Final pass and its relationship with final action for the creation of goal-scoring opportunities at EURO 2020

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ABSTRACT

The purpose of this research was to study EURO 2020 goal scoring opportunities by recording the technique of the final pass, the technique of the final action and their zone of execution. A sub-objective was to test the relationship between the technique and zone of the final-pass, but also the relationship between the final-pass zone, the zone of final-action and its efficiency. The parameters studied were, a) the final pass zone, b) the final pass technique, c) the final action zone, and d) the result of the final action. Data collection was done with SportScout software. The correlation between variables was tested using the Crosstabs analysis and the Chi-Square statistic criterion. The results showed that most of the final passes were made from the zone outside the 18-yard box and the most common techniques used were the medium-range and the short-range passes. The independence or homogeneity test showed that the type of final pass was significantly influenced by the zone in which it was executed. The same was the case with the final action zone, which appeared to be significantly affected by the final pass zone. However, the effectiveness of the attacks depended only on the zone of final action (the final actions were more effective when taken from the zone between the six-yard box area and the penalty spot). An assessment of the opportunities that lead to goals and how they are created can help identify the tactical factors that increase efficiency and lead to more goals being scored.
Keywords: Performance analysis, Match analysis, Soccer, Penetration pass, Crosses.

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INTRODUCTION

Goal is the ultimate objective of a football game (Tokul & Mulazimoglu, 2018). As football is a low-scoring team sport, unlike other sports such as basketball or handball, the analysis of goals is of great importance and is therefore perhaps the most studied variable. A goal can affect the offensive philosophy of a team (Mitrotasios & Armatas, 2014) and, therefore, the identification of goal scoring actions and patterns is one of the most frequent topics in the analysis of a football match (Pratas et al., 2018). The technical-tactical action preceding the final action leading to a goal is called the final pass (penultimate action or more commonly known as an assist). According to Aranda et al. (2019) this can be an individual action (e.g. dribble) or a team action (e.g. penetrating pass, crossing, cut back pass). The importance of the final pass is very high in modern football as its frequent use increases the chances of teams to be in the top positions in the final standings (Longo et al., 2019). According to Lago-Ballesteros & Lago-Penas (2010), the top four teams in the Spanish La Liga (2008-09) executed, on average, more final passes than the teams occupying the next twelve positions in the league.

Although, as mentioned above, goals are the quintessence of football and their number in a match is the most objective measure of the offensive efficiency of any team (Sarmento et al., 2018), their individual analysis does not clearly represent a team's strategy (James et al. 2002). In contrast, the multifaceted analysis of actions that create goal scoring opportunities (regardless of their outcome) can help us identify the tactical factors that increase the chances of a team to score more goals (Gonzalez-Rodenas et al., 2020a). All of the above served as a trigger for the present study, in which emphasis was placed on the recording of the final pass, i.e. the pass preceding the final action, of the areas/zones of the field from which they were made as well as of the effectiveness of these actions. Such an assessment will highlight the parameters that lead to goals or scoring opportunities. In this way, coaches will be provided with useful information and tactical options adopted by high-level teams. They, in turn, will have useful and research-based material to tailor their training sessions to practicing final passes in order to increase their chances of scoring goals.

The aim of the study
Thus, thought the observation of high-level matches, the purpose of this research was to study the technique of the final pass, its zone of execution as well as the zone of final action. Its sub-objective was to test the relationship between, a) the technical final pass and the zone of its execution, b) the zones of final pass and final action, c) the zone of the final action and its effectiveness.

METHOD

Participants
The research sample consisted of 1,856 actions of 51 football matches from the 2020 European Men's Football Championship, which, due to the COVID-19 pandemic, was held in the summer of 2021. More specifically, all the actions that created chances for goals from open play, from all the matches of the group stage and knock-out stage of all the teams participating in the final phase of the European Championship were recorded and analysed. Thirty-two goals were excluded from the actions studied (such as own goals, goals following a challenge for the ball by two players with the ball accidentally ending up in the opponent's goal) because they could not be categorised in any of the categories of the observation protocol.

