**The use and perceptions of performance analysis and data driven approaches within senior men’s football recruitment**

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**Abstract**

Football clubs face various demands due to transfer fee increases within player recruitment, leading to numerous clubs adopting alternate methods to remain competitive within the transfer market. This study aimed to investigate the perceptions and use of performance analysis (PA) within player recruitment. Participants (n = 19) from professional and semi-professional football clubs were invited to complete a survey through LinkedIn incorporating Likert scale and open text responses. The survey consisted of three sections: demographics, use of PA in recruitment, and perceptions of PA in recruitment. Data was analysed using Mann Whitney U and/or thematic analysis where appropriate to understand the difference in approach between experienced/inexperienced recruiters. Four key themes were identified as formulating the recruitment cycle, these were 1) *video and data* usage as a crucial tool, 2) *identification of hidden talent*, 3) *performance profiling* to quantify strengths/weaknesses and provide pertinent insights into a player's abilities, and 4) *due diligence* to assess a player's personality and cultural fit. The significance of this work has enabled the creation of a novel empirically grounded recruitment analysis framework. In doing so, this study makes an original empirical and conceptual contribution to our understanding of player recruitment in football to inform applied practice.

**Keywords:**

Performance analysis, data-driven recruitment, football recruitment, performance profiling, recruitment process

**Introduction**

Performance Analysis (PA) in sport dates to the early 1900s, with the first works undertaken on the odds of success in baseball which focused on variables such as batting, pitching, and fielding combinations1,2. PA is a valuable sport science discipline that utilises qualitative and quantitative insights to improve decision-making and performance3. A prominent methodology within PA is notational analysis, including the systematic recording of performances and training followed by the curation of quantitative summaries4,5. This method can include variables such as match location, opposition quality, match status, passing networks, technical, positional, and physical metrics6-8. Key Performance Indicators (KPIs), which are action variables that highly relate to successful performance, can be used to create a performance profile (e.g., a cluster of KPIs) on individuals and teams9. KPIs are typically presented in an appropriate data visualisation to evaluate performance10. Butterworth et al.10 proposed that performance profiling should be useful for pre- and post-match analysis, support multimedia, and assess individual and typical performances. Building beyond KPIs and Michael Lewis’11 exploration of data in baseball, Graham’s12 recent work illustrates how detailed *event* (e.g., pass, shot, tackle etc.) and *location* (e.g., x and y pitch co-ordinates) performance data alongside sophisticated data science algorithms can support data-driven player recruitment decisions.

The popularity of the book Moneyball11 likely contributed to the mainstream popularisation of quantitative data in identifying unknown talent in sports. For example, companies such as Hudl have provided data and video platforms (e.g., Wyscout. and InStat) that have provided football clubs with access to performance metrics and video across hundreds of leagues worldwide. This has allowed a highly cost-effective and time-efficient alternative to live scouting for individual/team analysis both pre-/post-match. These technologies have offered low-financial-power clubs an alternative approach to be more competitive in the player recruitment market13-17. Consequently, Premier League Clubs with higher-financial power have since moved away from employing a single analyst to have a team of specialist analysts (and often data scientists) that undertake work such as training, pre-match, post-match and recruitment analysis18 to ensure the vast streams of data can be thoroughly and effectively investigated.

There is a growing body of research focusing on the use and perception of PA in football19,20, rugby21, and Olympic sport22-25 environments. This work has strived to more effectively understand the roles, demand, and skillsets associated with effective practice. For example, Groom and Cushion26 suggested that coaches use video analysis for a variety of purposes, including identifying and correcting technical flaws, improving tactical awareness, providing feedback to players, motivating players, and analysing opponents (similar findings were observed by Wright et al.27). However, the study also highlighted coaches are often concerned with the time it takes to prepare and evaluate video material, the cost of video analysis equipment, and the possibility of video analysis being used negatively, such as to critique players 26.

Similarly, Middlemas and Harwood28 investigated the psychological factors that influence the effectiveness of video-based feedback in football. They found that the player's motivation to improve, self-confidence, willingness to receive feedback, and the coach's ability to deliver feedback all play a role in development. The benefit of video feedback can be enhanced by providing players with opportunities to practice, offering specific and relevant feedback, highlighting strengths and weaknesses in videos provided, and creating a supportive environment19. Andersen et al.20 further highlighted the potential of PA to improve team preparation, whilst also identifying financial, temporal, and practical barriers of PA. Whereas Boorof et al.29 found that video-based feedback can be used to foster respect, professionalism and discipline, whilst supporting the learning and development of players. Nicholls et al.24 investigated the use of PA and feedback in Olympic sport from the perspective of performance analysts identifying that PA is a widely used tool, with the most common methods being video analysis, profiling, and performance reports. Feedback is an essential part of PA, with most performance analysts reporting the most common methods of feedback used were video, verbal, and written feedback24. Nicholls et al.23 further highlighted that experienced coaches were more likely to use PA to identify areas for improvement, to provide feedback to athletes within 1 hour of performance, and to use a variety of analysis techniques. These findings suggest that experience is an important factor in the effective use of PA in elite sport23. Andersen et al.20 found that coaches have a good impression of PA and consider it an effective technique for increasing performance. Despite growing research in the perceptions and use of PA, further insights into applied practice across all PA realms (e.g., coaching and recruitment) are still required to support successful application.

