Measures of Academy Productivity in English Championship clubs

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Abstract

Design/methodology/approach

The utilisation of Academy players was conducted with data from 33 eligible clubs, from 2017/18 to 2019/20. Two measures of productivity are defined for comparison: 'Utilisation' (the total minutes played by Academy graduates) and 'Starts' (the number of times an Academy player started for the first team). To quantify these measures, players and clubs' indices were also defined through two perspectives: 'global' (proportion of all games played 2017/18-2019/20) and 'local' (proportion of games the player featured only). Nationality and position were also included.

Purpose

This study quantifies Academy Productivity within English Football Clubs that have competed in the second tier (Championship) between 2017-2020. Previous research has outlined that clubs situated underneath the top leagues have an important role in the development of elite professional players. This study aims to investigate that level of the pathway further in England.

Findings

Headline findings demonstrate large differences between clubs for the type and proportion of playing opportunities created. The data outlines that academy graduates have greater utilisation and starts in cup competitions, particularly the EFL cup. Clubs in the sample being relegated from the Premier League into the Championship recorded weaker 'utilisation' and 'starts' compared to those that competed in the lower divisions. Academies are producing and utilising a greater proportion of defensive players (goalkeepers, defenders, defensive midfielders) compared to more attacking sectors of the pitch.

Originality/value

This offers useful insight for academy managers, allowing comparisons between clubs. It has implications for future strategies around the role of the academy and approaches to generating player opportunity.

INTRODUCTION

Football academies have been an integral part of professional football for many decades, producing players for the first team, developing players to sell for revenue production and helped to maintain a link with the local community (European Club Association, 2012; Mills et al., 2012). The importance and focus on youth player development have developed considerably in Europe in the last fifteen years. This is due to interventions in the market by the Union of European Football Associations (UEFA), through new regulations such as the "home grown" rule (UEFA, 2019a) and Financial Fair

Play (UEFA, 2019b). Both regulations have increased the focus on player scouting, recruitment and development within European football clubs. In England, specifically, elite youth football is characterised by a highly pressurised environment (Sagar et al., 2010), with English professional clubs investing significant amounts into their academy system (calculated at £40 million per annuum by Green, 2009). The development of players can directly benefit the first-team or generate funds via player transfers. The transfer market in football is, according to Mourao (2016), important for revenues, asset valuation, and competitiveness. For professional clubs under the elite level, where revenue streams are significantly lower, the development and use of players developed 'in-house' can be a source of competitive advantage, or as part of a strategy to protect their sustainability in the long-term. The transfer of players has, for many clubs at different levels and in different countries, been one of the most relevant sources of income over a long period of time (Feess, Frick, and Muehlheusser, 2004). In addition, including sell-on contract clauses to generate revenue from future sales is an accepted practice is professional football which can increase the revenue from academy developed players.

The transition of players from youth academy to senior professional is an increasingly researched area, particularly at the elite end of the spectrum. Most of this focus is on the top leagues and does not take a more focused view of the leagues operating beneath the elite level which have been proven to be a productive and valuable element of the pathway for elite player development. Bullough and Jordan (2018) found 81 English players appeared in the Premier League (2006-2016) having spent their formative years in academies of clubs operating in leagues below the top division (i.e. non-EPL clubs). Previous studies in English football development have focussed on quantifying the number of players, appearances and minutes played in the context of overall volume in the top league (McGovern, 2002; Gratton and Solberg, 2007; Bullough et al., 2016). In addition to UEFA's home-grown rules, where a proportion of players are required to have developed in the English system, the pathway for elite players into England has been complicated by the terms set out in the Brexit transition. From 2021, all non-UK players will have to meet the rules of a points-based system with no under 18s able to sign and a limit on under 21's (a maximum of 6 per season). Post-Brexit, there will also be changes in the way English clubs can sign players from the European Union (BBC, 2020). These changes, plus the previous work outlining the sub-elite level as a significant part of the transition structure, means understanding more about the clubs in this pathway is important.

This study aims to expand the depth of the analysis about the development pathway under the top league by creating a method of analysis to evaluate the effectiveness of an Academy using indicators of productivity by quantifying the utilisation of academy graduates in the professional game. The study includes analysis from 33 clubs across three tournaments, namely The English Football League

structure, The Football Association Challenge Cup, and The English Football League Cup. The 33 clubs included all played at least one season in the English Championship (second tier) over the three most recently completed seasons, namely 2017/18, 2018/19, and 2019/20. The results provide an important level of insight to key stakeholders in Football (managers, coaches, owners etc.) to evaluate (and notably, compare) Academy transition data between sub-elite level clubs.

The youth academies managed by English professional football clubs are, for most players, the natural pathway to becoming a professional player. It has been estimated that the academy system in England involves around 12,500 players between the ages of 8 and 18, in addition to the 1.5 million boys playing grassroots football in England (Calvin, 2017). This research also indicates that only 180 of these players will become a professional footballer that makes it to the Premier League (Calvin, 2017), a transition rate of 0.012%. Bullough and Jordan (2017) reported that 369 English players made their top-flight debut between 2006-2016, although only 141 of these players developed through one of the eight clubs which had been ever-present in the Premier League. This research noted that English clubs that had never played in the Premier League had an important role in developing players capable of playing in the top league (Bullough and Jordan, 2017). Clubs not having competed in the EPL (between 2006 and 2016) produced 81 players who played in the Premier League, generating 4,209 appearances and 306,557 minutes of play. This demonstrates that clubs competing under the elite level can still produce elite players, many of whom are not Category 1 academies, and therefore have a vital role to play in transitioning academy graduates into the professional game. This paper aims to present a method to quantify the utilisation of academy graduates and compare clubs that have played in the Championship, which operates one-tier underneath England's elite league.

Literature Review

The importance that English football clubs have been giving to their academies has developed and changed significantly compared to the government funded Youth Training Schemes (YTS) in the 1980s (Stewart and Sutherland, 1996), becoming more autonomous and focussed with much greater funding. For example, comparing the youth development budget from the financial year of 2018/19 to 2019/20 saw 66% of Premier League clubs and 58% of Championship clubs increasing their investment in youth development compared to the previous season, (Statista, 2019). Football migration and recruitment patterns changed significantly following the Bosman ruling in 1995 and the withdrawal of quota rules which empowered players with greater freedom of movement to transfer outside of their National Association (Bullough et al., 2016). Since the Bosman ruling, the migration of players from different nationalities has accelerated, which has an impact on recruitment strategies within football clubs, and especially opportunities made available for youth players (Littlewood et al., 2011). In addition, the "home-grown" rule, introduced in 2006, was designed as an answer to

combating negative shifts in behaviour acknowledged in European football. Among the negative trends identified were clubs accumulating players, lack of motivation in training players, local clubs losing identity, and a reduction in playing opportunities for locally trained players (Dalziel et al., 2013). The aim is to leverage clubs' attitude towards youth development and opportunity over European football leagues. Basically, the rule imposes that in a squad of 25 players, there has to be a minimum of 8 homegrown players. A "home-grown" player in English football means a player who, irrespective of nationality or age, has been registered with any club affiliated to The Football Association or the Football Association of Wales for a period, continuous or not, of three entire seasons, or 36 months, before his 21st birthday (or the end of the season during which he turns 21)" Premier League (2019b).