Measures
Data collection was carried out using the SportScout video-analysis software. The match analysis scheme was created by the observer under the guidance of a UEFA PRO coach and included the following categories and individual parameters:

1. **Final pass technique** (refers to the last pass made by a player before a goal-scoring opportunity is created): a. Short pass (up to 10 meters, Middle passes (from 10 to 20 meters), b. Long pass (more than 10 meters), c. Crosses, d. Cut back pass, e. Header.

2. **Zone of final pass & final action** (the specific area on the field where the last pass leading to a goal-scoring opportunity is made & the area where the receiving player executes the final action, such as shooting, dribbling, or making a decision to exploit the goal-scoring opportunity): a. Zone 1 (area on the left extending from the end line to the height of penalty area and within in), b. Zone 2 (goal area), c. Zone 3 (area on the right extending from the end line to the height of penalty area and within in), d. Zone 4 (area extending from the upper line of the goal area to the height of penalty spot), e. Zone 5 (area extending from the imaginary penalty spot line to the height of the penalty area), f. Zone 6 (area on the left extending from the end line to the imaginary penalty area line outside of it), g. Zone 7 (area on the right extending from the end line to the imaginary penalty area line outside of it), h. Zone 8, j. Zone 9, k. Zone 10 (area extending from the penalty area line to half distance from the centre line), l. Zone 11 (area extending from the half distance from the centre line to the centre line area), m. Zone 12 (behind the centre line).
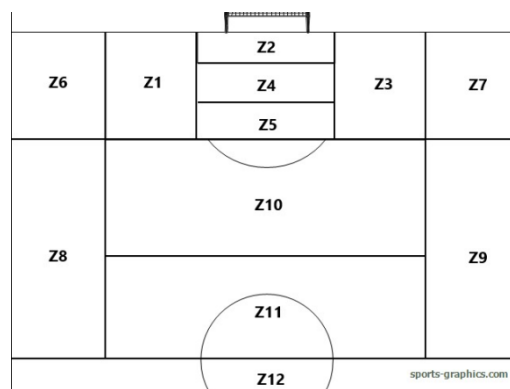

Figure 1. Zone of final pass and final action.

3. **Outcome of the final pass**: a. Successful (the final handover has reached the player who will perform the final action), b. Cut by the opposing player, c. Save/caught by the goalkeeper, d. The ball passed without final action (the final pass was too strong, at the wrong height or at the wrong time causing it to go away from the attacking teammate).

4. **Outcome of the final action (**the final action encompasses the subsequent actions taken by the receiving player after the final pass): a. Goal scoring, b. Goal opportunity (the final actions that came very close to the goal scoring e.g. directly on the goalpost or very close to goalpost, difficult save by the opponent goalkeeper or player), c. Unsuccessful final action (easy save by the opposing goalkeeper, weak shot on goal, errors).

Procedure
The observation of each phase of the matches started when the final pass occurred and ended after the completion of the final action of the attack. In order to ensure the validity and reliability of the collected data

(observation of the actions), the following procedure was followed: the high level coach, who as mentioned above participated in the creation of the analysis scheme, trained the observer (main observer) to recognize the parameters of the analysis scheme during the observation of each match. The validity of data collection was tested through intra-observation agreement where the coach and the main observer observed 50 randomly selected actions independently, using the same analysis scheme for the same actions. The Cohen's Kappa value showed that the coach's and the main observer's observations were highly correlated (k = 1.000). This ensured the validity of the data collection. Then, in order to test the reliability of the observation, i.e. whether the main observer would record all actions equally correctly in all matches of the sample, he observed an additional 50 randomly selected actions and after one week he repeated their observation. In this case too, Cohen's Kappa value was extremely high (k = 1.000). In this way the observer was considered to be ready to collect valid and reliable data.