Recently, Martin et al.30 suggested a nine-component framework for applied PA practice which included: (1) creating relationships and defining responsibilities, (2) needs analysis and service planning, (3) system design, (4) data management, (5) data collecting, (6) analysis, (7) reporting to key stakeholders, (8) athlete feedback, and (9) service review and evaluation. This framework provides a review of the components of applied PA practice and is a pertinent resource for applied PA practitioners. However, the framework has been developed *from* and *for* a general-purpose performance analyst (i.e., non-specialised role such as a recruitment analyst) and may therefore not be fit for purpose within the recruitment environment given the likely nuances between the requirements of the roles. The defining of relationships and responsibilities is notably important considering the depth of new roles within modern applied PA. The remit of many analysts is no longer only within the traditional coaching-performance analysis process. Instead, roles such as recruitment, loans, set-piece, goalkeeper, coach, and various other analyst roles have begun to emerge. Despite a blossoming sphere of research surrounding PA and the coaching process, largely due to an array of new analysis roles, it is worth noting a dearth in literature specifically within PA and player recruitment31. This is perhaps surprising given the significant impact the role can have on a club’s transfer activity, monetary investment within the transfer environment, and ultimately the on-pitch performance potential (i.e., recruiting higher potential players efficiently below market value). As such, this remains an important research gap in our existing understanding. Consequently, Lawlor et al.31 called for research endeavors coupling PA and recruitment, as well as differentiating talent identification (a subjective youth football field) from performance identification (an objective senior football field). Therefore, the primary aim of the study was to investigate the perception and use of PA within the recruitment process to inform applied practice. The significant of this work is to create a novel empirically grounded framework to guide player recruitment practice in football.

**Methods**

***Participants***

Nineteen participants were categorised by age: 18-24 (n = 2), 25-34 (n = 11), 35-44 (n = 5), 45-54 (n = 1). All participants worked within a professional (n = 17) or semi-professional (n = 2) club and were employed within a recruitment-based role such as, managers, coaches, directors of football, video scouts, live scouts, performance analysts, and data analysts (Table 1). Participants were recruited via the lead author’s professional connections or the networking site, LinkedIn (www.LinkedIn.com). The participants were split into two groups based on their experience in player recruitment; (1) experienced (n = 9, > 6 years of experience) and (2) inexperienced (n = 10, < 6 years of experience). Ethical approval for the study was gained from a university’s ethics committee.

**Table 1**. Participant information table

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| --- | --- | --- | --- | --- |
| Participant | Age  | Duration within recruitment | Club nation | Club division /Level |
| 1 | 35-44 | Three-to-five-years | Scotland  | 1 |
| 2 | 35-44 | Less than three years | Italy | 1 |
| 3 | 25-34 | Ten-to-fourteen-years | England | 3 |
| 4 | 18-24 | Less than three years | Georgia | 1 |
| 5 | 45-54 | More than fifteen years | The Netherlands | 2 |
| 6 | 25-34 | Six-to-nine-years | England | 3 |
| 7 | 25-34 | Three-to-five-years | Luxembourg | 1 |
| 8 | 25-34 | Six-to-nine-years | Portugal | 2 |
| 9 | 35-44 | Six-to-nine-years | England  | 4 |
| 10 | 35-44 | Six-to-nine-years | England  | 5 |
| 11 | 18-24 | Less than three years | Cyprus | 1 |
| 12 | 25-34 | Less than three years | England | 1 |
| 13 | 25-34 | Less than three years | England | 3 |
| 14 | 35-44 | Six-to-nine-years | England | 6 |
| 15 | 25-34 | Three-to-five-years | Spain | 1 |
| 16 | 25-34 | Six-to-nine-years | England | 3 |
| 17 | 25-34 | Three-to-five-years | England | 1 |
| 18 | 25-34 | Less than three years | England | 6 |
| 19 | 25-34 | Six-to-nine-years | England | 3 |

***Survey design***

A survey consisting of three sections was curated on the site, Google Forms (www.forms.google.com, Appendix 2). These included demographics, as seen in prior research into the perceptions of PA19,21-24. A second section aimed to uncover the use of PA in player recruitment, drawing on previous research findings of the value of PA within the coaching process25,32-36. The final section of the survey examined the perceptions of PA within player recruitment, drawing on previous research findings investigating the perceptions of PA within the coaching process 20,26,37,38.

 To ensure appropriate question wording, clarity, and response categories, the third co-author acted as a critical friend to provide feedback and examine author interpretation39. Additionally, two experienced (> 6 years of experience) performance and recruitment analysts detached from the main study performed a pilot completion of the survey, providing feedback where appropriate. The pilot identified a small quantity of amendments to the survey (e.g., the formatting of the survey allowing for easier recognition of the current category, and to ensure multiple-choice categories were appropriately formatted). Likert scales40 (i.e., Not at all, Rarely, Sometimes, Often, Very extensively; Not at all important, Low importance, Neutral, Important, Very important) were used within several questions to allow cross-context comparison. The final survey consisted of 26 questions with accompanying text box opportunities to enable participants to provide further detail, where appropriate.

***Procedure and data analysis***

The survey was completed in May 2023 at a time deemed suitable by the participants. Responses were imported into Microsoft Excel and collated as frequency counts and percentages in relation to the category and Likert scale items. All participant data including club role, club name, competitive league, and identifying information remained anonymous. Statistical analysis was carried out using SPSS (V28). Normality assumptions were assessed using the Shapiro-Wilk identifying a non-normal distribution (p > 0.05). A series of Mann Whitney U tests were used to identify differences in perceptions of PA during recruitment across experience levels (i.e., Experienced vs Inexperienced), in a similar manner to Nicholls et al.23 Adopting an inductive thematic analysis methodology, the lead author examined each open response verbatim to identify recurring themes41. With participant names anonymised, these recurring themes were then assigned labels. Subsequently, these labels were reviewed and organised into broader thematic categories41. This process facilitated the identification of critical components employed by recruiters during the recruitment process, enabling the integration of written responses within the broader context of the study's findings.