It is now common practice for clubs to sign "home grown" players in their teenage years before they have established themselves as a senior professional, including purchasing non-indigenous players at a younger age to enable them to qualify as "home-grown" (Vaeyens et al., 2008; Poli et al., 2016). This practice allows clubs with greater budgets to allocate greater resources to youth recruitment and disturb the development of youth talents at other clubs by signing them (Bullough & Jordan, 2017). This type of activity affects the whole development system and can result in young players being stockpiled at elite clubs with a reduced chance of developing in that pathway.

For clubs to meet the home-grown demands, many have changed their approach and culture to player development/recruitment and followed the strategy of pursuing and signing younger talents from across the world and earlier in their developmental journey to gain a competitive advantage over other clubs (Bullough & Jordan, 2017). Consequently, the academy structure is now populated by players from overseas, especially in England (Elliott & Weedon, 2011; Poli et al., 2016). This change in migration pattern has also been recognised as a constructive experience for youth players, not just a block on developing players from the host national association. The level of cultural and learning exchanges, which increases quality, has been a positive factor in the rule changes, although the presence of non-English players in the academy system can have consequences for developing English players (Littlewood et al., 2011; Richardson et al., 2012).

The flood of capital into professional football in the last three decades has also been significant and has implications affecting football clubs' strategies towards player recruitment and development. Formerly, in England, investment in professional clubs was made by local businessmen and city institutions, whereas it is more common for rich individual owners/consortiums to own clubs (Wilson et al., 2013). The new type of ownership has pushed the EPL brand and appeal internationally, exponentially increasing the value of TV deals, for example, the EPL broadcasting deal from 2019 to 2022, established an amount of £4.46 billion (BBC, 2018). Following significant financial interest in the

game, UEFA's Financial Fair Play regulations were developed, which also filtered down to influence the role of youth development, with clubs obliged to operate under great financial discipline to protect themselves against misuse of investments (Wilson et al., 2013). Clubs are required to operate more responsively, preventing them to spend more than earned, with penalties such as disqualification from European competitions, fines, and player transfer bans acting as deterrents (UEFA, 2011). The expenditure limits in the regulation, introduced in the 2010/2011 season, encouraged clubs around Europe to pay more attention to their academies and focus on developing youth players instead of investing solely on transferring players, into the club. The rule has seen some high-profile sanctions applied, however the application of these has been disputed, most recently with Manchester City FC, who overturned a ban on competing in European competitions (Pollard, 2020).

A proportion of revenue is allocated to youth development (Wilson et al., 2013). After the allocation of resources, it comes to the identification of talent, which is a traditional procedure within football clubs, and adding these potential talents in their academies. This approach often varies according to the club and the level it competes (Carling et al., 2012). Elite clubs, for example, use sophisticated recruitment strategies, nationally and internationally (Littlewood et al., 2011). Some of them started to invest in player and EU certification agreements with feeder and nursery clubs to gain even more access to the young foreign talent (Maguire & Pearton, 2000). Although FIFA regulations banned international transfers of players under the age of 18 (FIFA, 2019), inside the EU players can move at ease under the age of 18 years and, more globally, players whose parents emigrated to the respective country, for non-footballing reasons, can also move freely and afterwards sign for a foreign club (Littlewood et al., 2011). Moreover, owing to EU legislation, the quota rulings are unable to discriminate based on player nationality. Therefore, clubs can sign players at the age of 15 or 16 years, for example, from any country within the EU, arrange three years of training to them, and then they are classified as "home-grown" (Richardson et al., 2005). This will change in England post-Brexit, as discussed earlier.

As football has become more globalised, and the tangible rewards increase significantly, the complexity of player recruitment and development has also increased considerably. According to Vaeyens et al. (2005) and Bullough & Mills (2014), offering playing opportunities to youth players into the first team is a difficult process, related to the short-term pressures on the manager, arising from operating in a results-driven business. Football clubs would rather place high bids to recruit players that already have a level of experience than riskier new talent with no experience (Terviö, 2009) and this trend can reduce playing time for emerging players.

For English clubs, the creation of the Elite Player Performance Plan (EPPP) youth development scheme which aims to improve the quality and quantity of home-grown players produced in England

(Premier League, 2019a) has added to the operational context. The plan promotes the empowerment of each individual player through a player-led approach (Premier League, 2019a). The EPPP works across 3 stages of development, Foundation (U5 to U11), Youth Development (U12 to U16) and Professional Development (U17 to U23) (Premier League, 2019a). This 3-stage approach provides a long-term perspective for a young player to plan his career according to his individual purpose, adjusted to the overall club's environment. In 2018, 24 academies were rated in the top category (Training Ground, 2018), although data on categorisation of clubs is not routinely updated in the public domain. Martindale et al., (2005), underlines the importance of the club's quality environment for the development of a player. This is particularly pertinent for Championship clubs, increasingly competing for the best young players with clubs from further afield with significantly greater resources. The closure of some lower league clubs' academy system and the challenges faced by lower ranked clubs to achieve the highest academy rating means that it is important to understand more about player transition playing at this level (Doidge, 2013).

A major change from the former academy system included the abolition of the 90 minute travel time rule for under 18's which resulted in the process and approach for academies changing as the 'market' expanded geographically (Elliott & Weedon, 2011). For clubs outside of the EPL, this rule makes keeping their most talented young local players more difficult due to the attraction and resources available to the richest clubs. The role of youth development has, therefore, changed in some clubs, with some academies closing in lower-tier clubs (Bullough & Jordan, 2017). However, developing "home-grown" players can still be worthwhile for example, playing in the first team, providing revenues via transfer/loan fees, and future sell-on clauses and providing a pathway for talented local players.

Research in this area is becoming more valuable as clubs look to their academies to develop the next generation of players. The main objective of this study is to construct a method for analysing the productivity of a football academy by analysing 33 clubs competing in the second tier of English football in the last three full. This analysis will evaluate the academy productivity from a utilisation perspective and give a better understanding of youth development and transition. The results of this study can provide academy football managers with information to understand their 'productivity' and guide future strategy. This research builds an alternative set of indicators that make it possible to quantify academy transition from a utilisation perspective, to further develop the objective instruments currently used to measure and assess productivity in football academies.

