



England Squad Selection Research Paper November 2020 International Matches

Carteret Analytics - Quantitative Analysis City AM

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1. Summary

Gareth Southgate has frequently stated his preference to pick England squads based on the form of the players, rather than past reputation. If that is the case, then how does he objectively measure a player's form?

At Carteret Analytics we provide quantitative analysis to leading football clubs around the world, including Premier League and Championship clubs. It has been developed from quantitative analysis in investment banking to provide an objective measure of a football player's contribution to his team winning matches. It removes all the subjective 'noise' about how good a player is, and allows a football club, or international team manager in this case, to objectively compare one player against another.

Every player receives a Carteret Rating, which is updated after every match that he has played. The team at Carteret Analytics has assessed the performances of every eligible England player so far this season to determine who **Gareth Southgate** should pick in his initial 30-man England squad for the forthcoming international matches, and it has produced some interesting results.

Despite some criticism this season, and being dropped by Ancelotti, **Jordan Pickford** has objectively performed the best of any England goalkeeper this season. The next best goalkeepers are **Alex McCarthy** at Southampton, and **Karl Darlow** at Newcastle. There would be no place, based on current form, for **Nick Pope**.

In defence, **Southgate** has played three players in the recent matches against Denmark and Belgium. If he continues with this defensive formation, then the three defenders with the best overall Carteret Ratings so far this season are **Michael Keane**, **Tyrone Mings** and **Harry Maguire**. However, this does not make allowance for a scenario where (as is the case with Keane) a player performed better in the early part of the season.

It is for this reason that we are also able to provide an objective measure of the recent form of a player, to predict his objective performance levels in the next one to six matches. On this basis, then the three defenders that should ultimately make the starting line-up would be **Harry Maguire**, **Joe Gomez** and **Kyle Walker**.

We do not know how **Southgate** is intending to set-up the midfield, but if we assume that he plays four in midfield with a further three players then playing in advanced roles - so a **3-4-2-1** or **3-4-3** - then the four midfielders on best objective form at present are **James Ward-Prowse**, **Ross Barkley**, **Mason Mount** and, interestingly, **Jack Harrison**.

In an advanced role, the objective form analysis indicates that Southgate should pick **Jack Grealish** and **Marcus Rashford** (over **Raheem Sterling** and **Jadon Sancho**, both of whom have a slightly lower form level), with **Harry Kane** in the most advanced role.

The form analysis actually indicates that **Callum Wilson** is in the best form of any English centre forward at present, but it is very close to Kane's form and we consider it is more likely that Southgate will pick Kane in the starting line-up. **Dominic Calvert-Lewin's** form is starting to dip, and, based on objective form alone, the analysis indicates that both **Callum Wilson** and **Ollie Watkins** rank above Calvert-Lewin ahead of this international period.

2. Who should be included in the 30-man England international squad?

The following table lists the 30 best performing English players in Season 2020/21 (to date) based on each player's **Carteret Rating** (see **Glossary** below). It also provides a crucial **Form Indicator** to illustrate each player's predicted performance levels over the next one to six matches.

