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Course ID: 1RT001 11813

Player Recommendation: AFC Bournemouth
Mathematical Modelling of Football

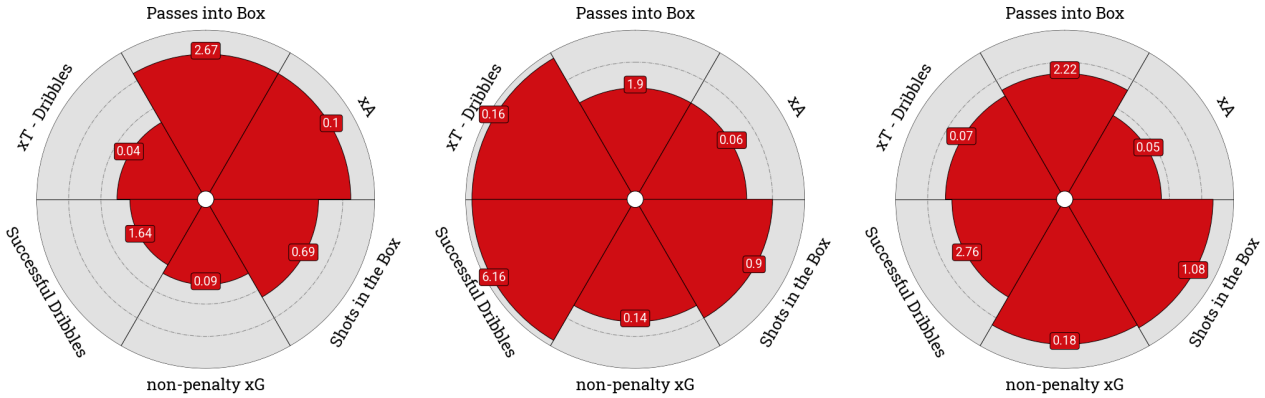
Attacking Performance

With the 2017/2018 season behind us, it's time to analyse what we can improve for the upcoming year. A decent season overall with a drop from 9th to 12th place where we scored 45 goals (10 less than the season before), and conceded 61 goals. In order for us to remain successful in the Premiership, I believe it's crucial for us to improve our goal scoring significantly for the 2018/2019 season. Looking at the distribution of our goals, I notice that many of the players in our squad contributed with a few goals or assists, but that none truly stood out being our main talisman. Our strikers, King and Wilson, scored 8 goals each, and the wingers who played the most minutes, Ibe, Fraser, and Stanislas, had 9 goals and 14 assists between them. To improve our attack for the next season, we need to complement our strikers with another winger who can contribute to more goals being scored.

To give a more detailed assessment of our wingers attacking contribution, I have defined a few metrics that are meant to be more qualitative assessment of the goal scoring opportunity, and some quantitative metrics commonly used to asses the attacking frequency.

- **Shots in the Box:** The number of shots made from within the the penalty area. The probability of scoring a goal increases significantly when the shot is taken within the penalty area, so the amount of shots from this area is a good measurement of a players ability to come to good scoring opportunities.
- **Passes into Box:** Same logic as previous metric, but attributed to the player successfully delivering a pass to a team mate in the penalty box. This metric highlights a players ability to set up their team mates for good scoring chances.
- **Successful Dribbles:** Successful attempts of offensive duels, where the player takes on or moves past an opponent into a free space. This metric aims to evaluate the players ability to create more space for themselves and the team while disrupting the opponents defense.
- **non-penalty xG** (Expected Goals): A more qualitative alternative to *Shots in the box*. xG measures the probability of a goal being scored from a shot, based on the shots distance from goal, how large angle of the goal is visible from the shooting position, and if the shot was taken with the preferred foot, weaker foot or by a header. The total value is the accumulated value for all shots taken. Penalties are excluded since they boost the xG value, but occur too randomly to be guaranteed in the future.
- **xA** (Expected Assists): Same estimation model as xG but attributed to the player making the last pass leading to the shot, i.e. the one that would get the assist if the shot is scored. Accumulated for all passes leading to shots.
- **xT - Dribbles** (Expected Threat): Estimate of how much a successful dribble increases or decrease the probability of a shot, and in extension a goal, when done as part of the buildup to the shot. The threat of the dribble is evaluated as how much it moves the ball into a position where the shot probability either is bigger or smaller compared to the position of the ball before the dribble attempt was made. The estimated threat of all successful dribbles are accumulated to a final score.

To give a fair assessment of how frequently our players delivers on these metrics, I look at how often they occur *per 90 minutes*, i.e. how many times can you expect these actions during a full game. To give some context on whether the resulting numbers are to be considered good or bad, I compare them to all other



(a) Ryan Fraser (b) Jordon Ibe (c) Junior Stanislas

Figure 1: The value of selected attacking metrics *per 90 minutes* for wingers with most playtime in AFC Bournemouth in the 2017/2018 season.

midfielders in the Premier League that played *more than 900 minutes* last season, thereby excluding players who only made a few but successful appearances.

