BBC Sport: Head Coach Assessment Report
Prospective Manchester United Permanent Head Coaches

Ralf Rangnick

Mauricio Pochettino

Erik ten Hag

Brendan Rogers

Carlo Ancelotti

Antonio Conte

Luis Enrique

Julen Lopetegui

Thomas Tuchel

[Ole Gunnar Solskjaer - as a comparator only]

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1. Quantitative Ratings and Metrics

The table at Exhibit 1 (below) summarises the key quantitative ratings and metrics for each of the head coaches that are the subjects of the analysis, and a full explanation of the ratings and metrics is provided in the Glossary of this report.

Exhibit 1: Table outlining the ratings for each head coach, including quantitative metrics indicating relative strengths and weaknesses (as at 28 March 2022)

Manager Name	Carteret Manager Rating	CMR CI	Normalised CMR	Strategic Intelligence Rating (Home)	Strategic Intelligence Rating (Away)	Strategic Intelligence Rating	Tactical Command Rating (Home)	Tactical Command Rating (Away)	Tactical Command Rating	Attacking Coefficient (Home)	Attacking Coefficient (Away)	Attacking Coefficient	Success-adjusted Attacking Coefficient (Home)	Success-adjusted Attacking Coefficient (Away)	Success-adjusted Attacking Coefficient	Shot Conversion Rating	Opposition Shot Conversion Rating	Shot Creation Ratio	Possession: Goal Conversion (Home)	Possession: Goal Conversion (Away)	Possession: KME Creation (Home)	Possession: KME Creation (Away)	Extrapolated League Position
Ralf Rangnick	438.70	4.03	272.60	37.78	26.67	64.44	2.20	1.80	4.00	9.66	8.74	18.39	6.90	4.90	11.80	30.70	19.61	1.00 : 1	2.67	3.55	9.02	9.68	5
Mauricio Pochettino	443.00	0.92	448.00	45.98	28.74	74.71	3.10	2.55	5.66	13.08	12.25	25.33	12.45	6.62	19.06	42.62	22.49	1.24 : 1	4.01	2.55	8.82	7.45	3
Erik ten Hag	459.40	0.89	467.40	41.98	39.51	81.48	2.15	2.52	4.67	9.32	9.07	18.39	7.62	7.58	15.20	43.41	14.20	3.52 : 1	5.42	3.35	13.82	8.94	3
Brendan Rogers	375.40	0.82	388.90	29.63	14.81	44.44	1.67	0.85	2.52	10.34	9.45	19.80	6.19	2.72	8.92	37.49	31.27	0.86 : 1	3.35	3.08	9.12	9.70	5
Carlo Ancelotti	462.80	0.91	469.10	39.08	36.78	75.86	2.41	2.31	4.72	0.48	12.66	13.14	10.31	9.61	19.92	29.94	24.89	1.85 : 1	3.46	3.27	11.35	10.27	3
Antonio Conte	491.70	0.94	496.00	33.33	29.82	63.16	1.21	2.63	3.84	10.71	10.62	21.32	7.92	6.26	14.19	35.32	24.20	1.57 : 1	4.97	3.45	10.99	11.83	2
Luis Enrique	568.80	4.36	330.10	47.13	34.48	81.61	3.10	3.14	6.24	13.56	13.32	26.87	12.29	9.51	21.80	39.43	21.69	1.82 : 1	5.25	3.89	12.07	10.85	5
Julen Lopetegui	430.80	1.57	399.50	39.08	26.44	65.52	1.97	1.28	3.24	12.37	13.02	25.39	9.99	6.40	16.39	43.15	21.22	1.32 : 1	3.42	1.31	7.19	5.18	5
Thomas Tuchel	503.60	0.96	505.80	30.95	39.29	70.24	2.14	2.14	4.29	10.16	10.34	20.50	7.04	7.84	14.88	38.16	21.05	1.60 : 1	3.52	3.20	9.69	7.58	2
Ole Gunnar Solskjaer	352.70	0.94	355.40	19.44	27.78	47.22	1.50	1.25	2.75	10.06	10.06	20.11	4.02	5.46	9.48	29.69	33.69	1.09 : 1	2.97	0.84	9.35	2.37	7

	Key Metric - Upper Tier
	Key Metric - Middle Tier
	Key Metric - Lower Tier
	Secondary Metric - Upper Tier
	Secondary Metric - Middle Tier
	Secondary Metric - Lower Tier

2.   Glossary

Carteret Manager Rating (CMR)

This is a unique quantitative measure of overall ability. It is based on the premise that the primary objective of a manager/head coach is to win football matches, and the Carteret Manager Rating (CMR) is an assessment of his success in this regard over the last five seasons. Whilst we can determine a manager's CMR over a longer period (if necessary), we have calculated that the most accurate and predictive indicator of success for a manager is based on his prior five seasons, with an incremental weighting towards the most recent seasons.

The CMR is also weighted for the level of the league in which the manager has operated at any point in time during the last five seasons. We apply a significance metric based on the level of data population for the last five seasons (the lower the figure the better), and which could be impacted, for example, by periods of inactivity within that period. Finally, as a means of comparison, we have also worked on a club specific premise that the club would want their next manager to guide the club to a particular position in the English Premier League (EPL) at the conclusion of Season 2022/23. With this objective in mind, our analysis focuses on <u>league</u> performances of the manager over the prior five seasons.

