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Pre-game Decision-Making by a Handball Coach -Using the qualitative and quantitative methods

Stefan Janković[1], Slobodan Simović[2], Srđan Trivundža[3]
[1]Faculty of Sports Scinece, PanEuropean University „Aperion" Banja Luka
[2]Faculty of Physical Education and Sport, University of Banja Luka
[3]Former Top Handball Player

Correspondence:
Stefan Janković
Faculty of Sports Scinece, PanEuropean University „Aperion" Banja Luka, stefan.z.jankovic@apeiron-edu.eu

Abstract: *Different decision-making models are used in various areas of human life, however no area relies as much on analytical data as professional sports. The perceived opportunities and problems are the key factors that heavily influence the decision-making process itself. This especially applies to sport coaches and their ability to make proper strategy-related decision ahead of the next match their teams will face. The development of the sports industry, its importance, both at the national and global level, requires these decisions be made analytically and rationally, that is, to avoid making intuitive decisions whenever possible. One of the ways to achieve this is to utilize the SWOT method. The present research was carried out in five stages, which were supposed to determine, by means of utilizing qualitative and quantitative methods, the radical and key goals of a handball team facing the next opponent. The sample of the study was a handball match between Denmark and Croatia played at the European Championship in Hungary in 2022. In the first stages of the research, the key strengths and weaknesses of both teams were determined using quantitative methods, followed by the qualitative Analytic Hierarchy Process method, which made the comparison between the teams possible viable. The obtained results were then assessed by means of the Denmark and Croatia National Team Factors Evaluation. The final results were then displayed using the Denmark-Croatia Matrix. The decision on the strategy for the upcoming match was made using the TOWS Matrix. We have come up with five identified goals, one of which, should it be fulfilled, would eventually lead the national team of Denmark to the victory. The final score, alongside with the entire analysis, have provided justification for the decision-making model used therein.*

Keywords: *AHP method, decision-making, handball game, national team, pre-game evaluation, SWOT analysis*

Introduction

Decision-making can be seen as one's choice of the course of action when faced with several alternatives. Managers often consider decision-making to be their primary job since they are constantly faced with the choice of what to do, who will do it, when, where, and every so often, how to do it (Weihrich & Koontz, 2008). Packianthan Chelladurai points out that opportunities and problems perceived by managers are the point at which decision-making begins (Chelladurai, 2014). Decision-making is a fundamental element of any sport, especially fast and dynamic team sports such as volleyball, soccer, handball, American football, rugby and basketball (Kaya, 2014). Decision-making in sports is a process in which athletes and coaches, taking into account all the elements that can have an impact on the final score, choose the strategy that best suits the situation at hand (Sharma, Tokas, Sharma, & Mishra, 2022).

There are several ways to make a decision: the rational model, the bounded rationality model, and the intuitive model (Simović et al., 2023). Herbert Simon introduced the concept of bounded rationality and the cognitive and social limits humans have (Simon, 1957). According to him, it is virtually impossible for a manager to gather all the necessary information, identify all possible alternatives, carefully evaluate each one and choose the most favorable one, in other words to be fully rational. Although the manager has the best of intentions, he/she can only use limited rationality, which is bounded by the complexity of the problem, the lack of information and the limitations of human capabilities.

One of the methods that is the most common tool ensure an efficient and effective analysis, as well as to obtain a sound decision-making framework, is the SWOT analysis (Kajanus, Leskinen, Kurttila, & Kangas, 2012). As such, the SWOT method has also found application in modern sports and has been used in the sports industry (Wei, 2019), sports event management (Karadakis, Kaplanidou, & Karlis, 2010), sports equipment (Garg, & Garg, 2018), sports organizations (Wani & Faridi, 2020), sports tourism (Milinković, Simović, Ljubojević, Jovanović, & Pantelić Babić,

2017), recreational sports and exercising (Sperlich, Düking, & Holmberg, 2017), sports marketing (Lee & Walsh, 2011), physical education (Jonibek, 2021), league competitions (Huang, 2021) as well as othe organizations of after-school sports programs (Răchită, 2011).

