

# Scouting Assignment - Liverpool Defender 2018/19

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## Summary

This report recommends acquiring Kalidou Koulibaly from SSC Napoli as a potential upgrade to Dejan Lovren.

## Introduction

Liverpool FC were the highest scoring team in the PL last season (84) after the champions, Manchester City (106). 38 goals were conceded however, only one less than Burnley, who finished in 7th place. Both Manchester United and Tottenham, who finished in 2nd and third place respectively, conceded less and scored less than Liverpool FC. This purpose of this report is to identify a transfer target who will potentially improve the defensive department close the gap on our closest rivals.

## Method

A machine learning model has been used to analyse Liverpool FC's performances last season to see which player on-the-ball actions are statistically more likely to lead to an opposition shot within 10 events of a Liverpool possession chain. The benefit of modelling Liverpool FC's data as opposed to the whole league is that the model is specific to the way the team currently plays. Southampton FC may not perform actions that lead to shots in the same manner that Liverpool FC do.

This model is then used to identify potential candidates from Spain, France, Italy and Germany who play in a manner that is statistically less likely to result in a shot out Liverpool FC's goal.

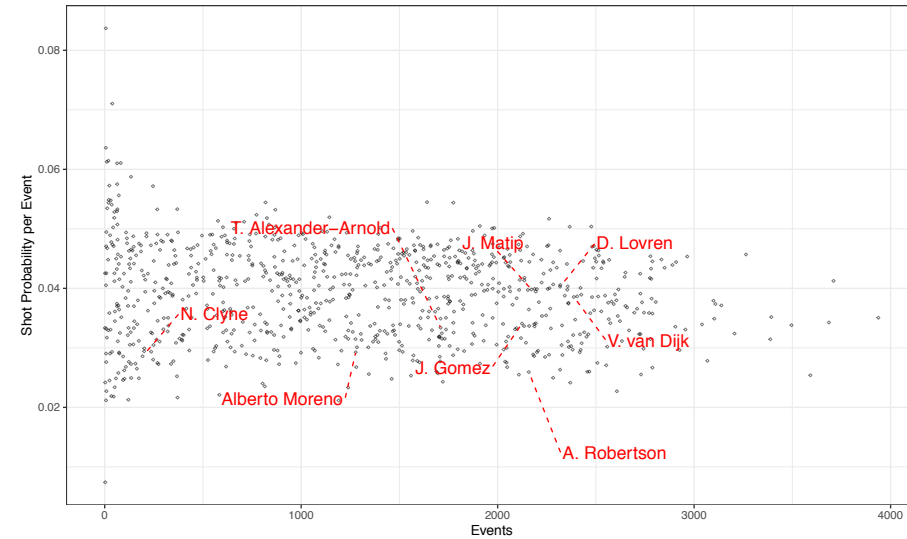
The quality of the shots has not been quantified for the puposes of this report. The model does not distinguish between the types of actions that a player takes or is involved with.

## Model Results for 2017/18 PL Season

As described in section 2, this report focuses on the acquisition of a centre-back to parter Virgil van Dijk as a potential upgrade for Dejan Lovren. The model generated for the purposes of this report identifies the following 10 players as the highest performing according to this metric and is shown in Table 1.1

playerId	Total_Shot	Mean_Shot	events	mean_y_location	Sigma_Shot	name	birthDate
70083	42.508	0.027	1572	49.787	0.026	Danilo	1991-07-15
3436	41.781	0.033	1254	38.297	0.032	Javi Manquillo	1994-05-05
70086	132.028	0.034	3938	41.960	0.026	N. Otamendi	1988-02-12
340	58.913	0.036	1651	32.796	0.032	Cuco Martina	1989-09-25
8307	62.968	0.036	1747	60.684	0.027	V. Kompany	1986-04-10
36	45.819	0.037	1245	67.577	0.031	T. Alderweireld	1989-03-02
370	88.547	0.037	2388	43.676	0.029	V. van Dijk	1991-07-08
14870	81.457	0.038	2172	64.645	0.028	J. Matip	1991-08-08
8653	104.500	0.038	2784	35.150	0.032	H. Maguire	1993-03-05
7855	90.597	0.038	2357	60.394	0.030	L. Koscielny	1985-09-10