**Results and Discussion**

***Video and Data***

The use of PA video to create player watchlists did not differ significantly between the two groups (U = 33.5, *p* = 0.36). However, 40% (experienced) and 33% (inexperienced) used PA video very extensively for this purpose, while 44% (experienced) and 50% (inexperienced) often reviewed footage to formulate watchlists. Video analysis of players provides a visual perspective of not only what happened, but also offers the ability to replay events, allowing for greater recollection42 and understanding of the 'what' and 'why' of performances43. Moreover, these findings are in line with Wright et al.33 and Martin et al.34 suggesting the use of video plays a pivotal role within coaching. The use of video scouting or analysis is a common practice in modern football recruitment, with participants noting that PA video is used to qualitatively identify players who fit the club’s playing style/philosophy (Appendix 1).

Participant 11 (Inexperienced group): We use a data approach first and then recommended players from the data approach will be looked at via video. Video/Performance analysis is used to collect qualitative information about a player in order to have a mixture of both quantitative and qualitative data leading to an objective opinion about a player.

Participant 12 (Inexperienced group): We use analysis of ourselves to then help us identify players that would fit our style.

Whilst these comments suggest that video analysis is a valuable tool for identifying players who fit a club's playing style, it is important to note that video scouting must not be used in isolation. Recruiters should consider other factors, including those found within player background checks, such as player personality and character traits (Appendix 1). By considering all these factors, recruiters can make more informed decisions about which players to sign.

An additional and pertinent finding related to the cost-effectiveness and time-efficiency offered via the use of video analysis as a tool within the holistic recruitment process (Appendix 1). Cost effectiveness is becoming more important by virtue of an ever-competitive market that continues to increase player transfer fees and therefore the financial impact of an incorrect recruitment decision (i.e., player does not justify the transfer fee or wages paid). Video analysis allows recruiters to view performances without the need to undertake extensive national or international travel and during a time that suits them individually. The cost-effectiveness of video analysis in player recruitment could offer foundation for a strategical approach to running a sporting organisation through the purchase of undervalued players, reduce the financial risks by virtue of a lower fee, and offer a more easily obtained profit margin if the player is subsequently sold on. This could be especially beneficial for clubs who may seek uniqueness in strategy to differentiate themselves from clubs with a greater transfer budget. Each point is supported by participant views, such as,

Participant 13 (Inexperienced group): Once we have identified potential players, we are able to watch key targets more extensively and understand game awareness and if they would fit into our system. This is a more cost effective and time efficient way to scout.

Participant 3 (Experienced group): Identify potential targets in the UK and abroad, allows us to watch video before attending a live game to maximise cost efficiency.

There was no statistical significance difference between the two experience groups regarding the perceptions of PA video within player recruitment (*p* = 0.377). A vast majority of respondents (84%) value PA within the recruitment process as Very Important or Important (88% experienced; inexperienced 80%). These findings are akin to previous research within the wider analysis environment which concluded that coaches positively view PA as important in the coaching process20,34,36,44.

***Identification of Hidden Talent***

Experience did not affect the use of PA metrics (U = 37, *p* = 0.549). Sixty-eight percent (66% experienced; 70% inexperienced of participants used PA metrics often or extensively in decision making, with 16% (22% experienced; 10% inexperienced) sometimes using them, and 16% (11% experienced; 20% inexperienced) using them rarely or never. Two key findings were identified from the participants' responses. Finding one suggests that PA metrics are used to support decision making, but they are not the only factor considered (Appendix 1). This is supported by the participants' statements, such as, "Data supports, never leads" (Participant 2 – Inexperienced group) and "It certainly is part of decision making. There must be a reason why we sign a player, and the data helps support that decision" (Participant 3 – Experienced group). Finding two suggests that PA metrics are used to compare players fitting the club's playing style and tactics. This finding is supported by the research of Zambom-Ferraresi et al.45, who suggest that PA metrics can be used to inform scouting departments. It is also supported by the comments of Participant 13 (Inexperienced group), who said, "Performance analysis metrics are combined with the manager's own ideas on which players would fit into the team's playing style and tactics". These findings suggest that PA metrics are a valuable tool in recruitment, but they should not be used in isolation. Coaches and scouts should use their experience and judgment to support the final decision, but PA metrics can be used to support this decision-making process. With the amount of data available to clubs continuing to grow, PA metrics could become even more important in helping clubs to identify prospective signings. There was no statistical significance between the two groups regarding the extent to which they perceive PA as a valuable tool for identifying hidden talent (*U* = 34, *p* = 0.322). Of these results, 84% (88% experienced; 80% inexperienced) of participants stated that they viewed PA as pivotal to identifying prospective hidden talent. These findings reflect that 47% of participants rated PA as very important (55% experienced; 40% inexperienced), while 42% rated it as important (33% experienced; 51% inexperienced) within the process of identifying hidden talent. This suggests that PA is now widely seen as a valuable tool for identifying players with potential, even if they are not well-known or highly rated.