One of the areas where SWOT analysis is used in sports is the pre-game decision-making with the help of which coaches are able to strategize accordingly (Simović et al., 2021). The coach's strategy decisions may be divided in the following three step: (1) the pre-interactive phase, which includes all the pre-game decisions; (2) the interactive phase, which includes during-game analysis and decision-making; and (3) the post-interactive phase, which corresponds to the post-game analysis, and which is heavily impacted by the final score of the game (Cloes, Bavier, & Piéron, 2001). Research has shown that coaching strategy in pre-game period is almost identical across the board, i.e. coaches first focus on strengths and weaknesses of their own teams, and then shift their focus to their opponents (Almeida, Saramento, Kelly, & Travassos, 2019).

One may say that SWOT analysis has been an integral part and tightly linked to sports research in various team sports including handball as well (Bon, Čarter, & Doupona, 2012; Davari, Nazari, & Naderian Jahromi, 2020; Traub, 2019). However, the studies like those ones have mainly been focusing on organizational and strategic issues in handball clubs and national level associations.

Handball is an Olympic sport played all over the world at a highly competitive professional level (Hermassi et al., 2021). Almost every game of handball is full of defense to offense transitions (Venzke, Schäfer, Niederer, Manchado, & Platen, 2023), which are heavily conditioned by both motoric (running, sprinting, jumping), and mental (reaction speed, situational analysis, decision-making) factors (Raiola, Invernizzi, Scurati, & Fattore, 2020).

The aim of the present study is to, utilizing SWOT analysis and qualitative and quantitative methods, choose the most optimal strategy in pre-game analysis of the next opponent, i.e. to make use of the opponent's and conceal our own potential weaknesses in order to maximize the chances of winning.

Methods

The study sample is comprised of a single game in the main stage of the competition at the 2022 European Championship played in Budapest (Hungary), between the national teams of Denmark and Croatia. These two teams have widely been regarded as the powerhouses of European and world handball. This sample game has been randomly chosen.

The research has been conducted in five separate stages, as indicated in Figure 1.