METHODOLOGY

The technical aspect of the research was discussed and agreed with one Championship Academy Management team to defining the measures for the study. Doing this in conjunction with a club

enabled the approach to determine the performance indicators that are of most relevant from the perspective of industry managers. It was determined that the important variables to compare clubs were (a) number of players appearing in a professional league (b) frequency of appearances of former academy players in the first team (c) the number of minutes on the pitch of each academy player (d) the number of times they started first team games (e) player nationality and (f) position. Academy Productivity is conceptualised under two aspects: (1) the utilisation of players; and (2) players promotion to the first team (capability to start games in the first team). For each of these dimensions, an index is computed based on their raw data i.e. time on the pitch, the number of appearances, and the number of times they start a game in the first team throughout a season.

Sample

A database was created using data collated and cross-referenced from three prominent football statistic websites. The consultation with one Academy Manager concluded that the last three seasons was the period to be studied (2017-18 to 2019-2020) to be relevant from an industry viewpoint to create an overview of the recent transition period, with academies operating in a fast-paced and competitive environment. The short-term analysis makes the data relevant to current practices and academy managers, rather than including transition rates from pre-EPPP, pre-home grown rules etc. This approach could be implemented as a rolling programme of analysis for clubs in future, using the previous three seasons as the benchmark for assessing the most recent transition.

Every club that competed in at least one edition of the Championship during this period was included in the database, totalling 33 clubs, split into three groups (1) played all three seasons in the Championship (2) played two of the previous three seasons and (3) played one season in the championship. Data from the antecedent or subsequent season were included, regardless of the division to ensure all clubs are comparing three seasons, despite not always competing at the same level. Data from the FA Cup and the League Cup were also included for each club. The sub-groups consist of Group 1 (three seasons, n=13); Group 2 (played two seasons, n=13); Group 3 (played one season, n=7). Due to the global pandemic, English football was suspended in March 2020 and only the Premier League and Championship completed their seasons. League 1 saw teams complete between 34 and 36 games (of 46) and League 2 saw teams complete either 36 or 37 games (of 46). Five of the 33 teams in the sample were affected, cumulatively losing 54 league fixtures. The two cups were not compromised as the EFL cup was already concluded by March 2020 and the FA Cup played to its conclusion in August. Although not ideal, the methodological approach accounts for this by creating indices based on the maximum minutes played by each team.

An academy player of a specific club was considered as any player that was under-19 by the time he signed with this club. In case a player was over 19, but still met the criteria of being an academy player of that specific club, he was included in the database. The signing must have been without any transfer fee when it took place. Where players had a question mark on the “fee” column of the website, a deeper inquiry was conducted to identify if the player was signed for a fee. If that was the case, the players were excluded from the data base. Otherwise, if no trace of a signing fee was identified, the players were included in the data base.

Dimensions of Productivity

To measure the productivity of each Academy, two dimensions of productivity were selected: Player Utilisation and Starts. The basic assumption for the selection of these indexes was that the more minutes on the pitch and starts in a professional first team after their progression to the first team (debut game), indicates the strength of the transition process (scouted / identified, developed, supported, and trained sufficiently so he could contribute to the first team). Therefore, two types of indexes were created for analysis:

1. Amount of time a player plays, or Utilisation Index; and
2. Number of times a player starts a match, or Starts Index

In addition to these two indices, two sub-approaches have been created to quantify player progression and utilisation, termed ‘Global’ and ‘Local’. Both approaches seek to measure utilisation using different bases. The Global approach uses all games played by the club in a specific tournament as a base for calculation, whereas the Local approach considers only those games the player played. The range of games available to calculate each measure outlines that the Global approach provides a more comprehensive index and the Local index is a more specific measurement with a greater accounting of operational context. The rationale for creating two approaches is to factor in contextual issues such as injury or suspension where players are not omitted from playing due to a technical reason, therefore the Local approach offers this additional insight.

Calculating Indices of utilisation

For each player j (j = 1, 2, ... J_k), playing for team k (k =1, 2, … 33), the minutes played under the Global and the Local approach was computed for each of the three competition types (league, FA Cup, EFL Cup) over the three seasons outlined. Each rate varies between 0 and 100 and the closer to 100, the greater the utilisation in that tournament during that season.

Each of the 33 clubs considered in the study, has J_k academy players who were available in each season for each tournament of the CHAMP (Premier League, Championship, League 1 or League 2), FAC (FA Cup) and EFL (English Football League Cup) tournaments. The number of matches a club plays in a tournament is not always the same as it depends on the number of clubs (fixtures) in each league and how far clubs progress in the two knockout cup competitions. The minutes on the pitch is, therefore, calculated as a proportion of the number of matches, either played by the club, or by the player.

Each club is assessed by creating an index score for the club index by capturing player utilisation data through the three domestic tournaments all clubs in the sample compete: (1) Premier League, Championship, League One or League Two, referred to as 'CHAMP (2) FA Cup or ''FAC'; and (3) EFL Cup or 'EFL'. For each tournament, the number of minutes on the pitch was considered under two circumstances: related to the clubs' overall appearances, in terms of the total amount of minutes played by the club, in that tournament (global); and related to the amount of time based only in the number of games in which each player actually played (local).

Players Utilisation Rate: Global (GPU) and Local (LPU)

According to the Global approach, for each season, during a given tournament, every listed player has his utilisation rate defined by the ratio between his number of minutes played on the pitch and the total minutes played by the team in the respective tournament, not considered injury time, using the calculation:

$$GPUChamp_{jk} = \frac{Min\ Champ_{jk}}{90 * \#\ Matches\ Champ_{jk}} * 100 \quad j = 1,2,...,J_k \quad k = 1,2,...,33.$$

This calculation is repeated for FAC and EFL and captures the utilisation of each player in each tournament, considering the total games played by the club, regardless of whether the academy players were listed to play, and creates a ratio about player utilisation over all matches played. For the Local index, every listed player has his utilisation rate computed by the ratio between the number of minutes played on the pitch and the total number of minutes of all the games played by him in the respective tournament, not considered injury time, using:

$$LPUChamp_{jk} = \frac{Min\ Champ_{jk}}{90 * Matches\ Played\ in\ Champ_{jk}} * 100 \quad j = 1,2,...,J_k \quad k = 1,2,...,33.$$

This calculation is repeated for FAC and EFL and captures the utilisation of each player in each tournament, considering only the games where the player was on the pitch. Games for which a player did not make an appearance do not count in this index.

Once individual player scores were calculated, the data was aggregated for each club using the average of the players rates as the measure of utilisation. It is recognised that the high level of dispersion of individual players' scores for a given club can be a limitation for creating an average, however the presentation and discussion of different performance indicators helps to provide the context for this.