The internal (within the club) and external (outside the club) sources of data to aid the recruitment process is ever increasing. Clubs are now employing standalone recruitment analyst sub-departments and/or purchasing the services of external companies offering world-wide video and data coverage. Importantly however, the reliability and validity of these sources is crucial, particularly when integrating external datasets into the recruitment process, to ensure long-term use and effectiveness. Ninety percent of participants (100% experienced; 80% inexperienced) were provided with access to an external dataset to supplement the identification of players. Wyscout was the most common, with 79% of participants reporting access to this data provider followed by StatsBomb (42%), InStat (26%) and the publicly-free data provider FBRef (21%) respectively. Participants stated how external data providers were a key resource in identifying potential targets as “It allows us to possibly identify additional players to those that the management team have earmarked as potential signings” (Participant 13 – Inexperienced group). Overall, the use of external datasets is a promising development in football recruitment as it has the potential to help clubs identify and sign the most appropriate player(s) for their needs46. However, it is important to note that external datasets are not a perfect solution. They can be expensive, may not always be accurate (i.e., reliability), and can be difficult to interpret if operational definitions are not provided or are unclear (i.e., validity). Thus, operational definitions should be uniformly recognised within PA to improve reliability and validity of data to enhance its clarity within industry and academia47,48.

 ***Performance Profiling and Due Diligence***

A final finding noted was the use of external datasets to curate normative performance profiles (Appendix 1). These normative performance profiles can allow recruiters to objectively compare prospective players across various positions49. Recruiters issued examples of their use of profiling in recruitment, for example,

Participant 13 (Inexperienced group): It gives insight into opposition analysis for matchdays as well as comparable statistical benchmarks for successful team performances.

Participant 11 (Inexperienced group): Identify and assess players who have similar characteristics to benchmarks we have for individual positional profiles.

The only statistically significant difference discovered between the experience groups was the value of performance profiles. It was found that inexperienced recruiters (80%) were more likely to use performance profiling often or extensively in the recruitment phase than experienced recruiters (55%, *U* = 20.5, *p* = 0.027). The increased prevalence of performance profiling among analysts with less than 6 years’ experience could plausibly be attributed to its incorporation into university curricula25. The pervasiveness of data affirms the importance of profiling to leverage insights from diverse leagues, conduct player comparisons, and anticipate or mitigate risks during the recruitment process. This is supported by participant 3 (Experienced group) who states, “Players have to be a certain standard before signing, means we need video evidence and data evidence to suggest they would come in and improve the team.”

Interestingly, this statement by participant 3 is consistent with the recommendations made by Butterworth et al.36 for performance profiles to complement multimedia in a synergistic manner to improve its efficacy. The necessity for a holistic approach to performance profiling was noted as a second finding (Appendix 1). Performance profiling should consider a player's technical, tactical, and physiological abilities; and should be regarded alongside their personal qualities, and ability to integrate into a dressing room. The participants identified the need for a holistic approach to recruitment that aligns with all departments within a football club. This includes thorough due diligence combined with subjective and objective findings. This can be evidenced by insight from participants, who stated,

Participant 14 (Experienced group): We combine performance profiling with communication with other managers, scouts, players, heads of recruitment to perform 'due diligence' not only on a player's footballing attributes, but also his qualities as a person, character, ability to integrate into a dressing room, etc.

Participant 19 (Experienced group):We had a strong profile of what we were looking for at [club name], which I then introduced to my next club; however, it needs consistency of ideology and formation to allow it to flourish, otherwise it's irrelevant.

It is worth noting that none of the participants mentioned the precise performance profiling approach employed. There are various performance profiling techniques published, such as those by James et al.49, O’Donoghue et al.9, O’Donoghue and Cullinane50 and O’Donoghue51. This would have provided insight into how these normative performance profiles determine variability of data and present itself. However, it’s worth acknowledging that analysts may not have access to these publications given the existence of paywalls and/or the time taken between method development and publication. A method proposed by O’Donoghue et al.9 employs the use of lower, median, and upper quartiles to distribute data. Butterworth et al.37 suggests this method is suitable for multiple performances, but isn’t suitable for a single performance, nor does it account for opposition strength. Another commonly used method was produced by James et al.49. This method possesses similarities to O’Donoghue et al.9, but can account for positional variation, allowing coaches to view skill demands across various playing positions49. In a recruitment context, this can allow clubs to compare players based on positional profiles. This can be evidenced by participant 3 (Experienced group), “profiles act like a job description for the players we are chasing”, which suggests that clubs may utilise methods akin to James et al.49.

There was also no difference between the experience groups regarding their perceptions of performance profiling's ability in quantifying potential recruit's abilities based on performance data (*p* = 0.559). Eighty-nine (100% experienced; 78% inexperienced) percent of participants stated that they viewed performance profiling as a powerful tool in quantifying prospective signings. Of this, 47% of respondents viewed performance profiling as very important (22% experienced; 70% inexperienced), and 42% (55% experienced; 30% inexperienced) viewed performance profiling as an important technique in quantifying the potential of prospective players. This suggests that the value of performance profiling in player recruitment is not dependent on the experience of the recruiter. This is an important finding, as it suggests that performance profiling can be used effectively by recruiters of all levels of experience. However, the specific and preferred methods of performance profiling are still unknown, a notion previously mentioned by Nicholls *et al*.25 within the Olympic sports domain.

***Holistic Recruitment Model***

The findings of this study form the key phases required for a comprehensive, evidence-based player recruitment framework (Figure 1). This model includes the use of video and data, data-driven performance identification, performance profiling, and due diligence phases. These phases contain the specific methodologies including PA (e.g., video/data analysis, performance profiling) required to review a player’s performances, squad fit, and cultural fit subjectively and objectively. All phases require stakeholder (e.g., coaches, directors, analysts, head of recruitment) decision-making holistically throughout to ensure the individuals monitored/analysed are of sufficient quality to progress to the next phase. Moreover, multiple information sources should be combined to ensure an extensive, self-interpretable review of potential player(s). For example, performance profiles must be synergistically combined with video analysis, and player character references. This allows a thorough examination of not only a player’s performance qualities, but psychological qualities – examining a player’s effect on, and off the pitch.