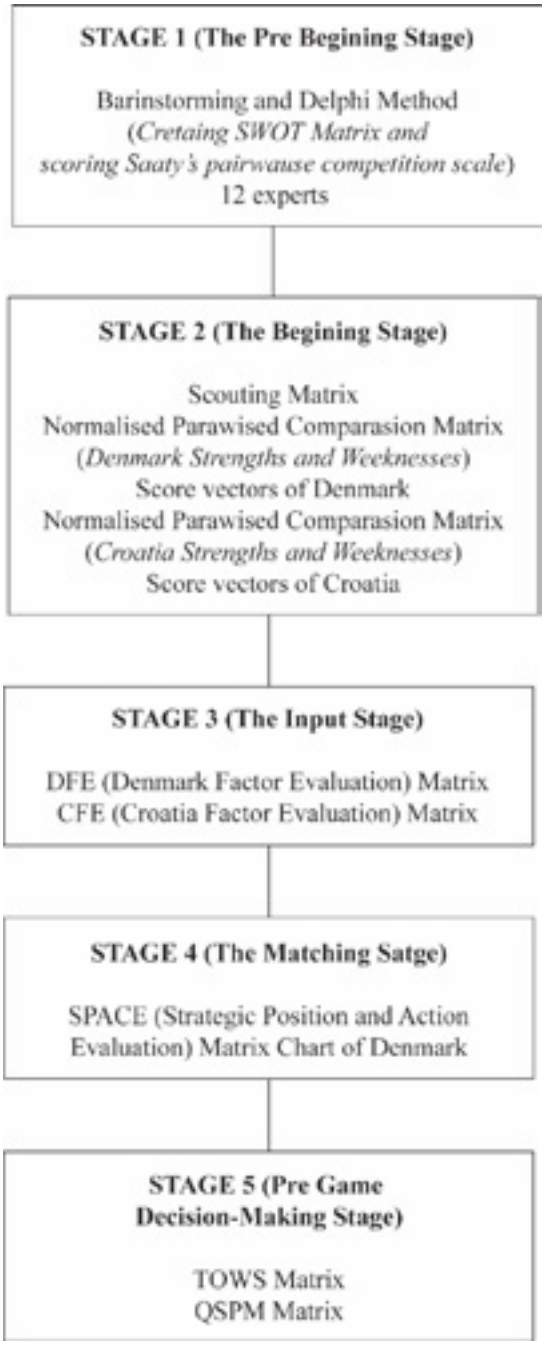

Figure 1. *Game-Decision Strategy Determining Stages*

In the Pre Beginning Stage, two qualitative methods were used to form the SWOT Matrix and the Matrix of Absolute Numbers. First we used the Individual Brainstorming method in which selected experts, each for himself, determined the strengths and weaknesses of both national teams. Based on their proposed findings, the study authors formed SWOT Matrix. Once the SWOT Matrix has been complete, the experts used a standardized comparison scale with nine levels (Albayrak & Erensal, 2004). Then, the Delphi Method was used so that the authors could synthesize and extract the average of the experts' opinions, i.e. their comparison of the weaknesses and strengths of the examined national teams.

When it comes to the selected experts, they are all former handball players who played in national teams and renowned European clubs, and then pursued coaching careers.

In The Beginning Stage, using mathematical quantitative methods, each average entry a_{jk} represented the value of the *j* criterion in relation to *k* criterion. If $a_{jk} > 1$ then *j* criterion is more significant than *k* criterion, and vice versa if $a_{jk} < 1$. If two criteria are of equal importance, then we entered 1 for the value of a_{jk}. Entries a_{jk} and a_{kj} have to satisfy the following constant $a_{jk} \, x \, a_{kj} = 1$. At the same time, $a_{jj} = 1$ for all categories.

$$A = \left(\bar{a}_{jk}\right)_{mxm} = \begin{bmatrix} a_{11} & a_{12} \dots a_{1n} \\ a_{21} & a_{22} \dots a_{2n} \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ a_{n1} & a_{n2} \dots a_{nn} \end{bmatrix}$$

When the Pairwise Comparison Matrix was formed, it was possible to perform a Normalized Pairwise Comparison Matrix so that in each column of the table the sum is equal to 1, i.e. $\overline{a}_{jk}$ from the second matrix is calculated as:

$$\tilde{a}_{jk} = \frac{a_{jk}}{\sum_{l=1}^{m} a_{lk}}$$

or

$$\tilde{A} = \begin{bmatrix} \tilde{a}_{11} & \cdots & \tilde{a}_{1n} \\ \vdots & \ddots & \vdots \\ \tilde{a}_{n1} & \cdots & \tilde{a}_{nn} \end{bmatrix}$$

In fact, relative weights are found through the normalization of the matrix. Those relative weights w (relative weights, which were later entered in the DFE and CFE Matrix) correspond to the largest eigenvalue λmax as:

$$A_w = \lambda_{max} \times W$$

Finally, the Criteria weight vector (vector of m-dimensional columns) was derived based on the average of the entries of each row of the Normalized Pairwise Comparison Matrix (Banihashemi & Rejaei, 2016) i.e.

$$w_j = \frac{\sum_{l=1}^{m} \bar{a}_{jl}}{m}$$

The DFE and CFE Matrices were calculated in the third stage, or the Input Stage. The CFE Matrix was formed by entering the values obtained in the Score Vector of Croatia, where a weight was calculated for each key factor representing Croatian national team, and shown in the numerical range from 0 (not important) to 1 (very important), and where, of course, the sum of the weights must be 1. This weight shows the relative effect of each factor on the team's success or failure. Then a score was assigned to each factor (Ratio). The numbers vary from 4 to 1, where 4 means - *a big impact of the Croatian national team on the final result*, 3 – *an above average impact*, 2 – *an average impact,* and 1 – *a small impact*. Finally, the weights of each factor were multiplied with its score (Ratio) and we obtained the weighted score of each factor. We added the obtained results to get the Sum Total Weight Scores. The same procedure was applied for DFE Matrix the only difference being in determining the result of each factor (Ratio). To be more specific, value 1 was assigned for *major weakness observed,* value 2 for *minor weakness,* value 3 for *minor strength,* and value 4 for *major strength*. As a logical result, the strength results should be represented by either value 3 or 4, whereas weakness results should be 1 or 2 (David, David, & David, 2023).