Analysis

The data were analysed using the SPSS 20.0 (SPSS, Chicago, IL) statistical analysis software. The calculation of the frequency of occurrence of the observed parameters was performed through the Frequencies analysis. The relationship (homogeneity or independence) between the variables/categories of the observation protocol was tested using the Crosstabs analysis and the Chi-Square test ($p < .001$). In cases where the expected value, even in a single instance of the analysis table, was less than 5, the Fisher's Exact Test value was taken into account.

RESULTS

Descriptive statistics

Statistical analysis of the data showed that of the total number of attacks observed (1,856 phases), 39% (728 actions) were completed. It was found that 11% of the completed attacks resulted in a goal, 38% in a goal scoring opportunity and 51% were ineffective (poor execution of the shot, easy clearance by the goalkeeper, turnover).

Studying all the attacks (completed and incomplete, Table 1) it was found that the most common 'Final Pass Technique' was the cross (42%) followed by the mid-range pass (20%). Short-range, long-range and cut-back passes had almost the same frequency with a rate of 11%, 13% and 12% respectively, while headers accounted for 4%. Regarding the zones from which the final passes were made, it was found that Zone 10 had the highest percentage (24%), followed by Zone 7 (12%), Zone 6 (12%), Zone 1 (11%) and Zone 3 (11%).Regarding the zones of final actions, it was found that most of them were performed from Zone 4 (36%), Zone 5 (18%), Zone 2 (17%) and 16% from Zone 10 (Table 1).

On the contrary, by only studying the completed attacks (regardless of their outcome) it was found that the most frequent techniques of the 'Final Pass' used were the Mid-range Pass (34%, 1/4) and the Short-range Pass (22%, 1/3). Those were followed by the Cross (17%, 1/6) and the Long-range Pass (14%, 1/7). With regard to the Final Pass Zone, it was found that most passes were executed from Zone 10 (37%). As for the remaining zones, final passes were completed at almost the same rate (7% on average) except for Zone 4 which counted for the lowest rate of all (2%). Regarding the 'Zones of Final Action' it was found that, again, the highest percentage was found in Zone 10 (32%) as well as in Zones 4 (21%) and 5 (18%). The remaining zones were used considerably less (Table 2).

Table 1. Percentage of pass technique, zone of final pass and zone of final actions in completed and incomplete attacks.

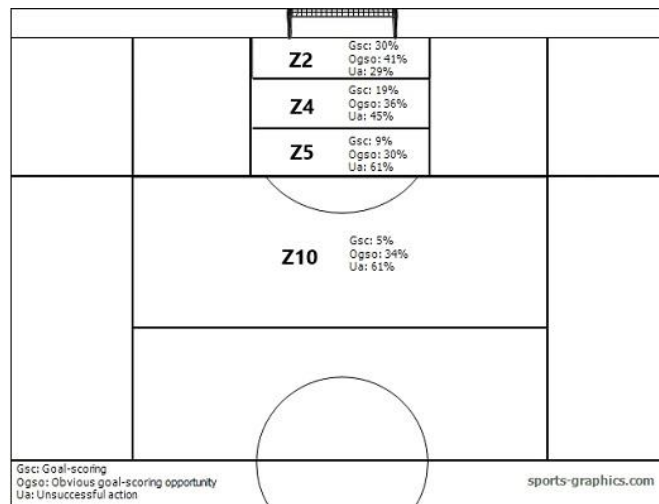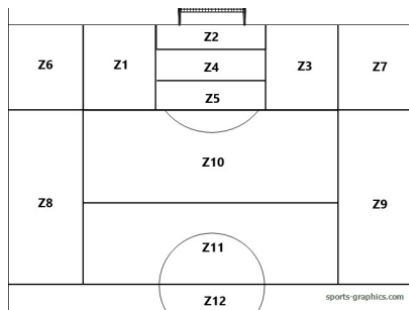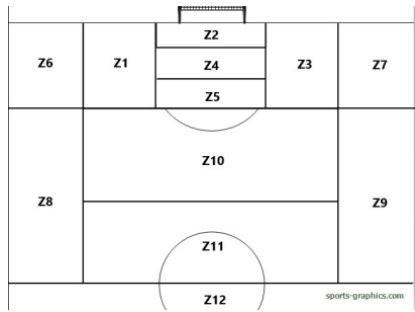| Categories	Parameters	Percent
Pass Technique (complete & incompleted attacks)	Short –range pass (up to 10 meters	11%
	Mid-range pass (from 10 to 20 meters)	20%
	Long-range pass (more than 10 meters)	13%
	Crosses	42%
	Cut back pass	12%
	Header	2%
Zone of final pass (complete & incompleted attacks)	Zone 1	11%
	Zone 2	0.2%
	Zone 3	11%
	Zone 4	2%
	Zone 5	3%
	Zone 6	12%
	Zone 7	14%
	Zone 8	7%
	Zone 9	9%
	Zone 10	24%
	Zone 11	5%
	Zone 12	4%
Zone of final action (complete & incompleted attacks)	Zone 1	7%
	Zone 2	17%
	Zone 3	5%
	Zone 4	36%
	Zone 5	18%
	Zone 6	0.1%
	Zone 7	0.1%
	Zone 8	0.2%
	Zone 9	0%
	Zone 10	16%
	Zone 11	0.1%
	Zone 12	0%