# Assessment of Current Defenders



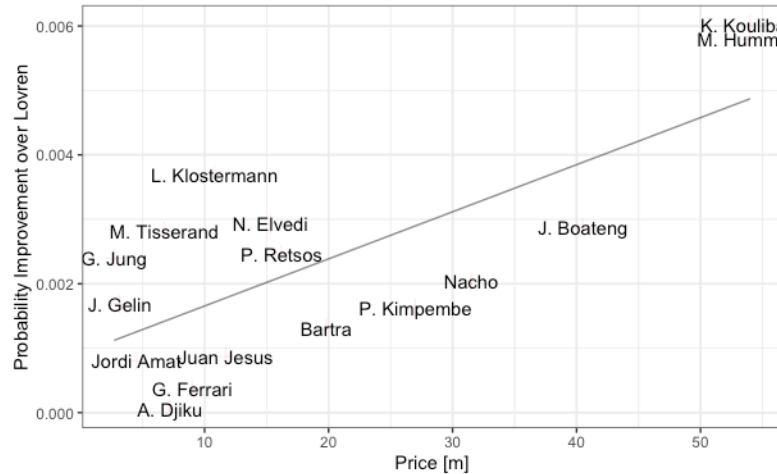
playerId	Total_Shot	Mean_Shot	events	mean_y_location	Sigma_Shot	name	birthDate
25393	93.38907	0.0402886	2318	54.27135	0.0248367	D. Lovren	1989-07-05
14870	86.45738	0.0398054	2172	64.64457	0.0260923	J. Matip	1991-08-08
370	92.05007	0.0385469	2388	43.67588	0.0263110	V. van Dijk	1991-07-08
257899	72.37088	0.0340729	2124	82.61017	0.0270286	J. Gomez	1997-05-23
346101	57.07453	0.0333769	1710	85.55439	0.0295315	T. Alexander-Arnold	1998-10-07
4908	37.41018	0.0292724	1278	13.95462	0.0229205	Alberto Moreno	1992-07-05
8392	5.51713	0.0285862	193	87.15026	0.0268752	N. Clyne	1991-04-05
222220	55.99115	0.0259338	2159	13.56600	0.0236428	A. Robertson	1994-03-11

- Currently only 3 senior Centre-Backs at Club
- Dejan Lovren is the lowest performer for this metric and is a currently regular starter.
- Full-back cohort perform well for this metric compared to range of players.
- CB identified as area of weakness to improve on as either replacement for or competition for D. Lovren.

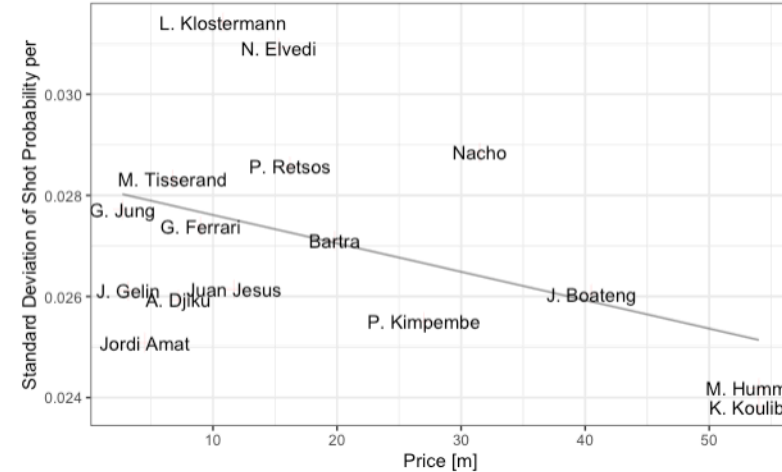
## Candidate Evaluation

- Only 9 players (CB's) have a higher rating than V. van Dijk and 16 players have higher ratings than D. Lovren (**Table 2.1**)
- 10 highest rated candidates (mean shot probability) all play outside England (except Harry Maguire, who would've been 10<sup>th</sup>)
- This metric is highly variable, as the standard deviation is of a similar magnitude to the mean – this can be interpreted as consistency

**Fig 2a – Potential Improvement over Lovren**



**Fig 2b – Sigma Shot Probability as Consistency**



**Table 2.1 - Potential Candidates**

name	price	age	Mean_Shot	Sigma_Shot	events	Total_Shot
K. Koulibaly	54.00	27.1	0.03426	0.02382	3686	126.3
M. Hummels	54.00	29.6	0.03450	0.02418	2623	90.5
L. Klostermann	10.80	22.2	0.03659	0.03143	1698	62.1
N. Elvedi	15.30	21.8	0.03736	0.03092	2591	96.8
J. Boateng	40.50	29.9	0.03741	0.02605	1749	65.4
M. Tisserand	6.75	25.6	0.03747	0.02832	1100	41.2
P. Retsos	16.20	20.0	0.03783	0.02858	1757	66.5
G. Jung	2.70	23.9	0.03789	0.02772	1810	68.6
Nacho	31.50	28.5	0.03825	0.02885	1652	63.2
J. Gelin	3.15	21.3	0.03860	0.02611	1728	66.7
P. Kimpembe	27.00	23.0	0.03866	0.02550	2405	93.0
Bartra	19.80	27.6	0.03898	0.02711	2597	101.2
Juan Jesus	11.70	27.2	0.03942	0.02614	1606	63.3
Jordi Amat	4.50	26.4	0.03949	0.02508	2064	81.5
G. Ferrari	9.00	26.5	0.03991	0.02739	2188	87.3
A. Djiku	7.20	24.0	0.04023	0.02593	2061	82.9