Clubs Utilisation Index: Global (GCU) and Local (LCU)

To aggregate the player measurements to the club level, the total Global Players Utilisation Rate for all players listed in a given tournament, is divided by the total number of players with at least one appearance, J_k, for a club k, given raise to the Global Club Utilisation Index, for each of the 33 clubs in the study. The expression used to compute this index was then repeated for FAC and EFL using the formulae:

$$GCUChamp_k = \sum_{j=1}^{J_k} \frac{GPUChamp_j}{J_k} \quad k = 1,2,...,33$$

Each club has a global index of utilisation on each tournament, as an average of its players rates of utilisation. This process was also undertaken to create the Local Clubs Utilisation Index (LCU), using the same formulae but based only on player appearances in the games they played.

Overall Index of Club Utilisation

The ultimate index of utilisation for a given club in a specific season is defined as the representation of the weighted average between the club's utilisation indexes across the tournaments. Each club has an overall utilisation index for the season, weighing each club's utilisation index in tournaments by their respective degree of relevance (P). The weights awarded to each competition (P1, P2 and P3) reflect the relative importance of each tournament within a season for the clubs. Weighting variables that are subjective or which can vary between clubs is, as Plumley et al (2017) note, not always underpinned by robust empirical evidence. As Zimbalist (2003) stated, in professional team sports in America, the owners of different franchises weight different performance metrics depending on their importance to the management functions they prioritise. Plumley et al (p.6) suggest that "there is no set definition for assigning weighting factors" and that a robust technique for weighting is to do so based on the perceived importance of variables. This will allow researchers to differentiate where some variables

are valued higher than others, but the discretion of the authors influence this. It is common in football that clubs have a preference to certain tournaments due to their importance (importance can be defined as the number of games, financial prizes, tv income, demand for tickets, media exposure, and the opportunity to qualify for European tournaments). In England league games are viewed as the main priority over cup games, and the FA Cup is viewed as the most prestigious of the two domestic cup competitions. Weights were attributed to each of the three different tournaments, corresponding to their relative importance and each club has an overall utilisation index which is weighted by the respective degree of relevance of each competition (P). The weights were defined as CHAMP (P_1), FAC (P_2) and EFL (P_3) to reflect the relative importance of each tournament in the season, and were defined in this study, $P_1 = 5$, $P_2 = 3$ and $P_3 = 2$.

This index is the Overall Global Clubs Utilisation Index (OGCU) and captures the level of utilisation of academy players by a club, by averaging their participation in the three tournaments, weight them by their respective degree of importance in the overall season. In summary, each club will have an overall measurement of utilisation of its academy players over the three tournaments for each season, based on the minutes played by the players over the games played by the club on that season. It is calculated using the formulae below, and then repeated for the Local measurement.

$$OGCU_k = \frac{P_1 * GPUChamp_k + P_2 * GPUFAC_k + P_3 * GPUEFL_k}{P_1 + P_2 + P_3}$$, for the Global form.

After calculating the overall utilisation indexes, the results are presented in ascending order, with the top performing club in each measure assigned a value of 100 and all other clubs' indexes are presented in relation to this new base. This method allows us to compare the productivity of each Academy in relation to the productivity of all other competitor clubs.

Indexes of Starts

The number of academy players starting a game represents a good way to verify the productivity of a club's academy. The data for 'starts' followed the same procedure used to compute the indexes of utilisation, using the same two approaches: Global and Local. The data for individual players are calculated, aggregated for clubs, and then weighted for the importance of the tournament using the same formulae presented earlier.

RESULTS

After setting the parameters of the data collection, two databases were created, one at individual player level, containing the Academy players statistics by club, tournament, and season: and one at club level, containing aggregated player data. From the latter, four raw indicators were extracted to define the data: number of academy players; total minutes played by the academy players; number of appearances, and the number of starts of the academy players in all eligible tournaments. The database returned 382 eligible players in the sample from 30 different countries spanning all continents of the world except South America. UK-based players (320, 84%) accounted for the most, and the Republic of Ireland (17, 4%) the only other nation with double figures of representation. All values were expressed by season and were obtained by adding the individual figures from the players. Table 1, below, presents the raw indicators for the 33 clubs in the sample.

Table 1 – Indicators of Productivity (all competitions) 2017-20

		TOTAL			PER PLAYER			Global	Local
	N	Mins	Apps	Starts	Mins	Apps	Starts	Utilis.	Utilis.
Aston Villa	15	13,626	230	141	908	15	9	15.34	43.22
Barnsley	8	12,565	169	141	1,571	21	18	20.17	68.81
Birmingham City	17	10,361	197	103	609	12	6	17.32	53.12
Blackburn Rovers	15	33,058	422	363	2,204	28	24	23.84	67.04
Bolton Wanderers	21	11,139	180	121	530	9	6	12.43	51.38
Brentford	8	11,534	176	124	1,442	22	16	27.23	51.73
Bristol City	9	14,689	192	163	1,632	21	18	25.74	63.81
Burton Albion	8	19,343	319	208	2,418	40	26	31.01	63.95
Cardiff City	3	8,026	100	90	2,675	33	30	34.93	77.68
Charlton Athletic	25	38,990	551	417	1,560	22	17	30.85	78.64
Derby County	15	26,013	388	283	1,734	26	19	25.54	58.50
Fulham	12	13,130	185	144	1,094	15	12	18.28	60.41
Huddersfield Town	11	7,729	108	84	703	10	8	18.83	56.85
Hull City	14	20,391	288	222	1,457	21	16	29.30	70.86
Ipswich Town	23	20,042	318	221	871	14	10	17.81	62.03
Leeds United	11	19,909	291	219	1,810	26	20	31.81	74.82
Luton Town	3	4,908	70	52	1,636	23	17	33.42	52.23
Middlesbrough	13	32,380	455	347	2,491	35	27	33.88	73.07
Millwall	11	16,849	258	179	1,532	23	16	29.18	66.39
Norwich City	5	24,047	303	268	4,809	61	54	51.35	82.10
Nottingham Forest	13	28,705	406	312	2,208	31	24	39.89	70.95
Preston North End	5	23,200	287	258	4,640	57	52	44.29	79.23
QPR	13	25,070	359	275	1,928	28	21	21.26	60.49
Reading	19	19,165	290	210	1,009	15	11	19.14	68.26
Rotherham United	3	5,059	89	55	1,686	30	18	22.18	50.90
Sheffield United	5	9,201	156	95	1,840	31	19	42.91	62.64
Sheffield Weds	16	18,135	236	198	1,133	15	12	18.82	71.20
Stoke City	4	4,651	66	54	1,163	17	14	17.96	69.18
Sunderland	10	20,514	307	235	2,051	31	24	29.60	63.11
Swansea City	11	18,852	262	205	1,714	24	19	19.04	67.84
West Bromwich	11	9,724	162	104	884	15	9	19.45	54.54
Wigan Athletic	10	1,122	36	7	112	4	1	5.57	18.19
Wolverhampton	15	5,951	133	55	397	9	4	14.67	44.32

Table 1 outlines the headline data for providing academy opportunity for the 33 clubs in the sample and also includes their overall Global Utilisation and Local Utilisation score. However, this research is concerned more with interpreting utilisation of all academy players using index scores for comparison, rather than just the absolute values. Assessing 'volume' only can be distorted by a small number of high performing players in an individual club. There is a moderate negative correlation (-0.42) between the number of players produced and the amount of time played (of all minutes, global utilisation), which suggests that quantity does not translate into the provision of consistent playing time. There is no correlation (-0.04) between the number of players and the local utilisation (minutes played of the games where the player played), and this is an important distinction to make as this is a more focussed measure. The Global score is an indication of all opportunities offered, and the local score is a representation of the amount of the game played when opportunities are provided.