Figure 1. Player recruitment framework – The key phases required for comprehensive, evidenced-based player recruitment.

**Future Directions**

The dynamic landscape of professional football recruitment is undergoing a transformative shift, driven by the ever-increasing integration of PA and data insights. As technology advances and data collection techniques become more refined, the role of PA and data in player recruitment is poised to further expand. A key future direction lies in the refined application of performance profiling via data science methodologies such as machine learning and artificial intelligence (AI) in combination with more detailed datasets which include tracking and body pose information. A further area of research within player recruitment and PA could investigate the transition from multidisciplinary teams (e.g. individual department decision-making on players: coaching, performance analysis, recruitment, sport science etc.) towards integrated interdisciplinary teams (e.g. integrated club decision-making on players combining: coaching, performance analysis, recruitment, sport science etc.)

**Conclusion**

By investigating the use and perceptions of PA and data in recruitment practices, this study was the first of its kind to establish their crucial role and develop a player recruitment framework. The specific findings of this study illustrated that over 44% of recruiters utilised video to generate player watchlists. Interestingly, 68% of all participants used PA metrics often or extensively to inform decision-making. Inexperienced recruiters viewed performance profiling with greater significance (80%) than their experienced (55%) counterparts.

PA metrics were viewed as pivotal in identifying otherwise unknown talent. This is corroborated by recruiters having regular access to external datasets. Data and metrics are then used holistically to support PA video, a time and cost-effective approach to traditional scouting. This affords clubs’ crucial insights into a player’s strengths and weaknesses. Performance profiling is extensively used to quantify potential recruits and is often supported by external datasets to evidence a player aligns to a club’s profile. Due diligence supplements the performance profiles, offering an insight into a player’s personality and fit into a squad to act as a comprehensive player description to aid decision-making. The significance of this work has enabled the creation of a novel empirically grounded recruitment analysis framework (Figure 1). In doing so, this study makes an original empirical and conceptual contribution to our understanding of player recruitment in football to inform the applied practice within football clubs and national associations.