In the Matching phase we compared the intensity of the key factors in Danish and Croatian national teams and their impact onto the final score. By doing so we obtained an indication what the most optimal choice of future strategy (Strategic Positioning) is. More specifically, we created a SPACE Matrix diagram. The entire procedure included

calculation of weight scores of DFE and CFE matrices and their graphic representation in the range of 1 to 4. DFE results were presented on the x-axis whereas CFE results were presented on the y-axis.

In the final stage of The Pre Game Decision Making, and based on the previously obtained results, a TOWS matrix was formed and it included a clear guidelines towards formulation of the goals of the future strategy and their importance on proper strategizing ahead of a new game (Fadillah, Dewi, & Hardjanto, 2013; Koontz, Weihrich, & Cannice, 2020). We also left some space for a possible QSPM Matrix (Quantitative Strategic Planning Matrix) in case we came up with some significant findings relative to the other strategic options and their possible outcomes, i.e. should DFE and CFE intersection points be close on either *x* or *y* axis.

Results

Table 1. *SWOT Matrix (Denmark vs Croatia)*

Strengths (Denmark) S_{Den}	Weaknesses (Denmark) W_{Den}
s1D – organized positional attack s2D – attack segmenting with proper preparation-execution transition s3D - „attacking versatility"(achieved through all-round scoring positions and balanced scoring efficiency) s4D – well-organized transition attacks (fastbreaks and counterattacks) s5D – well-balanced first and second attempt attacking s6D – current form s7D – two goal keepers s8D – team line-up s9D – disciplined and stable defensive formation s10D - disciplined defensive formation including offense-to-defense transition	w1D – attacking deep defensive zones w2D – reckless ball possession w3D – dips in form and performance w4D – performance problems in slow pace related games w5D – goalkeeper dependency w6D – heavy reliance on one defensive formation with multiple defending flaws
Strengths (Croatia) S_{Cro}	Weaknesses (Croatia) W_{Cro}
s1C – adjusting the defense to the opponent (deep and shallow zone switching) s2C – transition to defense s3C – motivation and defensive aggression s4C – improvisation in attack (quality ball possession awareness, goal-to-goal play, patience in offensive setting, etc.) s5C – individual characteristics SB s6C – offensive efficiency of inner position players	w1C - Covid-19 protocol w2C – two goalkeepers w3C - turnovers w4C – playing experience and change of generations w5C – right and left back players' performance w6C – team line-up w7C – media and public pressure w8C – defense-to-offense transition w9C – attacking patterns w10C – defensive turnovers

Table 1 shows SWOT Matrix which was formed right after the initial brainstorming delivered by the 12 handball experts who took part in our study. The total of 10 strengths and 6 weaknesses of the Danish national team and 6 strengths and 10 weaknesses of the Croatian national team were recorded. A code was assigned to each strength and weakness so that we could use the research results more easily in our study. The strengths and weaknesses of the Danish national team would correspond to the internal environment in a classic SWOT analysis, whereas the strengths and weaknesses of Croatian national team would correspond to the external environment, with the side note that one team's strengths would be seen as the other team's threats – same holding true for one team's weaknesses and the other team's opportunities.