Carteret Manager Rating Confidence Index (CMR CI)

The overall purpose of the quantitative analysis in the football sector is to accurately predict the future performance levels of players, managers and teams - in a variety of league, style, player combination and formation scenarios. We have built a series of algorithms that are able utilise a huge amount of raw data to produce highly accurate predictions - which we constantly measure after every match to ensure the predictive levels (R-squared value) remain high. The line of predictive extrapolation in any data analysis will always be dependent on the quality and quantity of raw data. We are usually very confident with the quality of raw data that we are able to utilise, but sometimes the <u>quantity</u> of the raw data is lower for one manager for a particular period than another manager. We need to recognise that difference in quantity, and the CMR CI is our mechanism for doing so. A CMR CI rating of 1.00 or lower suggests an extremely high level of confidence that the quantity and quality of the raw data is of a sufficiently high level to produce a strong extrapolated line of prediction.

Normalised Carteret Manager Rating

In addition to the Carteret Manager Rating, we have also developed a series of algorithms to take account of the volume, variability and veracity of the raw data for each manager. The Normalised Carteret Manager Rating takes account of the fact, for instance, that one manager might have an exceptional rating and individual metrics but has only managed for a relatively short period and, perhaps, in a single league. In this scenario it would be a relatively high risk to assume that the manager in question might continue on the same trajectory and at the same levels for, say, the next three seasons. The CMR for a manager with longer and broader experience (across leagues, and particularly in the target league) might be a better predictor of medium-term success, than for a manager with very limited

experience or with gaps in his managerial career. The Normalised Carteret Manager Rating takes account of the CMR CI (see above) to rebalance/homogenise the probability of a successful outcome with each manager over the next three seasons.

Strategic Intelligence Rating

This measures the manager's ability to prepare and set his team, and analyse the opposition, to maximise the chances of the team winning the next match. The higher the figure, the better. We consider this to be a very important metric because a manager who is able to achieve a high probability of a successful match outcome through a combination of understanding the objective performance abilities and form of his/her [available] players, and their players' contributions to to successful outcomes from pitch positions and formations, increases the probability of achieving a higher league position at the conclusion of the season. This metric also includes manager ability to adjust for the same objective indicators in the opposition players (in various formations and combinations).

Tactical Command Rating

This is a measure of the manager's ability to transform a match (during the match), and, in particular, to develop a winning position for the team from various match scenarios. The Key Match Events (KMEs) are those events within a match that lead to a goal being scored; could lead to a goal being scored; lead to a goal being conceded; or could lead to a goal being conceded. This part of the analysis assesses how the probability of each and every specific KME is altered within each and every match to transform a leading, equal, or deficient scoreline into a win (or, as a secondary measure, a draw). A match loss will lead to a weighted negative assessment, based on the preceding scoreline position within every match. The Tactical Command Rating is a 'per match' rating, the higher the figure the better.

Attacking Coefficient
Success-adjusted Attacking Coefficient

The attacking coefficient measures the manager's propensity to play an attacking style of football - the higher the figure, the more attack minded is the manager. We have also measured the relative impact of the manager's attacking coefficient on the success of the team winning matches - again, the higher the figure the better. Success is not wholly related to a manager's attacking coefficient, but an attacking style of play, married to the team winning football matches, might be a consideration for the Club.

Team Shot Conversion Rating
Opposition Shot Conversion Rating

This is an extract of one of the KMEs. Based on the premise that the primary objective of the Club is to win matches, in order to achieve the specific target of guiding the Club to a particular position in the EPL at the conclusion of Season 2022/23, this is a key metric that highlights a team's ability to increase the

probability of winning matches. There are a whole series of impact metrics that measure and rate the contribution to KMEs, but this is a useful metric to extract both in terms of its overall objective influence, and as an illustration of attacking efficiency. We have also included the requisite metric for the opposition teams from each of the matches, to give a relative sense of attacking and defensive efficiency. It is preferable for the Team Shot Conversion Rating to exceed the Opposition Shot Conversion Rating.

Shot Creation Ratio

It is obvious that a shot on goal significantly increases the team's opportunity of scoring a goal, which in turn significantly increases the team's chances of winning the match. It is a statistically significant exercise to assess the comparative ratio of shots on target, between the team and the opposing team, as an indicator of propensity for winning matches. In the ratio above, the manager's team is listed first. It is sometimes preferable that his figure should exceed the opponent's figure, but the key factor, of course, is the conversion of a shot on goal to an actual goal (as per the Shot Conversion Rating above).

Possession - Goal Conversion Rating (Home)
Possession - KME Creation Rating (Home)
Possession - Goal Conversion Rating (Away)
Possession - KME Creation Rating (Away)

Possession is a metric that is often referenced and debated - and misapplied. Possession is a good base for KMEs - if the team has possession at a specific point in time, then it is highly unlikely that a goal will be conceded at that point in time (unless it is an own goal) - and equally the team is only likely to score a goal if it has possession (again, a specific type of own goal being an exception). However, football provides an immensely fluid data population with a myriad of time points, and so it is vital to identify the key points (in relation to possession) that have the highest relative impact on winning matches. The Possession Goal Conversion Rating assesses the positive impact of possession at key points within each and every match, that lead to a goal being scored - a high figure indicates a more effective conversion of possession by the team, rather than possession for the sake of possession. Likewise a high Possession KME Creation Rating indicates a positive utilisation of possession to improve the quantity of KMEs that lead, or could lead, to match winning scenarios.

Projected League Position (Complete 2021/22 EPL Season)

Perhaps the most exciting, and the ultimate, metric. We have weighted the CMR and all the other metrics, based on a comprehensive analysis of the empirical impact that each metric has had on finishing in a particular position in the requisite league over the last 20 years, and undertaken an identical process for all the other managers in the requisite league (during this season) as at the date of the report. We have then considered the Carteret Ratings for each of the players in each squad in the league, to determine how the target manager might have performed with that squad (as if he had control of team selection at the start of the season - in this case, control of the actual Manchester United squad at the start of Season 2021/22).