Another important observation is that academy players are more likely to play and start in the cup competitions, particularly the EFL cup which is considered as the least important out of the three competitions (Table 2). The Global Utilisation Score for the league is 21.39 which is lower than the FA Cup (26.71) and the EFL Cup (34.19) and this is the case for most clubs in most seasons. The pattern is similar for the Global Starts Score. The Local Utilisation Score (i.e. a representation of utilisation when in the squad) is also lower for league games than FA Cup and the EFL Cup.

Table 2 – Average Global and Local Club Utilisation Index by competition– Season 2017/2018 to 2019/20

	Ave. Global Club Utilisation Score			Ave. Global Club Starts Score		
	CHAMP	**FAC**	**EFL**	**CHAMP**	**FAC**	**EFL**
2017/2018	17.53	24.84	34.08	17.91	23.64	31.65
2018/2019	25.89	29.69	36.61	25.52	27.36	33.09
2019/2020	20.76	25.59	31.87	20.52	23.84	30.42
TOTAL	**21.39**	**26.71**	**34.19**	**21.32**	**24.95**	**31.72**

	Ave. Local Club Utilisation Score			Ave. Local Club Starts Score		
	CHAMP	**FAC**	**EFL**	**CHAMP**	**FAC**	**EFL**
2017/2018	59.89	60.86	67.81	58.99	67.49	69.53
2018/2019	60.96	70.26	68.64	54.90	69.41	68.10
2019/2020	53.64	64.97	68.42	51.62	62.74	64.95
TOTAL	**58.16**	**65.36**	**68.29**	**55.17**	**66.54**	**67.53**

This is relatively logical as there is a reduced level of risk attached to playing younger and/or inexperienced players in competitions deemed less important, and for sub-elite level clubs,

competitions they are much less likely to win or progress far in. However, the main factor to determine if a player can handle the transition into first-team football is minutes on the pitch, therefore it is encouraging that many clubs in the sample take the opportunity to test academy graduates in the cup competitions.

To avoid analysing transition statistics by absolute values only, the indicator variables are presented using a comparison of the utilisation of academy players in different clubs in different seasons. The index approach provides a better understanding regarding overall utilisation of academy players across all competitions for Academy Managers, rather than overall volume.

Utilisation Indexes

The 'Global' and 'Local' Club Utilisation Index is outlined in Table 3, detailing the total utilisation index for each club. As the Global index is based on the number of games played by the club, a zero value denotes that no academy player has been utilised in that season. For the Local approach, whenever a club has not utilized any academy player in a given tournament, a zero value is not possible, and is marked as a "-", as a missing value for that club. Table 3 presents the Global and Local Club Utilisation Index in each tournament and Table 4 outlines the comparative performance against the top performing club (in terms of utilisation) each season, and is presented in groups, based on the number of seasons played in the EFL Championship.

Table 3 – **Overall Global and Local Club Utilisation Index – Season 2017/2018 to 2019/20**

		Overall Global Club Utilisation Index					Overall Local Club Utilisation Index				
N		**17-18**	**18-19**	**19-20**	**Ave.**	**INDEX**	**17-18**	**18-19**	**19-20**	**Ave.**	**INDEX**
	Preston North End	97.38	29.92	91.71	73.00	**90.8**	96.65	63.57	100.00	86.74	**96.8**
	Nottingham Forest	100.00	36.11	50.75	62.29	**77.5**	92.40	73.03	67.07	77.50	**86.5**
	Middlesbrough	64.91	28.81	71.54	55.09	**68.5**	79.38	77.77	82.55	79.90	**89.1**
	Leeds United	52.97	45.19	44.54	47.57	**59.2**	100.00	83.30	61.66	81.65	**91.1**
	Millwall	56.33	26.48	58.08	46.96	**58.4**	64.53	81.34	71.82	72.56	**81.0**
	Hull City	41.12	36.43	59.93	45.83	**57.0**	91.53	68.60	72.19	77.44	**86.4**
3	Brentford	59.70	21.09	51.76	44.18	**55.0**	73.40	48.66	47.43	56.50	**63.0**
	Derby County	30.57	32.62	57.30	40.16	**50.0**	49.49	68.95	73.61	64.02	**71.4**
	Bristol City	59.62	25.23	35.40	40.08	**49.9**	96.87	75.34	36.36	69.52	**77.6**
	QPR	24.18	28.04	47.72	33.31	**41.4**	70.94	67.97	59.31	66.07	**73.7**
	Reading	21.43	23.26	46.91	30.53	**38.0**	72.93	77.93	72.97	74.61	**83.2**
	Sheffield Weds	28.29	24.05	34.98	29.11	**36.2**	86.29	81.78	65.15	77.74	**86.7**
	Birmingham City	12.67	30.73	33.51	25.64	**31.9**	50.74	52.09	71.70	58.18	**64.9**
	Norwich City [1]	80.21	60.98	100.00	80.40	**100.0**	95.03	99.51	74.34	89.63	**100.0**
	Sheffield United [2]	46.42	69.12	76.74	64.09	**79.7**	59.28	72.74	73.50	68.51	**76.4**
	Cardiff City [1]	37.57	65.67	45.82	49.69	**61.8**	96.51	74.57	83.70	84.93	**94.8**
	Blackburn Rovers [2]	12.67	41.73	53.07	35.82	**44.6**	50.74	93.93	75.16	73.28	**81.8**
	Barnsley [2]	5.72	25.22	69.29	33.41	**41.6**	47.18	93.17	85.48	75.28	**84.0**
	West Bromwich [1]	8.54	27.16	57.94	31.21	**38.8**	32.88	66.26	80.12	59.75	**66.7**
2	Ipswich Town [2]	21.46	18.03	48.26	29.25	**36.4**	69.65	60.47	73.48	67.87	**75.7**
	Stoke City [1]	10.37	23.74	52.79	28.97	**36.0**	50.95	84.64	91.61	75.73	**84.5**
	Fulham [1]	42.26	20.34	20.93	27.84	**34.6**	86.48	62.80	48.48	65.92	**73.5**
	Swansea City [1]	2.22	40.47	39.44	27.38	**34.1**	59.95	83.87	78.72	74.18	**82.8**
	Aston Villa [1]	23.07	17.39	32.48	24.31	**30.2**	58.19	45.59	37.78	47.19	**52.6**
	Bolton Wanderers [2]	16.83	11.40	33.49	20.57	**25.6**	46.49	61.34	60.75	56.19	**62.7**
	Wigan Athletic [2]	13.98	1.52	13.36	9.62	**12.0**	14.11	17.93	27.80	19.95	**22.3**
	Charlton Athletic [4]	46.68	36.23	62.73	48.55	**60.4**	68.16	100.00	89.79	85.98	**95.9**
	Burton Albion [4]	51.18	41.07	49.35	47.20	**58.7**	79.06	80.74	49.45	69.75	**77.8**
	Sunderland [4]	47.39	34.36	57.64	46.46	**57.8**	57.41	65.89	83.99	69.10	**77.1**
1	Luton Town [4]	12.28	100.00	6.70	39.66	**49.3**	59.41	99.64	11.10	56.72	**63.3**
	Rotherham United [4]	11.33	33.18	60.07	34.86	**43.4**	22.10	73.12	71.98	55.73	**62.2**
	Huddersfield Town [3]	47.82	9.73	36.31	31.29	**38.9**	73.23	29.79	84.01	62.34	**69.6**
	Wolverhampton [3]	34.58	12.94	22.02	23.18	**28.8**	63.78	46.33	34.96	48.36	**54.0**