**References**

1. Fullerton HS. The inside game: the science of baseball. The Am Mag 70th ed, 1910, 2–13.
2. Eaves JS. A history of sports notational analysis: a journey into the nineteenth century. *Int J Perform Anal Sport* 2015 Dec;15(3):1160–76.
3. O'Donoghue P. The use of feedback videos in sport. *Int J Perform Anal Sport* 2006 Nov;6(2):1–14.
4. Herold M, Goes F, Nopp S, et al. Machine learning in men’s professional football: Current applications and future directions for improving attacking play *Int J Sports Sci Coach* 2019 Dec;14(6):798–817.
5. Sarmento H, Marcelino R, Anguera MT, et al. Match analysis in football: a systematic review. *J Sports Sci* 2014 Dec 14;32(20):1831–43.
6. Taylor JB, Mellalieu SD, James N, et al. The influence of match location, quality of opposition, and match status on technical performance in professional association football *J Sports Sci* 2008 Jul;26(9):885–95.
7. Gonçalves B, Coutinho D, Santos S, et al. Exploring team passing networks and player movement dynamics in youth association football. Hayasaka S, editor *PLoS ONE* 2017 Jan 31;12(1).
8. Harper D, Carling C, and Kiely J. High-Intensity Acceleration and Deceleration Demands in Elite Team Sports Competitive Match Play: A Systematic Review and Meta-Analysis of Observational Studies. *Sports Med* 2019 Dec 1;49.
9. O'Donoghue P, Mayes A, Edwards KM, et al. Performance norms for British national super league netball. *Int J of Sports Sci Coach* 2008 Dec;3(4):501-11.
10. Butterworth A, O’Donoghue P, and Cropley B. Performance profiling in sports coaching: a review. *Int J of Perform Anal Sport* 2013 Dec 1;13(3):572-93.
11. Lewis M. *Moneyball: The art of winning an unfair game*. WW Norton and Company 2004.
12. Graham I. *How to win the Premier League: The inside story of football’s data revolution*. Penguin: London 2024.
13. Ingle S. How Midtjylland took the analytical route towards the Champions League. *The Guardian*, <https://www.theguardian.com/football/2015/jul/27/how-fc-midtjylland-analytical-route-champions-league-brentford-matthew-benham> (2015, accessed 9 March, 2023).
14. Pratley R. How data analysis won FC Midtjylland a title (and more). <https://breakingthelines.com/data-analysis/how-data-analysis-won-fc-midtjylland-a-title-and-more/> (2020, accessed 9 March, 2023).
15. Barnsley FC. Club statement. <https://www.barnsleyfc.co.uk/news/2017/december/club-statement/> (2017, accessed 9 March 2023).
16. AZ Alkmaar. Billy Beane takes minority stake in AZ. <https://www.az.nl/en/nieuws/billy-beane-takes-minority-stake-in-az> (2020, accessed 3 April 2023).
17. Zhu F, and Lakhani K. TSG: Hoffenheim: Football in the Age of Analytics*. Har Bus Sch Case* 2015;616(10).
18. Carling C, Lawlor J, Wells S. Performance analysis in professional football. In Gregson W, Littlewood M (Eds), Science in Soccer: Translating Theory to Practice. (pp. 213-239). London: Bloomsbury; 2018.
19. Reeves MJ, and Roberts SJ. Perceptions of Performance Analysis in Elite Youth Football. *Int J Perform Anal Sport* 2013 Apr;13(1):200–11.
20. Andersen LW, Francis JW, and Bateman M. Danish association football coaches’ perception of performance analysis. *Int J Perform Anal Sport* 2021 Jan 2;22(1):149–73.
21. Francis JW, and Jones G. Elite Rugby Union Players Perceptions of Performance Analysis. *Int J Perform Anal Sport* 2014 Apr;14(1):188–207.
22. Kojman Y, Beeching K, and Gomez MA, et al. The role of debriefing in enhancing learning and development in professional boxing. *Int J Perform Anal Sport* 2022 Mar 4;22(2):250-60.
23. Nicholls SB, James N, Bryant E, et al. Elite coaches’ use and engagement with performance analysis within Olympic and Paralympic sport. *Int J Perform Anal Sport* 2018 Sep 3;18(5):764-79.
24. Nicholls SB, James N, Bryant E, et al. The implementation of performance analysis and feedback within Olympic sport: The performance analyst's perspective. *Int J Sports Sci Coach* 2019 Feb;14(1):63-71.
25. Nicholls SB, James N, Wells J, et al. Performance analysis practice within Olympic and Paralympic sports: A comparison of coach and analyst experiences. *Int J Perform Anal Sport* 2022 May 4;22(3):343-51.
26. Groom R, and Cushion C. Coaches’ perceptions of the use of video analysis. *Insight* 2004 Aug 1;7.
27. Wright C, Atkins S, Jones B, et al. Elite football player engagement with performance analysis. *Int J Perform Anal Sport* 2016 Dec;16(3):1007–32.
28. Middlemas S, and Harwood C. No place to hide: Football players' and coaches' perceptions of the psychological factors influencing video feedback. *J Appli Sport Psychol* 2018 Jan 2;30(1):23-44.
29. Booroff M, Nelson L, and Potrac P. A coach’s political use of video-based feedback: a case study in elite-level academy soccer*. J Sports Sci* 2016 Jan 17;34(2):116-24.
30. Martin D, O’Donoghue PG, Bradley J, et al. Developing a framework for professional practice in applied performance analysis. *Int J Perform Anal Sport* 2021 Nov 2;21(6):845–88.
31. Lawlor C, Rookwood J, and Wright CM. Player scouting and recruitment in English men’s professional football: opportunities for research. *J Qual Res Sports Stud* 2021 Dec 23;15(1):57-76.
32. Kraak W, Magwa Z, and Terblanche E. Analysis of South African semi-elite rugby head coaches’ engagement with performance analysis. *Int J Perform Anal Sport* 2018 Mar 4;18(2):350–66.
33. Wright C, Atkins S, and Jones B. An analysis of elite coaches’ engagement with performance analysis services (match, notational analysis and technique analysis). *Int J Perform Anal Sport* 2012 Aug;12(2):436–51.
34. Martin D, Swanton A, and McGrath D. The use, integration and perceived value of performance analysis to professional and amateur Irish coaches *Int J Sports Sci Coach* 2018 Aug;13.
35. Painczyk H, Hendricks S, and Kraak W. Utilisation of performance analysis among Western Province Rugby Union club coaches. *Int J Perform Anal Sport* 2017 Nov 2;17(6):1057–72.
36. Butterworth, D.A., Turner, J.D. and Johnstone, A.J., 2012. Coaches’ perceptions of the potential use of performance analysis in badminton. *Int J Perform Anal Sport* 12(2), pp.452-467.
37. Fernandez-Echeverria C, Mesquita I, Conejero M, et al. Perceptions of elite volleyball players on the importance of match analysis during the training process. *Int J Perform Anal Sport* 2019 Jan 2;19(1):49–64.
38. Fernandez-Echeverria C, Mesquita I, González-Silva J, et al. Towards a More Efficient Training Process in High-Level Female Volleyball From a Match Analysis Intervention Program Based on the Constraint-Led Approach: The Voice of the Players. *Front Psychol* 2021 Mar 3;12:645536.
39. Gratton C, and Jones I. *Research methods for sports studies*. 2nd ed. repr. London, New York: Routledge, 2010.
40. Likert R. A technique for the measurement of attitudes. *Archives of Psychol* 1932.
41. Braun V, and Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006 Jan 1;3:77–101.
42. Nicholls SB, and Worsfold PR. The observational analysis of elite coaches within youth soccer: The importance of performance analysis. *Int J Sports Sci Coach* 2016 Dec;11(6):825-31.
43. O'Donoghue P. *An introduction to performance analysis of sport*. Routledge, 2014.
44. Loo JK, Francis JW, and Bateman M. Athletes’ and coaches’ perspectives of performance analysis in women’s sports in Singapore. *Int J Perform Anal Sport* 2020 Nov 1;20(6):960-81.
45. Zambom-Ferraresi F, Rios V, and Lera-López F. Determinants of sport performance in European football: What can we learn from the data?. *Decis Supp Syst* 2018 Oct 1;114:18-28.
46. Özaydın S. An empirical analysis of financial fair-play: The case of Russian Premier League. *Russian journal of economics* 2020.
47. Williams JJ. Operational definitions in performance Analysis and the need for consensus. *Int J Perform Anal Sport* 2012 Apr 1;12(1):52-63.
48. James N. Notational analysis in soccer: past, present and future. *Int J Perform Anal Sport* 2006 Nov 1;6(2):67-81.
49. James N, Mellalieu S, and Jones N. The development of position-specific performance indicators in professional rugby union. *J Sports Sci* 2005 Jan 1;23(1):63-72.
50. O’Donoghue P, and Cullinane A. A regression-based approach to interpreting sports performance. *Int J Perform Anal Sport* 2011 Aug 1;11(2):295-307.
51. O'Donoghue P. *An introduction to performance analysis of sport*. Routledge, 2014.