Figure 2. Relationship between zone of final actions and attack's outcome.

Table 2. Percentage of pass technique, zone of final pass and zone of final actions in completed attacks.

Categories	Parameters	Percent
Pass Technique (complete attacks/regardless of their outcome)	Short –range pass (up to 10 meters	22%
	Mid-range pass (from 10 to 20 meters)	34%
	Long-range pass (more than 10 meters)	14%
	Crosses	17%
	Cut back pass	9%
	Header	4%
Zone of final pass (complete attacks/regardless of their outcome)	Zone 1	9%
	Zone 2	0.3%
	Zone 3	9%
	Zone 4	2%
	Zone 5	5%
	Zone 6	8%
	Zone 7	6%
	Zone 8	5%
	Zone 9	6%
	Zone 10	37%
	Zone 11	8%
	Zone 12	4%
Zone of final action (complete attacks/regardless of their outcome)	Zone 1	11%
	Zone 2	9%
	Zone 3	8%
	Zone 4	21%
	Zone 5	18%
	Zone 6	0.1%
	Zone 7	0.1%
	Zone 8	0.4%
	Zone 9	0%
	Zone 10	32%
	Zone 11	0.3%
	Zone 12	0%

Relationship between observation parameters and the effectiveness of completed attacks

The analysis of the data showed that the outcome of the completed attacks was significantly dependent only on the 'Final Action Zone' category (Fisher's Exact test = 69.64, p = .000). In particular, 5% (1/20) of the final actions from Zone 10 resulted in a goal, 34% (1/3) came very close to a goal and 61% (1/6) were ineffective. As for Zone 4, 20% (1/5) resulted in a goal, 36% (1/3) came very close to a goal and 45% (1/2) were ineffective. Regarding Zone 5, 10% (1/10) resulted in a goal, 30% (1/3) came very close to a goal and 61% (1/2) were ineffective. The zone from which the most goals were scored in relation to the total number of final actions executed from it was Zone 2 (30%, 1/3). Also, 1/2 (41%) of the final actions from Zone 2 came very close to a goal while 1/2 (29%) were ineffective (Figure 2).