- Taking into account current market value there are potential candidates who appear undervalued for this metric (those above the line in Fig.2a) that offer significant improvement over D. Lovren
- Taking into account consistency, those below the line in Figure 2.b represent undervalued candidates.
- Only four players fit into both categories and can be split into two groups: Prestige Veterans (Koulibaly & Hummels) & Up and Comers (Gelin & Jung)
- This analysis indicates that although a significant investment, acquiring Kalidou Koulibaly from SSC Napoli would offer the most significant improvement in central defence at a relatively low price for this metric.
- He is preferred over Hummels due to a more appealing age profile and is thought to be less attainable than Koulibaly.
- Table 2.2** compares defender KPI's for Koulibaly and Lovren. Koulibaly outperforms Lovren in three areas: Passes/90, Tackles/90 and Carries/90, while Lovren performs more Intercepts/90 and Blocks/90.

**Table 2.2 – Koulibaly vs Lovren**

	Passes/90	Aerial Duels/90	Intercepts/90	Goals/90	Assists/90	% Passes Completed	Tackles/90	Blocks/90	Carries/90
Koulibaly	78.5	1.55	0.7	0.15	0.03	91.3	2.05	1.17	68.7
Lovren	66.8	5.59	2.2	0.08	0.04	91.1	1.36	1.36	56.1

## Metadata Analysis and Target Identification

The six analysts assigned to recruiting for this position have conducted their own investigation and have presented a single candidate for consideration. Each analyst has then taken the player selected by their colleague and has then tested them using the metric by which they chose their own player. After assessing how each player performs or scores, that analyst then assigns a rank order to each candidate, excluding their own player. The rank from each analyst has then been collated into a decision matrix as shown in Table 4.1.

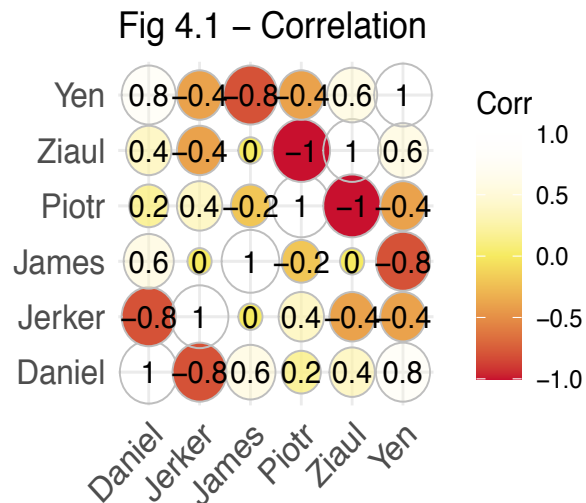


Table 4.1 - Analyst Rankings for Potential Recruits

	Daniel	Jerker	James	Piotr	Ziaul	Yen
Carlos	2	4	1	5	2	NA
de Vrij	NA	1	2	1	5	4
Kolarov	3	NA	5	4	3	1
Koulibaly	5	3	NA	3	4	5
Sabaly	4	2	4	NA	1	3
Sule	1	5	3	2	NA	2

A Spearman Rank Correlation comparison was made between all of the analysts' choices and can be seen in Figure 4.1. There is not particularly strong agreement between each analyst when it comes to ranking the players.

There is, however, a consensus with regard to the preferred player. Figure 4.2a shows the total score for each player taken from the decision matrix in Table 1. Koulibaly has the highest score, having obtained 80% of potential votes (25), followed by Kolarov on 64%.

The median score given for each player is shown in Figure 4.2b. Even though there is little agreement between candidate rankings, Koulibaly has a higher median score than any other player, followed by Kolarov and Sabaly.

The conclusion of this recruitment assignment is to recommend the acquisition of Kalidou Koulibaly from SSC Napoli as a potential upgrade to Dejan Lovren. Although an elite performer, Aleksandar Kolarov is not recommended as a potential candidate due to his age, while Youssouf Sabaly may be a candidate to further monitor.