CarteretAnalytics		Squad Overview Table				
Player	Position	Club	Age	Carteret Rating (20/21 season to date)	CRCI*	Form Indicator#
Jordan Pickford	Goalkeeper	Everton	26	185.8	2.35	Strong
Alex McCarthy	Goalkeeper	Southampton	30	168.6	2.08	Weak
Karl Darlow	Goalkeeper	Newcastle United	30	155.7	2.08	Strong
Michael Keane	Defender	Everton	27	283.2	2.08	Strong
Tyrone Mings	Defender	Aston Villa	27	250.3	2.35	Strong
Harry Maguire	Defender	Manchester United	27	240.1	2.08	Strong
Kyle Walker	Defender	Manchester City	30	239.4	1.60	Strong
Ben Chilwell	Defender	Chelsea	23	239.2	2.39	Weak
Joe Gomez	Defender	Liverpool	23	238.1	1.66	Strong
Aaron Cresswell	Defender	West Ham United	30	237.1	2.08	Strong
Eric Dier	Defender	Tottenham	26	220.1	2.35	Strong
Lewis Dunk	Defender	Brighton & Hove Albion	28	219.3	2.71	Strong
Reece James	Defender	Chelsea	20	216.8	2.34	Strong
Trent Alexander-Arnold	Defender	Liverpool	22	210.6	1.38	Strong
Ezri Konsa	Defender	Aston Villa	23	204.9	2.35	Weak
James Ward-Prowse	Midfielder	Southampton	26	271.6	2.08	Strong
Ross Barkley	Midfielder	Aston Villa	26	255.3	2.91	Strong
Jack Harrison	Midfielder	Leeds	23	228.1	2.38	Strong
Mason Mount	Midfielder	Chelsea	21	213.7	2.39	Strong
Jordan Henderson	Midfielder	Liverpool	30	198.9	2.35	Strong
Declan Rice	Midfielder	West Ham United	21	183.6	2.08	Strong
Jack Grealish	Attacking Midfielder	Aston Villa	25	329.6	2.35	Strong
Marcus Rashford	Attacking Midfielder	Manchester United	23	281.0	2.00	Strong
Raheem Sterling	Attacking Midfielder	Manchester City	25	237.7	1.59	Strong
Jadon Sancho	Attacking Midfielder	Borussia Dortmund	20	210.6	2.97	Strong
Harry Kane	Centre Forward	Tottenham	27	348.1	2.00	Strong
Dominic Calvert-Lewin	Centre Forward	Everton	23	306.3	2.14	Strong
Patrick Bamford	Centre Forward	Leeds	27	268.7	2.22	Strong
Callum Wilson	Centre Forward	Newcastle United	28	267.7	2.10	Strong
Ollie Watkins	Centre Forward	Aston Villa	24	259.4	2.35	Strong

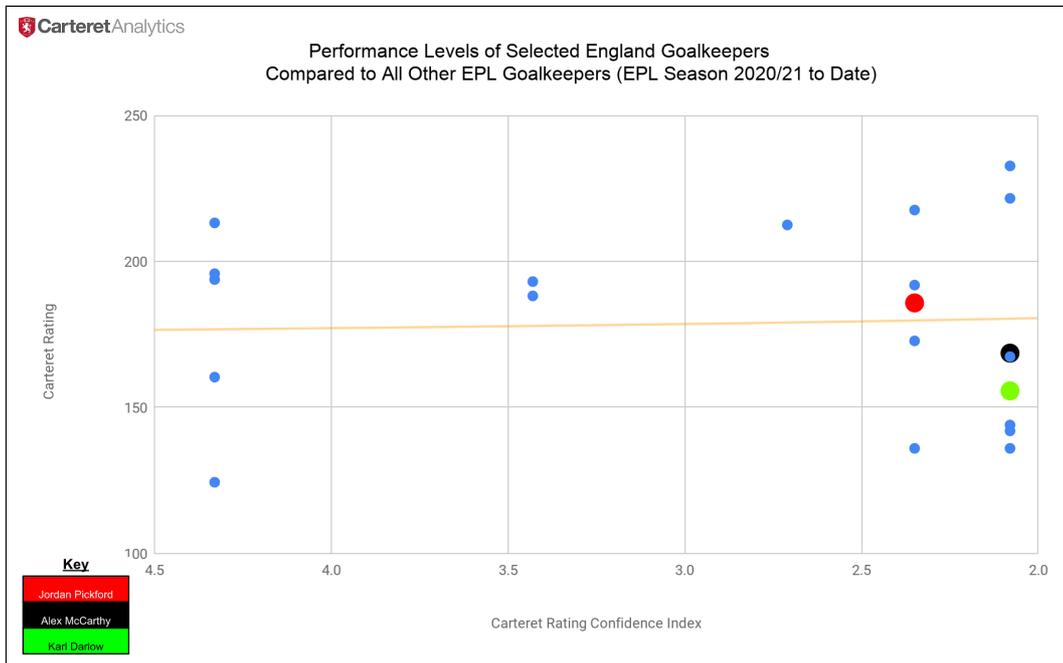


* *CRCI* dictates the level of confidence in the quantity and quality of the raw data used to calculate any *Carteret Rating* (see *Glossary* below).