Final Pass Technique VS Final Pass Zone (completed attacks regardless of the attack's outcome)

According to the results, the 'Final Pass Technique' was significantly dependent on the zone from which it was executed (Fisher's Exact test = 1084.52, p = .000). In particular, most of the Medium-range Passes were

executed mainly from Zone 10 (53%), Zone 11 (10%) and Zone 1 (10%). Most Short Passes were executed mostly from Zone 10 (49%) but also from Zones 5 & 1 (16% & 11% respectively). On the contrary, most crosses were executed from Zone 6 (25%), followed by Zones 7, 10, 8, 9, (23%, 18%, 17%, 15%, respectively). As for Long-range Passes, most were executed from Zone 12 (32%), Zone 11 (24%) and Zone 10 (20%). Regarding the Cut Pass which had the lowest percentage, it was found that it was mostly executed from Zone 1 (46%) and Zone 3 (44%). The Head Pass was mostly executed from Zones 5 & 4 (24% & 21% respectively) and also from Zones 3 & 1 with percentages of 21% & 13% respectively (Table 3).

Table 3. Relationship between final pass technique and zone of final pass.

Final pass technique	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10	Z11	Z12	Total
Short pass Count %Within pass technique	10%	1%	7%	7%	16%	2%	3%	2%	2%	51%	1%	0%	100%
Middle passes Count %Within pass technique	8%	0%	7%	0.4%	2%	5%	3%	33%	28%	49%	45%	7%	100%
Long pass Count %Within pass technique	1%	0%	2%	0%	0%	2%	2%	6%	13%	22%	27%	25%	100%
Crosses Count %Within pass technique	1%	0%	2%	0%	0%	31%	21%	13%	14%	17%	1%	0%	100%
Cut back pass Count %Within pass technique	43%	0%	43%	0%	0%	3%	11%	0%	0%	0%	0%	0%	100%
Header Count %Within pass technique	11%	4%	15%	22%	22%	0%	0%	0%	0%	0%	0%	0%	100%

Note. *p* < .001.

Final Pass Zone VS Final Action Zone (completed attacks regardless of the attack's outcome)
It was also found that the 'Final Action Zone' was significantly dependent on the 'Final Pass Zone' (Fisher's Exact test = 273.40, *p* = .000). The results show that most of the final passes made from Zone 10 ended up mainly within Zone 10 (48%) but also in Zones 5, 1 & 4, with a lower percentage (14%, 13% and 13% respectively). In contrast, the largest percentage of Final Passes executed from Zone 1 ended in Zone 4 (32%), Zone 2 (23%) and Zone 5 (20%). As for the final passes from Zone 3, 38% of them ended in Zone 4, 19% in Zone 5 and 16% in Zone 2. Regarding the final passes from Zone 6, most of them ended in Zone 4 (36%), 21% in Zone 5 and 19% in Zone 2 (Figure 2). With regard to the other zones, the final passes from Zone 7 ended mainly in Zone 4 (28%), from Zone 9 in Zone 10 (34%), from Zone 8 in Zone 4 (31%), from Zone 5 in Zones 11 & 5 (29% & 26%) while the final passes from Zone 4 ended in Zone 4 with a percentage of 56% (Figure 3).
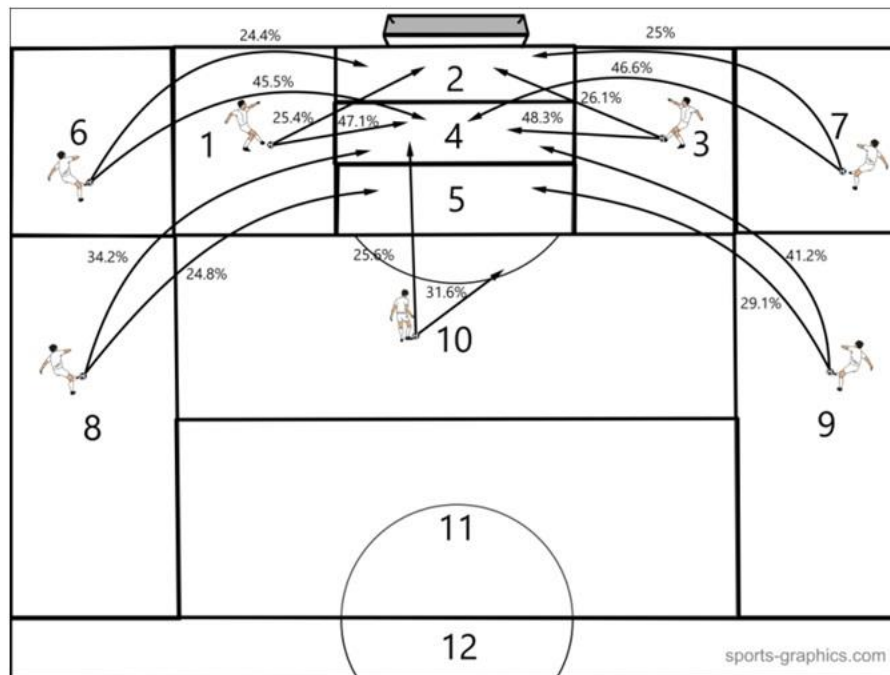
Figure 3. Relationship between zone of final pass and zone of final action.

