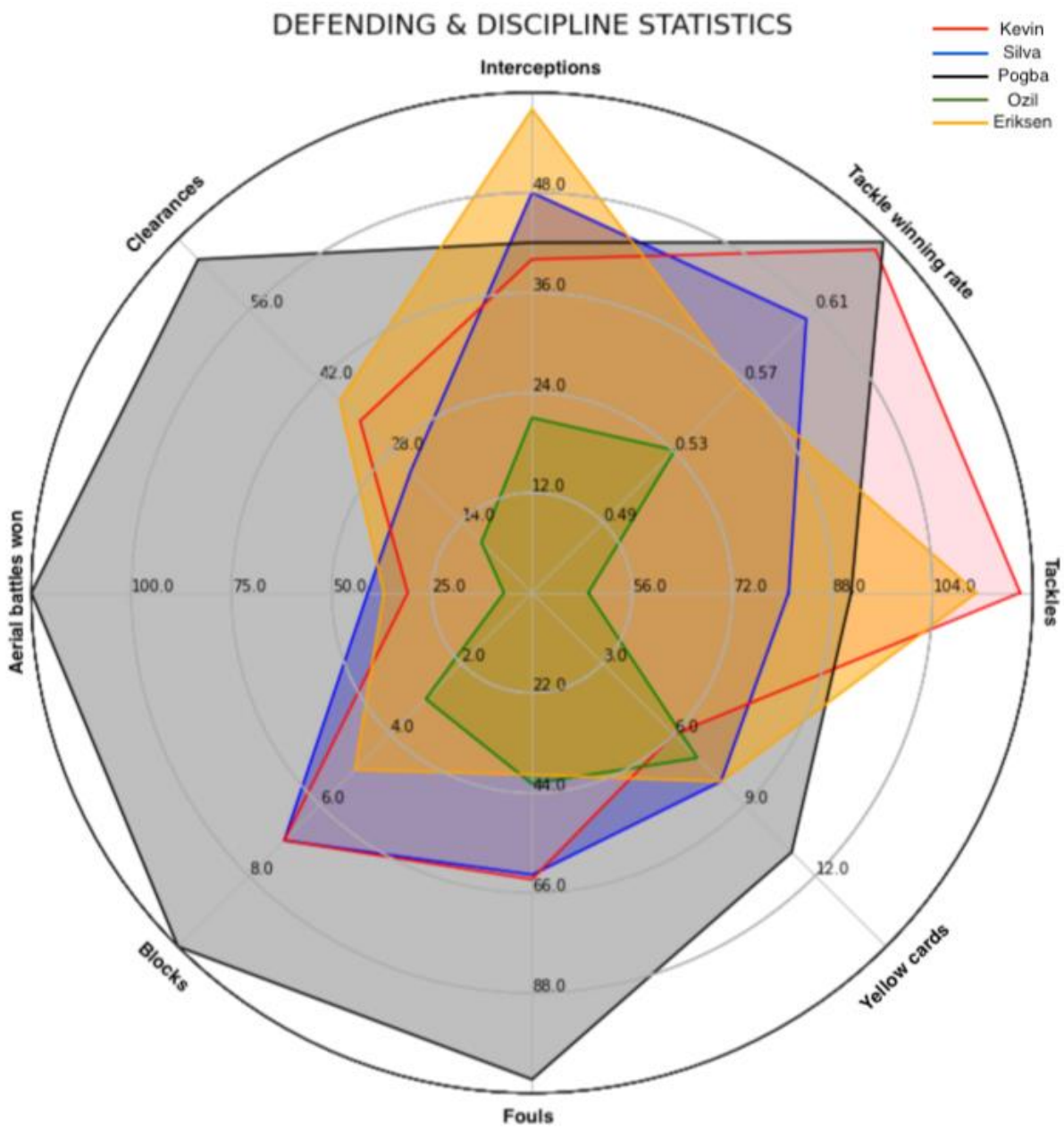


Figure 10

This defending and discipline chart presents tasks a midfielder needs to do. Kevin did well in tackles, he also need to defend deeply and make clearances. Eriksen did best in Interceptions which is faster and less dangerous to impede opponent's attacking than tackles, but requires experience on anticipation. Pogba was obvious the big man in defending, this is due to his strong and tall figure which enables him to make defensive move easily and efficiently. Combined with Figure 7 where Pogba was found to take many offensive jobs, his B2B playing style can be spotted and illustrated.

4. Conclusion

This reports presented visualization and analysis of the performance data of a football player – Kevin De Bruyne. It described his growing process using appearance and direct contribution data, and illustrated that Kevin grew gradually at Genk, and became the main stay in Wolfsbrug and Manchester City. To further illustrate his technical characteristics, a shooting map and a passing map were adopted to show his attacking and playmaker playing style. Finally, through player comparison, more technical details were uncovered to show different aspect of his techniques. His passing and chance-creating abilities were emphasized in these comparisons as well. Hope these visualizations and analysis can make readers more familiar with Kevin De Bruyne, and give some proof that he is, or is becoming one of the world's best midfield players.

5. Reference

1. "#17 Kevin De Bruyne." https://www.transfermarkt.com/kevin-de-bruyne/leistungsdatenverein/spieler/88755, 2020. Accessed 2020-04-02.

2. "Kevin De Bruyne – Historical Participations" https://www.whoscored.com/Players/73084/History/Kevin-De-Bruyne, 2020. Accessed 2020-04-03.

3. "Stats Centre – Player Comparison" https://www.premierleague.com/stats/player-comparison, 2020. Accessed 2020-04-05.

4. "Kevin De Bruyne" https://www.premierleague.com/stats/player-comparison. 2020. Accessed 2020-04-15.

5. "On the anatomy of a counter-attack" https://2plus2equals11.com/tag/soccer/, 2017.
Accessed 2020-4-17.

6. "How data analytics is fast becoming football's must-have signing", https://www.exasol.com/en/blog/how-data-analytics-is-fast-becoming-footballs-must-have-signing/ 2019. Accessed 2020-04-30.

7. G. Labellarte, “Kevin De Bruyne: ‘Belgium cannot use Manchester City tactical blueprint’”, https://www.sportsmole.co.uk/football/man-city/news/de-bruyne-belgium-cannot-use-man-city-tactics_321705.html 2018. Accessed 2020-05-03.