[1] = one season in EPL, [2] = one season in League 1, [3] = two seasons in EPL, [4] = two seasons in League 1

Observing the two index approaches, Global and Local, within the three seasons, certain clubs' academy players score consistently high utilisation rates e.g. Norwich City, and within this data, some clubs have much higher Global utilisation scores in league fixtures (e.g. Preston North End and Nottingham Forest). Some clubs have consistently low utilisation scores across the three observed seasons (e.g. Wigan Athletic). Academies that have a higher utilisation index are more productive than the others in terms of using players from their academy, as they make the transition to the first team. Those clubs that have played all three seasons in the Championship have a similar performance in both the Global and Local indicator (i.e. where there is a higher Global score there is a higher Local score). For those seven clubs that have played one season in the championship (2017-20), those spending two seasons below the Championship (Charlton Athletic, Burton Albion, Sunderland, Luton Town, and Rotherham United) saw the highest Global utilisation scores for their academy graduates than any other combination of leagues played in (24.3). The two clubs that spent two seasons in the Premier League (Wolverhampton and Huddersfield), where budgets are bigger and recruitment (generally) involving higher value transfer fees, scored the lowest average across the 3 seasons (9.5). Global utilisation in league games is consistent across all three seasons for those clubs that have played all three seasons in the championship (24.5 in 17/18, 21.9 in 18/19 and 22.0 in 19/20).

Starting Indexes

The second measure of academy transition is the number of games started, as an indicator for quality of appearance and being selected outright, rather than as cover (substitute). Table 4 presents the converted starts index for each club as a comparison score against the best performing club in each season for the Global and Local format. It follows the same approach for zero (Global) and missing for Local indexes as previously outlined.

Table 4 – Global and Local Club Starts Index – 2017-18 to 2019-20

N	Club	Global Club Starts Index					Local Club Starts Index				
		17-18	18-19	19-20	Ave.	INDEX	17-18	18-19	19-20	Ave.	INDEX
	Preston North End	92.90	27.54	95.30	71.91	**89.9**	93.81	48.06	100.00	80.62	**94.1**
	Nottingham Forest	100.00	38.47	51.87	63.45	**79.3**	83.58	82.77	67.41	77.92	**91.0**
	Middlesbrough	65.62	25.34	76.27	55.74	**69.7**	77.47	65.85	79.13	74.15	**86.6**
	Leeds United	55.68	43.77	50.72	50.06	**62.6**	100.00	76.03	67.44	81.16	**94.8**
	Hull City	43.78	34.84	63.06	47.23	**59.0**	89.91	61.61	71.11	74.21	**86.6**
	Bristol City	62.57	26.27	49.69	46.18	**57.7**	92.84	70.23	41.35	68.14	**79.6**
3	Brentford	63.27	20.92	53.19	45.79	**57.2**	70.82	42.82	37.76	50.47	**58.9**
	Millwall	54.12	25.71	53.69	44.51	**55.6**	55.13	70.97	60.41	62.17	**72.6**
	Derby County	30.70	31.14	61.14	40.99	**51.2**	47.17	63.43	74.38	61.66	**72.0**
	QPR	24.25	28.51	47.68	33.48	**41.8**	69.50	65.51	51.65	62.22	**72.6**
	Reading	20.86	23.68	47.75	30.76	**38.4**	70.22	79.03	72.20	73.82	**86.2**
	Sheffield Weds	28.01	23.77	35.10	28.96	**36.2**	80.07	78.67	68.59	75.78	**88.5**
	Birmingham City	4.61	28.93	33.16	22.23	**27.8**	23.70	44.88	62.52	43.70	**51.0**
	Norwich City	77.68	62.39	100.00	80.02	**100.0**	87.82	100.00	68.18	85.33	**99.6**
	Sheffield United	42.44	41.98	72.93	52.45	**65.5**	39.88	45.95	65.78	50.54	**59.0**
	Cardiff City	39.64	66.95	43.84	50.14	**62.7**	96.01	74.91	86.04	85.65	**100.0**
	Blackburn Rovers	38.68	38.26	55.48	44.14	**55.2**	68.73	81.29	72.49	74.17	**86.6**
	Barnsley	5.61	24.32	74.58	34.84	**43.5**	39.12	89.63	87.30	72.02	**84.1**
	Stoke City	13.48	24.61	56.59	31.56	**39.4**	56.89	86.76	93.97	79.21	**92.5**
2	Ipswich Town	23.45	16.90	53.69	31.35	**39.2**	73.66	43.39	75.38	64.14	**74.9**
	West Bromwich	5.20	23.93	62.36	30.50	**38.1**	18.67	55.21	82.98	52.29	**61.0**
	Fulham	44.39	18.94	20.68	28.00	**35.0**	82.84	56.27	38.01	59.04	**68.9**
	Swansea City	0.00	41.04	40.80	27.28	**34.1**	53.72	82.14	76.07	70.64	**82.5**
	Bolton Wanderers	28.42	13.49	32.86	24.92	**31.1**	55.71	68.52	54.80	59.68	**69.7**
	Aston Villa	24.78	15.85	29.80	23.48	**29.3**	51.60	30.03	28.38	36.67	**42.8**
	Wigan Athletic	12.09	0.00	1.54	4.54	**5.7**	12.19	0.00	6.27	6.15	**7.2**
	Sunderland	51.63	33.08	60.65	48.45	**60.5**	57.20	64.39	84.02	68.54	**80.0**
	Charlton Athletic	47.72	36.01	59.94	47.89	**59.8**	63.36	76.28	81.90	73.85	**86.2**
	Burton Albion	50.41	39.67	51.89	47.32	**59.1**	71.60	77.57	47.73	65.63	**76.6**
1	Luton Town	12.40	100.00	0.00	37.47	**46.8**	56.58	98.05	0.00	51.54	**60.2**
	Rotherham United	12.11	35.80	64.09	37.33	**46.7**	21.97	77.81	72.33	57.37	**67.0**
	Huddersfield Town	38.54	10.09	39.16	29.26	**36.6**	58.67	32.78	81.46	57.64	**67.3**
	Wolverhampton	35.53	11.72	16.73	21.33	**26.7**	57.84	42.83	22.15	40.94	**47.8**