DISCUSSION

By analysing a large number of completed attacks in EURO 2020, this study aimed to examine the final passes before the completion of these attacks by recording their technique, the zones from which they were performed, the zones of the final action as well as their effectiveness. It then proceeded to test the relationship between technique and the zone of final pass, the zone of final pass and the zone of final action as well as what the effectiveness of the attacks depended on.

According to international literature, one of the most popular actions in high-level matches, apart from the combination play (Mitrotasios & Armatas, 2014), is the cross (Michailidis et al., 2018). Analysing the 2018 World Cup matches, Vergonis et al. (2019) concluded that one in five goals scored in them came from a cross. According to the results of the present study, the cross initially appeared to be the most frequent final pass technique regardless of whether the attack was completed or not. Subsequently, when the analysis of the data was focused on the completed attacks, it was found that the most common final pass techniques were the middle-range and short-range passes. Furthermore, the correlation of crossing with the other passing techniques and their effectiveness showed that the middle-range and short-range passes were equally effective at creating goal-scoring opportunities but tended to be more successful at scoring goals. The effectiveness of these (penetrating) passes is highlighted in the research of Smith & Lyons (2017), who analysed high-level matches (World Cups 2002, 2006, 2010 and 2014) and concluded that the penetrating pass was the most frequent action that resulted in a goal. Also, the contribution of middle-range and short-range final passes in creating goal scoring opportunities has also been highlighted by other studies, according to which penetrating passes seem to be the most common ones (Gonzales-Rodenas et al., 2017; Sarmento et al.,2018). This confirms the tendency of top-tier teams to favour through balls (passing to the back of the defence) as well as crosses, something that was also confirmed in the sample of the present study (2020 World Cup).

Apart from the type of final pass, an equally important parameter is the zone from which it is executed. In his research, Cobanoglu (2019) found that most of the final passes were made from outside the 18-yard box and fewer from the side zones. The results of the present study seem to be similar in that most of the final passes were made from the central area outside the 18-yard box (Zone 10) as well as from the central zones within the 18-yard box (Zones 4 & 5). Perhaps this is related to the way the teams dealt with better organized defences. The main defensive styles in recent years have been on-the-ball or zone defence, creating defensive pressure in the space where the ball is located. Breaking down such a defence from the central axis is difficult and can be done either by a penetrating pass behind the defence or by an individual action of an attacking player (Gonzales-Rodenas et al., 2020a). As for the other zones, it was found that the final passes made from them had a much lower but comparable percentage (9% on average). In contrast, significantly fewer final passes were executed from the central zones near the goal (Zones 4 & 2). It seems that when the final pass was very close to the opponent's goal, the teams in the sample chose to complete the attack without any delay that could lead them to a turnover and, as a result, lose the opportunity to score a goal or lose possession of the ball.