To get a broader understanding and enable easier comparison between the players, the attacking metrics for our main wingers are visualised in the player radars in Figure 3. The size of each slice of the radar is relative to how the player is ranked among Premier League midfielders for that metric. That is, if the slice is filled to the edge, the player is one of the best in the league for that metric, and if the slice is almost empty he is among the worst performers in this metric.

Bournemouth's Wingers

From the radars, we can see that our wingers have quite diverse strengths in terms of these metrics. **Ryan Fraser** (1a) is quite good at getting *passes into the box* and with that shows a decent output of *xA* compared to the rest of the league. **Jordon Ibe** was one of the absolute best in the Premier League in terms of *successful dribbles*, and the *threat* those dribbles contributed to, whereas **Junior Stanislas** was the best among our wingers in terms of *shots in the box* and *xG*. While it's good to have to have players with different skills, I believe our attacks from the wing will be less predictable if we could add a more versatile player to our lineup. One who contribute with a variety of dribbles, passes, and shots to a higher extent than our current players.

Scouting a new winger

To find a player with multiple ways to contribute to the attack, I will scout for a combination of the various ways to be involved in a goal. In order to measure quality over time rather than quantity, I look at the expected numbers rather than the amount of performed actions. Let's call the combination of metrics *Expected Goal Involvement (xGI)*, and define it as

$$xGI = xG_{non-penalty} + xA + xT.$$

For the wingers in our squad, the combined xGI score per 90 minutes would then be **0.23** for Fraser, **0.36** for Ibe, and **0.3** for Stanislas as a reference point.

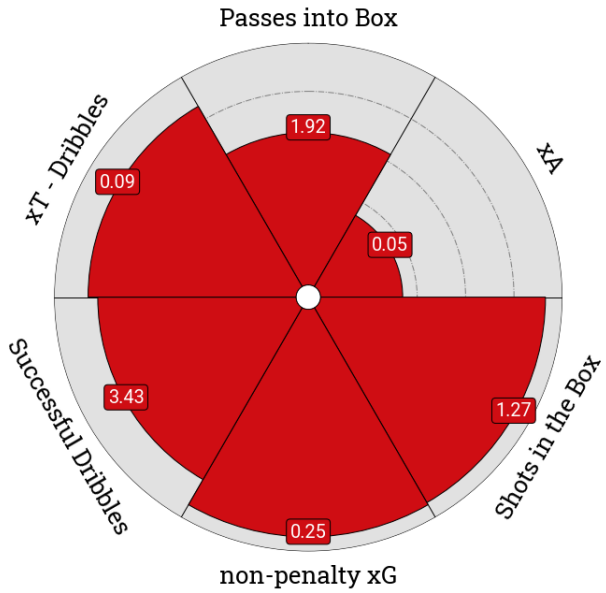
To find a winger that has a high expected goal involvement but still would be realistic for us to sign, I have narrowed my search to only investigate wingers from the German Bundesliga, as it's an attacking league in general with the wings heavily involved. I have excluded players from Bayern Munich in my search, because let's face it there's no way we could afford signing a well performing player from them. I also noticed

that all of our winger are right footed, so I specifically looked at *left footed wingers* to make our roster more versatile for Mr. Howe.

Recommended signing

By using the combined xGI metrics and the narrow search mentioned above, I found that one player really stood out from the crowd. With a combined xGI of **0.39**, 25 year old Filip Kostic from Hamburger SV was far ahead of the rest of the left footed wingers in Bundesliga past season. The second highest score was 0.27 by Kai Havertz (Bayern Leverkusen) and Caiuby (Augsburg). During the past season he returned 5 goals and 1 assist, but the xGI shows that could have been involved in more goals than that. Looking at Kostic radar (2a), it shows that he is quite versatile in how he contributes to goals. He was threatening a lot with his *dribbles*, and even though his *xA* is quite poor, his average of *passes into the box* shows that he was decent at putting the ball in to the dangerous area. Perhaps his team mates were not as good at converting the shoots from those passes. With Wilson and King receiving those passes instead, I would expect his passing contribution to shine more at Bournemouth.

His most impressive metric however is clearly his *shots in the box* and accumulated *non-penalty xG*. He was one of the best in these aspect among*all* midfielders in Bundesliga that played more than 900 minutes past season. In fact of the top 10 midfielders in non-penalty xG (2b), he is the only player that didn't play for a team ending up in the top 6. Instead he produced these numbers for a struggling team that came second to last in the league.



(a) Attacking metrics **Filip Kostic**, Hamburger SV.