Clubs such as Wigan and Wolverhampton are shown to rarely start academy players, whereas Norwich City, Cardiff and Preston are all more likely to start their games using former academy players now in the first-team environment. An observation across the three seasons is the high number of 'zero starts' recorded, demonstrating that no Academy player earned a chance to start a game for their club in particular competitions. Again, with some exceptions, former academy players making the transition are more likely to start cup games than league games. For the utilisation index and the starts index, the Local index is always higher than the Global one. This is expected since the denominator of the Local approach is a lower bound for the Global indicator.

The level of precision of the results, or its reliability, was assessed by the correlations among both the utilisation and the starts indexes for each of the three seasons of the study. The criterion related validity was defined as the correlations between the clubs' productivity indexes and the raw indicators, all of them relative to the number of the clubs' players. The higher these correlations, the stronger is the internal consistency of the indexes for that season. Table 5 presents the correlations between the indexes and the external criterion representing the clubs' raw productivity indicators. These values represent the criterion related validity measures of the indexes. As for the reliability, the higher these correlations, the higher the validity of the indexes in measuring the productivity of the academies. The table outlines that there is a high internal consistency between these three indicators in the three seasons analysed. The correlation values for the Global indicators are higher than 80%, indicating a good criterion related validity for the results. Global indexes are higher than local ones, indicating that global indexes are stronger than the Local indexes. While it is true that some players had a high number of minutes and starts per season, the majority of the academy players from the data base did not have a considerable number of minutes or starts per season which reduced the corelations for the Local indexes.

Table 5 – Correlation Matrix Between the Indexes and the Productivity Indicators 2017-18 to 2019-20

	Global Club Utilisation			***Local Club Utilisation***			***Global Club Starts***			***Local Club Starts***		
	17/18	***18/19***	***19/20***	***17/18***	***18/19***	***19/20***	***17/18***	***18/19***	***19/20***	***17/18***	***18/19***	***19/20***
Minutes	0,85	0,92	0,89	0,69	0,57	0,61	0,85	0,87	0,86	0,63	0,49	0,59
(sig)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,003)	(0,000)
Apps	0,86	0,93	0,89	0,59	0,53	0,51	0,85	0,87	0,87	0,54	0,46	0,50
(sig)	(0,000)	(0,000)	(0,000)	(0,000)	(0,001)	(0,002)	(0,000)	(0,000)	(0,000)	(0,001)	(0,006)	(0,000)
Starts	0,84	0,91	0,88	0,69	0,57	0,63	0,84	0,86	0,86	0,64	0,49	0,61
(sig)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	(0,003)	(0,000)

Playing position

Finally, analysing the positions from the academy players is an important factor in the supply line for developing professional players. The sample observed demonstrated that there is a greater tendency to develop players in more defensive positions, and offer those positions more playing time, including starts (see Table 6). More offensive players are more likely to be used more sparingly, and much less likely to start games for their club, with an average of 9 starts per player compared to 19 starts per player for defenders. This has developmental implications, if clubs do not see their attacking players coming through as viable options for the first team, this may result in incoming transfers in those positions which further inhibits playing opportunities.

Table 6 – Number of Players by Position

			TOTAL (by position)			TOTAL (by sector of pitch)				Average (per player)		
Pos.	**Players**	**%**	**Apps**	**Starts**	**Mins**	**Total**	**Apps**	**Starts**	**Mins**	**Apps**	**Starts**	**Mins**
GK	22	6%	498	493	44,592	22 (6%)	498	493	44,592	23	22	2,027
RB	37	10%	1,224	1,079	96,904	125 (33%)	2,692	2,350	212,980	22	19	1,704
LB	28	7%	621	534	48,470							
CB	60	16%	847	737	67,606							
DM	18	5%	443	359	32,317	142 (37%)	3,316	2,314	212,332	23	16	1,495
CM	80	21%	1,713	11,33	103,710							
RM	10	2%	179	113	10,775							
LM	11	3%	476	346	31,704							
AM	23	6%	505	363	33,826							
RW	19	5%	463	318	28,943	93 (24%)	1,431	805	78,792	15	9	847
LW	16	4%	201	116	11,032							
SS	7	2%	149	86	9,805							
CF	51	13%	618	285	29,012							
Total	**382**	**100%**	**7,937**	**5,962**	**548,696**	**382**	**7,937**	**5,962**	**548,696**	**21**	**16**	**1,436**

It can be argued that producing high quality creative midfielders and effective attackers are more difficult than producing and developing defenders. It may rely more on natural attributes, a coaching approach or even developmental culture. This could be an area for further research, with the data (minutes on the pitch and starts) concentrated more towards defensive-minded players (including goalkeeper) during the three seasons analysed.

The differences between individual players are also noticeable in the database. There are observations of academy players recording fewer than 10 minutes of first-team football, which may be the only professional minutes they ever play, mixed in with others in the database with very different career trajectories, where they have been transferred for a high fee or become capped at international

level. This suggests that the pathway from sub-elite level clubs can be extreme, from leaving the professional game to progression through to international representation and is demonstrates it as a valuable element of the development pathway.

Summary of headline results

- There is a moderate negative correlation (-0.42) between the number of players produced and the proportion of time played, which suggests that quantity does not translate into the provision of consistent playing time.
- There is no correlation (-0.04) between the number of players and the local utilisation (minutes played of the games where the player played).
- Academy players are more likely to play and start in the cup competitions, particularly the EFL cup which is considered as the least important out of the three competitions.
- Clubs spending time in the EPL and being relegated into the Championship offer fewer playing opportunities and starts compared to those that compete in the lower divisions.
- There is a greater tendency to develop players in defensive positions, with more offensive players (wide and attacking midfielders, and strikers) making up a smaller proportion of the sample and used less frequently.