The results of the present study showed that the final action zone was significantly affected by the zone of final pass. In particular, the final passes made from zone 10 ended up mainly inside zone 10. This shows the tendency of teams to take direct shots from outside the 18-yard box. The final passes, as well as crosses from the side zones outside the 18-yard box and passes from the side zones inside the 18-yard box, seemed to be directed towards the central zones of the 6-yard box and the 18-yard box (zones 2, 5 & 4). These findings seem to be in agreement with Gonzales-Rodenas et al. (2020a), whose study is probably the only one that has documented the correlation between these zones. Also, according to the same authors, parallel and cut back passes are the main technical actions of the final pass, usually executed from zones 1 and 3. The areas where these passes ended up in this study, as in that of the above authors, were the zone between the penalty spot and the 6-yard box (zone 4) as well as the zone of the 6-yard box (zone 2). The player entering these side zones has the above options (parallel and cut back pass) which create serious problems for the defending team. Moreover, the choice of passing parallel to the goal, mainly inside the 6-yard box (zone 2) causes big problems for the goalkeeper, who is exposed between the passer and the receiver, but also for the defenders who have to face the risk of an own goal. The increased number of own goals by the teams studied in this research is probably due to this fact. Also, the parallel pass and the cut back pass into the penalty area (zone 4) have the advantage of placing the attackers facing the goal, in close proximity and at a greater angle to it. Therefore, the chances of scoring a goal are higher, as the defenders don't have much chance and time to react and press.

Research indicates that the 16-yard box is the area from which most goals are scored with a percentage of more than 80% (Cobanoglu, 2019; Mitrotasios & Armatas, 2014; Pratas et al., 2018; Wright et al., 2011). As previously mentioned, in the present study the most popular zones from which the final actions were taken were zone 10, zone 4 and zone 5. However, the teams in the sample scored the majority of their goals when the final action originated mainly in Zones 2 and 4. Still, we should also take into consideration the attacks that came very close to scoring as well as those that were ineffective. In particular, the attacks that came very close to scoring were those in which the final action was initiated from the side zones inside the 16-yard box (1 and 3). These zones were characterized by the fact that one in two of the final actions initiated in them came very close to scoring while the other half were ineffective (resulted in a turnover, poor execution of the shot or an easy clearance by the opponent). It should also be mentioned that although the final actions from zones 10 & 5 came very close to scoring (the ball hit the crossbar, it was just out of bounds, there was an extremely difficult clearance by the opponent) these were also the zones from which most of the failed attempts were made (turnovers, poor execution of the shot, stealing the ball from the opponent).

CONCLUSIONS

The interpretation of the results of the present study, which was based on the analysis of completed attacks, shows that the area in the centre and outside the 16-yard box (Zone 10) was the area from which most of the final passes were made.

While the cross might seem to be the most popular passing technique, this is not the case if we consider the percentage of its occurrence in completed attacks. However, its effectiveness did not differ from the effectiveness of the other passing techniques studied.

The effectiveness of the completed attacks seemed to be affected only by the zones the final actions were carried out from, with zones 4 and 2 being the most favoured. The following could be further investigated in future studies: the relationship of the parameters of final pass technique, final pass zone, final action zone and efficiency, with a) the type of the team's offense, and b) the opponent's defence. This will allow us to examine whether the above parameters (offense, defence) influenced the parameters studied in this study.

Limitations
While the observation of the matches was valid and reliable, a limitation of the research was the separation of the stadium zones. Specifically, this restriction applies to the central and lateral zones outside the penalty area of the field where the recording was approximately done.

AUTHOR CONTRIBUTIONS

Efstratios Kyranoudis: Data collection. Katerina Papadimitriou: Training on the software used. Support and check of data collection. Aggelos Kyranoudis: Creating an observation protocol (observation parameters/variables). Anestis Giannakopoulos: Statistical analysis. Xanthi Kontstantinidou: Creating an observation protocol (observation parameters/variables).

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DISCLOSURE STATEMENT

No potential conflict of interest were reported by the author.

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