Form Indicator can be used to perceive the expected level of performance within a player's next one to six matches.

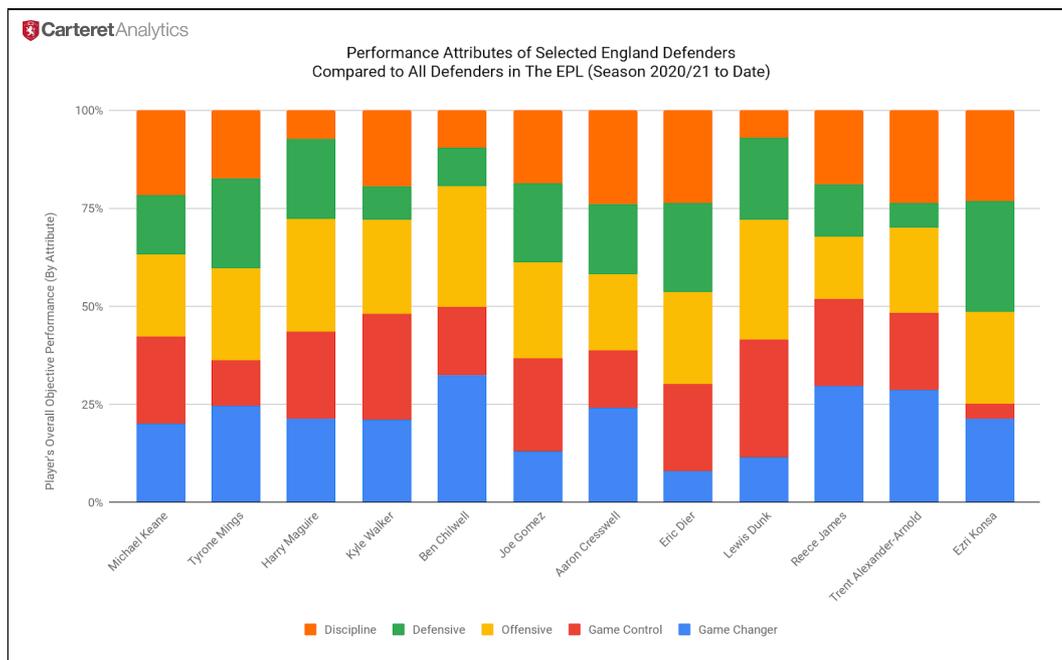
3. Breakdown of quantitative analysis, by position

Goalkeepers



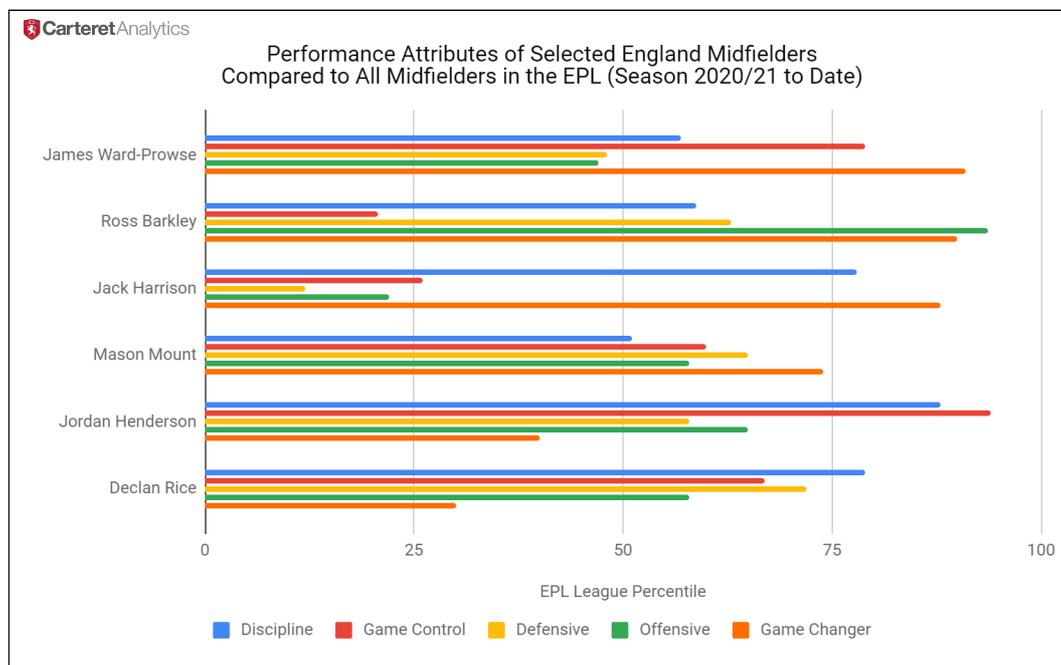
- The chart above showcases the performances of every goalkeeper that has participated in the English Premier League so far.
- A trend line has been plotted (highlighted orange) to indicate the threshold of performance required to be considered as a high level performer.
- On an objective basis, **Jordan Pickford** (highlighted red) can be identified as the best for England, but not the best in England.