Appendix 1.1 - Theme schematic

**Overarching Theme**

**2nd Order Sub Themes**

**1st Order Sub Themes**

We use a data approach first and then recommended players from the data approach will be looked at via video.

Once we have identified potential players, we are able to watch key targets more extensively and understand game awareness and if they would fit into our system.

We use analysis of ourselves to then help us identify players that would fit our style.

Identify potential targets in the UK and abroad, allows us to watch video before attending a live game to maximise cost efficiency.

**Example Raw Data Extract**

Qualitatively identify players who fit the club’s philosophy.

Objective data-driven player identification is followed by subjective PA video insights.

PA video is utilised prior to national and international live scouting as a cost-effective practice.

Holistically harnessing data and video to provide player insight.

**Video and Data Combined**

PA video extensively analysed to ensure a player is best-fit to a squad’s system in a time effective manner

PA video offers a time and cost-effective approach to recruitment.

Appendix 1.2 - Theme schematic

**Overarching Theme**

Internal and external sources are utilised to identify otherwise unknown talent to then analyse.

PA metrics are holistically used to support the recruitment of players matching club tactics and philosophy.

**2nd Order Sub Themes**

**Identification of Hidden Talent**

PA metrics are used to support decision making but are not the only factor considered.

PA metrics are used to compare players fitting the club's playing style and tactics.

Management knowledge/ Internally derived performance identification

Third party/

Externally derived performance identification

**Example raw data extract**

**1st Order Sub Themes**

Performance analysis metrics are combined with the manager's own ideas on which players would fit into the team's playing style and tactics."

Data supports, never leads

It [data] certainly is part of decision making. There has to be a reason why we sign a player, and the data helps support that decision.

We use the lists Wyscout provides based on their index to check any players we may have missed from the leagues we follow or any interesting young players who are performing well according to that index.

It [data] allows us to possibly identify additional players to those that the management team have earmarked as potential signings

Appendix 1.3 - Theme schematic

**2nd Order Sub Themes**

**Example raw data extract**

**1st Order Sub Themes**

**Overarching Theme**

It [PP] gives insight into opposition analysis for matchdays as well as comparable statistical benchmarks for successful team performances.

Identify and assess players who have similar characteristics to benchmarks we have for individual positional profiles.

Profiling allows normative player performance benchmarks, facilitating current squad comparisons.

Performance profiling is combined with multimedia to supply objective (profiling) and subjective (multimedia) insights.

Profiling is combined with multimedia to support decision-making.

Players have to be a certain standard before signing, we need video and data evidence to suggest they would come and improve the team.

**Performance Profiling and Due Diligence**

We combine performance profiling with communication with other managers, scouts, players, heads of recruitment to perform 'due diligence' not only on a player's footballing attributes, but his qualities as a person, character, ability to fit into a dressing room, etc.

Background character checks.

Consistent background checks for club ideology, philosophy, and dynamic alignment.

Club ideology and philosophy.

We had a strong profile of what we were looking for at [club name], which I then introduced to my next club; however, it needs consistency of ideology and formation to flourish, otherwise it's irrelevant.

Appendix 2 - Questionnaire

**Demographics**

Participant name:

...................................................................................................

Age of Participant:

18-24

25-34

35-44

45-54

55-64

65+

Total duration involved within player recruitment:

Less than three years

Three-to-five-years

Six-to-nine-years

Ten-to-fourteen-years

More than fifteen years

Current job role (multiple choice if necessary):

Scout

Video Scout

Data Scout / Data Analyst

Recruitment Analyst

Performance Analyst

Coach

Head-coach / Manager

Chief Scout / Head of Recruitment

Technical Director / Director of Football

Without club / Currently unemployed (maximum of three years)

Other:

...................................................................................................

What level of the club do you work within  (multiple choice if necessary):

Senior

Professional development phase

Youth development phase

Foundation phase

Club name (anonymous):

...................................................................................................

Club nation:

...................................................................................................

Club division:

Division one

Division two

Division three

Division four

Division five

Division six

**Use of performance analysis in recruitment**

Do you have access to an external performance dataset  (multiple choice if necessary):

Wyscout

Instat

StatsBomb

OptaPro / STATS

FBRef

None

Other:

...................................................................................................

What does your club's use of the external performance dataset enable it to do?:

...................................................................................................

Q1A.) How does your club use performance analysis and its video to curate player watchlists? :

1. Not at all - We do not use performance analysis and video to curate player watchlists.

2. Rarely - We use performance analysis and video to curate player watchlists only occasionally.

3. Sometimes - We use performance analysis and video to curate player watchlists regularly, but not for every player.

4. Often - We use performance analysis and video to curate player watchlists for most players.

5. Very extensively - We use performance analysis and video to curate player watchlists for all players and it's an essential part of our club's strategy.

Q1B.) Please expand upon your answer:

...................................................................................................

Q2A.) How does your club use performance analysis and its data to curate player watchlists?:

1. Not at all - We do not use performance analysis and data to curate player watchlists.

2. Rarely - We use performance analysis and data to curate player watchlists only occasionally.

3. Sometimes - We use performance analysis and data to curate player watchlists regularly, but not for every player.

4. Often - We use performance analysis and data to curate player watchlists for most players.

5. Very extensively - We use performance analysis and data to curate player watchlists for all players and it's an essential part of our club's strategy.