DISCUSSION

This research aimed to create an alternative set of indicators to quantify academy transition from a utilisation perspective, to measure and assess productivity in football academies. Creating opportunities for academy graduates can be a complicated strategy depending on the performance outcomes determined for the academy managers and the first-team coach, as they have very different determinants for success. This analysis provides a useful contextualisation for academy managers to understand the efficacy of their academy and guide future strategy.

Some of the data above can be attributed to club culture and some to budgets (both low and high) which affects recruitment strategies in clubs. Club culture can also change very quickly with a change in circumstances. Chelsea FC are a good example, outlined as a club with low academy transition (Bullough and Jordan, 2017), Their transfer ban in 2019-20 resulted in academy graduates such as Mount, Gilmour, Abraham, James, and Hudson-Odoi making significant contributions during the season, which was followed in the summer of 2020 when the ban was lifted, with a £275m spend on Chilwell, Silva, Werner, Zieych, Havertz and Mendy.

The purpose of this research was to examine and compare productivity within English football academies, using clubs competing in the Championship between 2017 and 2020. There are various methods to assess productivity, and the implications from the findings are at the core of this for academy managers regarding which measures determine ‘best performance’ or success? Table 7 outlines the rank of each club by different performance indicators (utilisation index, starts index, volume and per player) which creates a comparison for academy managers to assess transition data against other clubs. Clubs ranked higher (top 10 performing) for player utilisation and starts tending to score lower on producing volume, but better on ‘per player’ indicators. Other clubs (notably Birmingham, Aston Villa, Wolverhampton, and Bolton) have produced the most players but their playing time, utilisation and starts are very low in comparison to others. Norwich and Preston only transitioned 5 players each but with very strong use of these players. For academy managers, this approach allows them to evaluate academy productivity, and strategy based on whether they feel quantity or quality is the main aim of operating the academy. Using absolute values only can distort the assessment and comparison if a small number of high performing players in an individual club generate significant playing time. This system allows academy managers to understand more about the playing time they are generating.

Table 7 Rank by measurement

	UTILISATION		STARTS		VOLUME				PER PLAYER		
Club	**Global**	**Local**	**Global**	**Local**	**Players**	**Mins**	**Apps**	**Starts**	**Mins**	**Apps**	**Starts**
Norwich City	1	1	1	2	27	7	10	7	1	1	1
Preston North End	2	2	2	4	28	8	14	8	2	2	2
Sheffield United	3	19	5	28	29	26	26	26	10	7	11
Nottingham Forest	4	8	3	6	13	4	4	4	6	6	7
Middlesbrough	5	6	4	10	12	3	2	3	4	4	4
Cardiff City	6	4	6	1	31	27	29	27	3	5	3
Charlton Athletic	7	3	9	11	1	1	1	1	18	17	18
Leeds United	8	5	7	3	17	12	11	12	11	12	10
Burton Albion	9	16	10	17	26	13	7	14	5	3	5
Millwall	10	15	14	20	18	17	16	17	19	15	19
Sunderland	11	18	8	15	21	9	9	9	8	8	8
Hull City	12	9	11	8	11	10	13	10	20	21	20
Brentford	13	28	13	29	25	22	23	22	21	18	21
Derby County	14	23	16	21	9	5	5	5	12	13	12
Bristol City	15	17	12	16	23	18	20	18	16	19	15
Luton Town	16	27	17	27	32	31	31	32	15	16	17
Blackburn Rovers	17	14	15	9	8	2	3	2	7	10	6
Rotherham United	18	30	18	25	33	30	30	30	14	9	14
Barnsley	19	11	19	13	24	21	24	21	17	20	16
QPR	20	21	20	19	14	6	6	6	9	11	9
Huddersfield Town	21	24	25	24	16	28	28	28	29	30	29
West Bromwich	22	25	24	26	20	25	25	24	27	27	27
Reading	23	12	23	12	4	14	12	13	25	25	25
Ipswich Town	24	20	22	18	2	11	8	11	28	28	26
Sheffield Wednesday	25	7	26	7	6	16	17	16	23	26	23
Stoke City	26	10	21	5	30	32	32	31	22	22	22
Fulham	27	22	27	23	15	20	21	19	24	23	24
Swansea City	28	13	28	14	19	15	15	15	13	14	13
Birmingham City	29	26	31	30	5	24	19	25	30	29	30
Aston Villa	30	32	30	32	7	19	18	20	26	24	28
Wolverhampton	31	31	32	31	10	29	27	29	32	31	32
Bolton Wanderers	32	29	29	22	3	23	22	23	31	32	31
Wigan Athletic	33	33	33	33	22	33	33	33	33	33	33

The methodology measures productivity within football academies using three headline variables, volume, utilisation and starts, as determined as most important through dialogue with an Academy Manager. Productivity is a matter of objective fact whereas performance is much more subjective and relates to much wider factors and variables. It is logical that, the more minutes, starts and appearances a player has made, it is more likely that he was performing well, and therefore being selected for the next game by the coach. However, other factors can come into consideration, for example, depth in the squad, injuries, change in manager, relationships, relegation/promotion. Analysing productivity of academy players does not directly evaluate player performance. The indicators used in this study consider quantitative statistics of playing data, not considering performance during that time and whether they were effective on the pitch e.g. saves, pass completion, distance covered, tackles, shots, assists etc. It could be more efficient in future iterations to measure productivity along with performance statistics or player ratings from each game. Future research in this area could also make a more direct link with the EPPP classifications to allow discussions around differences in productivity across a wider range of criteria.

CONCLUSIONS

The development pathway for elite footballers in English club academies operates in a complex and fast-paced environment, and the results in this study highlight that academy transition amongst the clubs sampled varies significantly. The data outlines useful comparisons between clubs which academy managers could use to benchmark themselves against other clubs, or themselves over time if academy transition is important to the club in question. The definitions of success depend on the role of an academy in each club, and what is determined as success also depends on how the academy is set-up, i.e. to generate a small cohort of players to play in the first-team, to sell players for profit or to provide opportunities for lots of different players to see if any make the successful transition. The inclusion of these indicators of performance further the understanding around academy transition at the sub-elite level and contributes to the knowledge base around the assessment of the productivity measurement of academies. This approach could be applied to any league in any country and is a useful tool for academy managers to assess their own transition record and compare against other clubs. This may be increasingly important as English clubs, having already adapted to UEFA's home-grown rule, now must account for the post-Brexit rules about signing non-UK players under the age of 18. The development and transition of players from academies in clubs playing under the Premier League where revenues are significantly lower could, therefore, become a more viable part of the supply line. There are implications for managers of academies and first teams and club owners as they plan their strategy for player development and recruitment in line with their budget and organisational philosophy towards recruitment. This is particularly true where the generation of

revenue via transfer fees (and future sell-on contractual clauses) can be a major source of revenue for long-term sustainability in unpredictable times for professional football, post-pandemic.

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