Defenders



- The stacked bar chart above displays a breakdown of each selected defender's *Carteret Rating* by attribute.
- We can see that a significant proportion of **Ben Chillwell's** *Carteret Rating* is made up by his *Offensive* oriented contributions during a performance.
- Interestingly, **Aaron Cresswell** demonstrates a better capability of impacting a match through generating a greater volume of game changing *Key Match Events* (KMEs) when compared with Liverpool defender **Joe Gomez**.

Midfielders

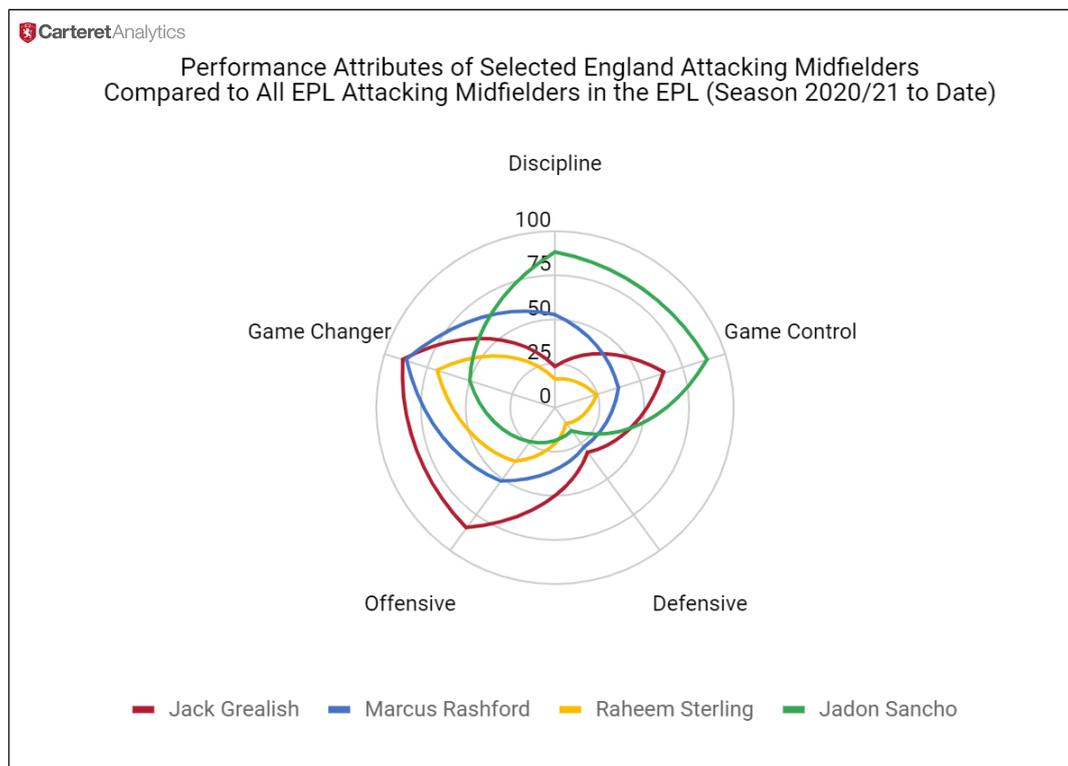


- In a similar fashion to the defenders' chart (above), the horizontal bar chart (above) drills down into the *Carteret Rating* of each selected midfielder. More specifically, it provides the *League Percentile* of each player's attributes (a comparison of how they stack up when measured against the rest of the midfielders that participate within the English Premier League - see *Glossary* for further detail).