Q2B). Please expand upon your answer:

...................................................................................................

Q3A.) How does your club use performance profiling in the recruitment phase?:

1. Not at all - We do not use performance profiling in the recruitment phase.

2. Rarely - We use performance profiling in the recruitment phase only occasionally.

3. Sometimes - We use performance profiling in the recruitment phase regularly, but not for every player.

4. Often - We use performance profiling in the recruitment phase for most players.

5. Very extensively - We use performance profiling in the recruitment phase for all players and it's an essential part of our club's strategy.

Q3B.) Please expand:

...................................................................................................

Q4A.) How does your club use performance metrics in scouting reports?:

1. Not at all - We do not use performance metrics in scouting reports.

2. Rarely - We use performance metrics in scouting reports only occasionally.

3. Sometimes - We use performance metrics in scouting reports regularly, but not for every player.

4. Often - We use performance metrics in scouting reports for most players.

5. Very extensively - We use performance metrics in scouting reports for all players and it's an essential part of our club's scouting strategy.

Q4B.) Please expand:

...................................................................................................

Q5A.) How does your club use performance analysis metrics to aid decision making in the recruitment process?:

1. Not at all - We do not use performance analysis metrics to aid decision making in the recruitment process.

2. Rarely - We use performance analysis metrics to aid decision making in the recruitment process only occasionally.

3. Sometimes - We use performance analysis metrics to aid decision making in the recruitment process regularly, but not for every player.

4. Often - We use performance analysis metrics to aid decision making in the recruitment process for most players.

5. Very extensively - We use performance analysis metrics to aid decision making in the recruitment process for all players and it's an essential part of our club's recruitment strategy.

Q5B.) Please expand:

...................................................................................................

Q6A.) How does your club use performance data within reports for club stakeholders?:

1. Not at all - We do not use performance analysis metrics to aid decision making in the recruitment process.

2. Rarely - We use performance analysis metrics to aid decision making in the recruitment process only occasionally.

3. Sometimes - We use performance analysis metrics to aid decision making in the recruitment process regularly, but not for every player.

4. Often - We use performance analysis metrics to aid decision making in the recruitment process for most players.

5. Very extensively - We use performance analysis metrics to aid decision making in the recruitment process for all players and it's an essential part of our club's recruitment strategy.

Q6B.) Please expand:

...................................................................................................

Q7A.) How does your club use performance analysis to identify players who may have been overlooked due to cultural or regional biases in football recruitment?:

1. Not at all - We do not use performance analysis to identify players who may have been overlooked due to cultural or regional biases in football recruitment.

2. Rarely - We use performance analysis to identify players who may have been overlooked due to cultural or regional biases in football recruitment only occasionally.

3. Sometimes - We use performance analysis to identify players who may have been overlooked due to cultural or regional biases in football recruitment regularly, but not for every player.

4. Often - We use performance analysis to identify players who may have been overlooked due to cultural or regional biases in football recruitment for most players.

5. Very extensively - We use performance analysis to identify players who may have been overlooked due to cultural or regional biases in football recruitment for all players and it's an essential part of our club's recruitment strategy.

Q7B.) Please expand:

...................................................................................................

Q8A.) To what extent does your club use performance analysis data to monitor the development and improvement of players once they have been recruited?:

1. Not at all - We do not use performance analysis data to monitor the development and improvement of players once they have been recruited.

2. Rarely - We use performance analysis data to monitor the development and improvement of players once they have been recruited only occasionally.

3. Sometimes - We use performance analysis data to monitor the development and improvement of players once they have been recruited regularly, but not for every player.

4. Often - We use performance analysis data to monitor the development and improvement of players once they have been recruited for most players.

5. Very extensively - We use performance analysis data to monitor the development and improvement of players once they have been recruited for all players and it's an essential part of our club's player development strategy.

Q8B.) Please expand:

...................................................................................................

**Perceptions of performance analysis in recruitment**

To what importance do you view performance analysis in the recruitment process for football players?:

1. Not at all important

2. Low importance

3. Neutral

4. Important

5. Very important

To what importance do you believe that performance analysis can provide valuable insights into the strengths and weaknesses of potential football recruits?:

1. Not at all important

2. Low importance

3. Neutral

4. Important

5. Very important

To what extent do you believe that performance analysis can improve the accuracy and objectivity of football recruitment decisions?:

1. Strongly disagree

2. disagree

3. Neutral

4. Agree

5. Strongly agree

To what extent of confidence do you view the reliability of performance data used in football recruitment analysis?:

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly agree

To what extent do you agree that performance profiling can help to quantify potential recruits abilities based on performance data:

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly agree

To what extent do you perceive performance analysis as a valuable tool for identifying hidden talent in football recruitment?:

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly Agree

To what extent do you agree that performance analysis can help identify potential recruits who may not have been discovered through traditional scouting methods?:

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly Agree

To what extent do you believe that performance analysis can improve the efficiency of football recruitment by reducing the need for extensive scouting trips?:

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly Agree

To what extent do you agree that the use of performance analysis in football recruitment can result in more objective and evidence-based decision-making?:

1. Strongly Disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly Agree

To what extent do you agree that performance analysis can help identify players who may have been overlooked due to physical characteristics or other biases?:

1. Strongly disagree

2. Disagree

3. Neutral

4. Agree

5. Strongly agree