Player	Age	Market Value	Preferred foot	non-penalty xG
Y. Konoplyanka	28	€10	right	0.317
K. Bellarabi	28	€12	right	0.306
S. Gnabry	22	€20	right	0.302
S. Kagawa	29	€13	right	0.284
A. Robben	34	€7	left	0.28
F. Kostić	**25**	**€6**	**left**	**0.246**
A. Vidal	31	€35	right	0.243
M. Sabitzer	24	€25	right	0.237
C. Pulisic	19	€45	right	0.219
N. Amiri	21	€17	right	0.21

(b) Top 10 midfielders with highest *non-penalty xG*.

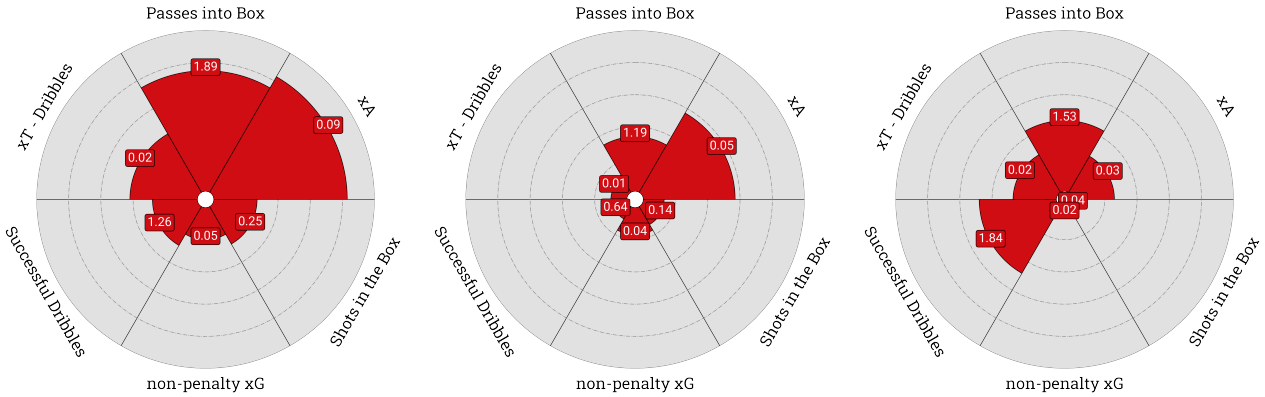
Figure 2: Attacking metrics *per 90 minutes* for midfielders with more than *900 minutes* in Bundesliga, 2017/2018 season.

With all the other players in 2b playing for teams that will compete in European competitions the season, I doubt that neither the clubs or the players would be interested in discussing transfers with a club in the middle of the Premier League table. However since Hamburger got relegated this season, their financial situation might force them to sell some player, and Filip Kostic is likely interested in a transfer to keep playing in a first division. According to Transfermarkt his current market value is estimated to €6.00 million, which I don't think is an outrageous price for us to spend on a winger that has the potential to contribute a lot to our attack in many different ways.

Final Recommendation

After consulting with the rest of the statistical scouting team, we concluded that while our strikers and wingers didn't reach a sufficient output in terms of goals last season, the position that would benefit the most from a new signing is the central midfield. Our current central midfielders doesn't contribute with enough progression and threat with their passes, so we decided to recommend signing 20 year old **Maxime Lopez** from Olympique de Marseille, who showed great skills in both progressive passing and creating threat with his passing play in Ligue 1 in 2017/2018.

Using the same metrics as defined for the wingers above, it's quite clear that Maxime Lopez (3a) produced a higher xA score and more passes into the box than the central midfielders of AFC Bournemouth, Andrew Surman (3b) and Lewis Cook (3c), did during the past season. Being only 20 years old and among the best passers in a top 5 league is very impressive, and his potential is very high at a price of only €8M.



(a) Maxime Lopez (b) Andrew Surman (c) Lewis Cook

Figure 3: The selected attacking metrics *per 90 minutes* for **Maxime Lopez**, Olympique de Marseille, and central midfielders with most playtime in AFC Bournemouth in the 2017/2018 season

One caveat here is that the metric used in these radars mainly were constructed to analyse wingers, with more direct attributes in terms of goal contribution being prioritised. For this reason it might not be the fairest evaluation of the central midfielders contributions to our attacking play in general. As mentioned in the original scouting report for Maxime Lopez, passing the ball progressively and with high accuracy are more relevant metrics when comparing players further down the pitch.

Another thing worth mentioning is that the radars shows how well the player performed compared to other midfielders *in their league*. Being among the best and having a high score in one league doesn't translate to the same score or rank in another league. The same goes for comparing Filip Kostic to our wingers at Bournemouth as well. Bundesliga. Playing in the Premier League is not suitable for everyone, and many physical and mental metrics covered here would be an interesting extension to this scouting report.

However the radars still highlights the players strengths and to some extent their playing style, and in the cases of Lopez and Kostic, they are both relatively young players at reasonable costs (€14M combined), and for that reason I feel confident in **recommending signing both of them** during this summer, as their potential to boost our attack heavily outweighs the estimated cost of signing them.