- Many of the selected midfielders possess attributes that lie within the top tier (75th) percentile of the EPL.
- **Jordan Henderson** is one of the league's finest at controlling the game from the middle of the pitch, this is further supported by the exceptional level of discipline that he demonstrates during a match.
- **Ross Barkley** presents a more offensive option should the England team wish to adopt a more attacking approach, whilst **Mason Mount**, despite not excelling in any particular attribute, offers a more rounded option.

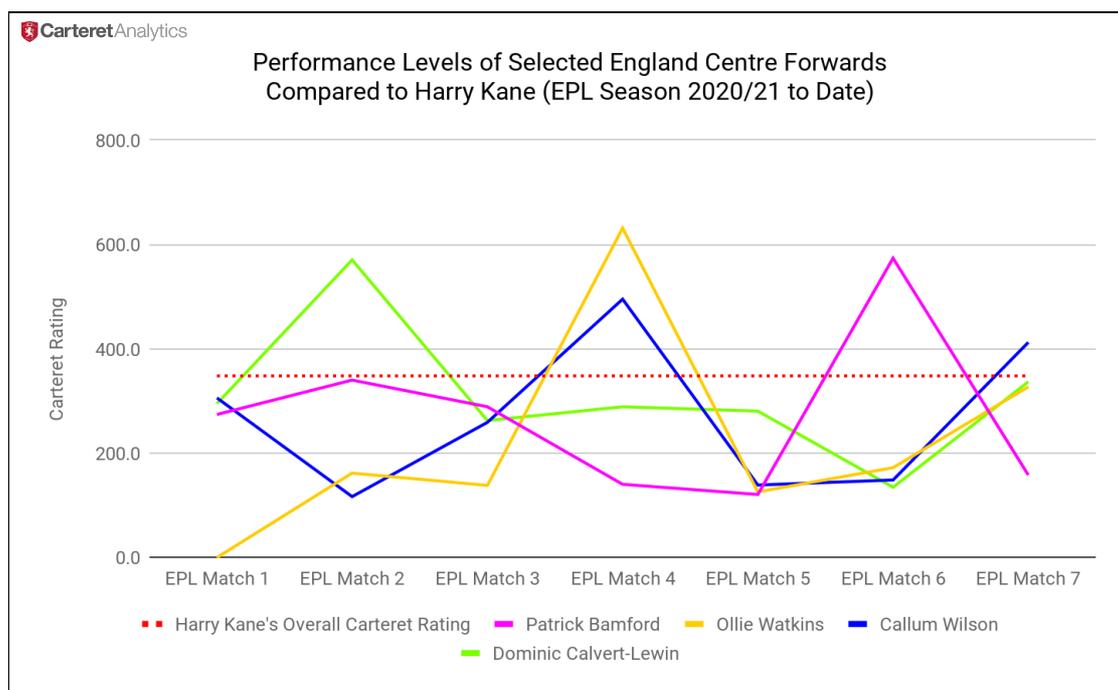
Attacking Midfielders

- The Radar Chart below provides a comparison of the performance attributes of four England Attacking Midfielders, **Jack Grealish**, **Marcus Rashford**, **Raheem Sterling** and **Jadon Sancho**.
- Each player is compared to all other EPL Attacking Midfielders in the 2020/21 season.

- Our data analysis highlights **Jack Grealish** and **Marcus Rashford** as the players who offer the greatest attacking threat, in terms of their *Game Changer* and *Offensive* attributes.
- Interestingly, **Jadon Sancho** offers the lowest attacking contribution of the four players identified, but he does provide *Game Control* attributes that are not demonstrated by the other players. The data suggests **Jadon Sancho** can control a match but he cannot transform a match.



Forwards



- In the chart above, England captain **Harry Kane** maintains consistency as one of England's highest performers and thus, has been used to benchmark (utilising his *Overall Carteret Rating*) the remaining selected forward's performances throughout the EPL season so far.
- From the 7 matches played, it is only Newcastle's **Callum Wilson** that has been able to replicate a performance level above that of **Harry Kane's** Overall Carteret Rating.
- **Ollie Watkins** has ultimately displayed the highest objective performance of any selected forward during Aston Villa's fourth match of the season but has failed to replicate a performance anywhere near his peak.
- **Calvert-Lewin** has performed the most consistently but still falls short of the benchmark that **Harry Kane** has set for the England forwards.

4. A little bit of science...

At Carteret Analytics we have developed the quantitative analysis utilised to good effect in investment banking for trading strategy, portfolio optimisation, derivatives pricing and hedging, and risk management by our sister corporate finance firm, Carteret Capital - and applied it to football. **In particular, our work provides an objective measure of how good a football player really is - removing all the subjective noise and opinions.**

An integral part of the analysis is to calculate a ***Carteret Rating***⁴ for every football player, which rates and values a player's contribution to his team winning football matches. It is incredibly accurate at predicting a player's capabilities. Indeed, we always start with the premise that a professional football club's primary objective is to win matches - and therefore the more a player contributes to his team winning matches, the better the player.

⁴ *Carteret Rating*: this is a proprietary method of determining how good a player really is. It is a significant and leading-edge algorithm. We assess a player by identifying every match in which he has been involved (for which we have data) and identifying the key events in each and every one of those matches. These Key Match Events ("KMEs") are events that led to a goal being scored; could have led to a goal being scored; led to a goal being conceded; or could have led to a goal being conceded. Then, for each and every KME, in each and every single match, we analyse that player's contribution to each of those KMEs. This is a substantial piece of analysis, and one which produces a unique *Carteret Rating* for the player. It is a dynamic rating, and it changes with each additional match played.

5. Glossary

Carteret Rating

This is a proprietary and objective method of determining how good a football player really is (and aims to accurately predict future performance in various scenarios set by the football club). It is based on a series of leading-edge algorithms that have been developed by Carteret Analytics. These algorithms have evolved from the quantitative analysis utilised in investment banking by its sister company, Carteret Capital, for, inter alia, asset and equities trading strategies, pricing and hedging of derivatives, portfolio optimisation and risk management. The algorithmic methodology assesses each player by identifying every match in which he/she has been involved (for which we have data) and then identifying and isolating the Key Match Events (“KMEs”) in each and every one of those matches. Then, for each and every KME, in each and every single match, we analyse that player’s contribution to each of those KMEs. This is a substantial piece of analysis, and one which produces a unique *Carteret Rating* for the player.

It is a dynamic rating, and it changes with each additional match played. Its ‘beauty’ is in its pure objectivity - ignoring characteristics such as age and nationality, and avoiding the ‘noise’ of subjective considerations that are frequently taken into account (often wrongly) in trying to determine the ability, attributes, characteristics and the ‘fit’ of a player into the club style or systems. It is an exceptionally accurate rating, with an *r-squared value* between 0.88-0.90 for Premier League players - demonstrating that it is very precise at predicting how good a player will be in the future. The dynamic nature of the Carteret Rating also enables Carteret Analytics to accurately predict the impact of the player in different clubs and different leagues.

Carteret Rating Confidence Index (“CRCI”)

We are in the business of predictions, and, more specifically, accurately predicting 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 to 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*) remains 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 quantity of the raw data is lower for one player for a particular period than another player. We need to recognise that difference in quantity, and the CRCI is our mechanism for doing so. A CRCI 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.

Attribute

In addition to a player’s Carteret Rating, we are also able to break down a player’s performance into a number of Attributes - Game Changer, Game Control, Offensive, Defensive and Discipline. This provides greater clarity on the player’s strengths and weaknesses, and enables us to provide insights into **how** the player actually contributes to increasing the probability of his team winning matches. Where the Carteret Rating provides the overall (objective) measure of the player’s performances, the Attributes allow us to peel back the layers of those performances - to identify strengths and weaknesses, but also to help us understand how he might fit into preferred styles and formations. These Attributes have been quantitatively constructed based on rigorous data testing, to provide an accurate representation of how a number of KMEs can be combined to build a picture of how a player can best contribute in a match to increase the probability of the team winning.

The **Game Changer** Attribute measures a player's creation of, or contribution to, specific KMEs that were demonstrated to move the in-match position to a better score position (weighted against the extant opposition score position), or to retain a score position in circumstances where there was a material probability that the score position could have moved against the player's team.

The **Game Control** Attribute measures a player's ability to maintain a positive score position, and avoid a reduced or negative score position, through a variety of in-match scenarios such as proactive ball control and movement, maintenance of possession, and transitioning between offensive, defensive and 'special teams' types of play (moving the ball and gameplay away from dangerous scenarios in a positive score position, late in the match). It is a good measure of tactical leadership on the pitch, and it is an extremely beneficial Attribute for teams that value a possession based style of play as well as those teams that need to contain the game for periods of time.

The **Offensive** Attribute measures a player's ability to create and contribute to 'positive' KMEs that actually provided an incremental step to offensively maintain an in-match score position or to positively transform an in-match score position. This will involve forward play, as well as play in a offensively forward zone. Likewise, the **Defensive** Attribute measures a player's ability to create and contribute to 'protecting and continuing' KMEs, i.e. to avoiding a reduced and/or negative in-match score position. All players will have both an Offensive and Defensive Attribute, whatever their position, and these Attributes (as with all Attributes) are generally measured against a League Percentile of other players in the same position (in a particular league). High levels for both the Offensive and Defensive Attributes often indicate a player's [strong] ability to transition quickly and effectively between attack and defence (and vice-versa).

The **Discipline** Attribute is a useful measure of a player's ability to avoid losing control of various aspects of a match and to avoid reducing the options of the team to maximise the probability of winning future matches because he has been suspended through poor Discipline. Poor in-match Discipline often leads to loss of possession, and frequently leads to negative KMEs. It is usually measured on charts *in the positive* - i.e. on radar charts or bar charts set against the League Percentiles for the Attribute, a player whose Discipline is in the bottom 25th League Percentile has a poor Discipline Attribute.

League Percentiles

The mechanism to measure and rate a player against their peers (usually in the same position) in a particular league. References are often made to the lower 25th League Percentile (which indicates a poor performance measure), 50th League Percentile (which is the average measure), and in the 75th League Percentile (which indicates high performance - in the top 25% of players in that League).

Key Match Events ("KMEs")

Key Match Events ("KMEs") are events that we have identified (through constant quantitative testing) as having the greatest influence on the outcome of a football match. Our current quantitative modelling includes 42 KMEs, and in very general terms these are events that, to varying degrees, 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. The *Carteret Rating* - which is obviously the proprietary objective measure that permeates everything that we do - measures a player's creation and contribution to each and every KME, in each and every match for which we have data on that player. This is a huge piece of data analysis, and is the reason why the *Carteret Rating* is so accurate and predictive.

6. About Carteret Analytics

Carteret Analytics is part of the Carteret Group of companies, based in the City of London, New York and Geneva. It provides leading-edge quantitative analysis and commercial analytics to clients worldwide, with particular expertise in the sports sector. In football our work includes player rating and valuation, head coach assessment, team performance analysis, and applying proprietary analytics to transform commercial revenues.

Further information and contact details

If you have any questions, or would like to enquire about further services provided by the Carteret Group, then please feel free to contact one of the team members listed below.

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