Using the Analytic Hierarchy Process mathematical method, we compared each of the obtained key elements for the Danish and Croatian national teams with other strengths and weaknesses and thus formed the Parawise Comparisons Matrix of Denmark Factors Evaluation (Strengths & Weaknesses) and the Parawise Comparisons Matrix of Croatia Factors Evaluation ($Weaknesses_{Opportunities}$ & $Strengths_{Threats}$). We added each vertical column of the matrix, and then divided each individual cell of the vertical column with the obtained vertical result and entered the obtained re-

sult into the matrix. Then we added those results horizontally across the rows of the matrix, and divided the obtained results by the total number of strengths and weaknesses in both national teams. We obtained tables Score Vectors Denmark and Score Vectors Croatia as the result of the foregoing procedure. Figure 2 shows the impact of each of the key factors on the final score. The results are presented in percentages, i.e. we multiplied the values obtained in the Score Vectors tables by 100. In this way, you can see how each recorded strength and weakness of both national teams affected their overall performance quality.

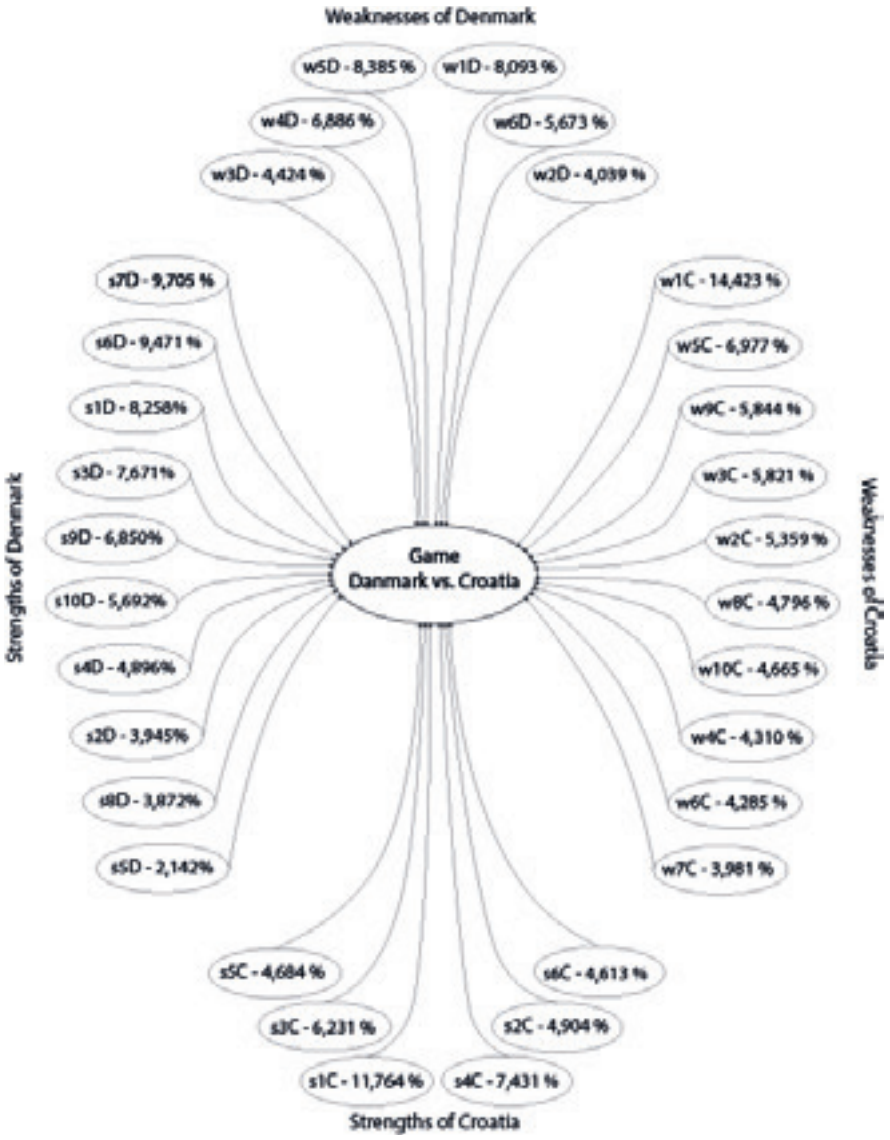

Figure 2. *Weight of Kay Factors Strengths and Weakness Team Denmark and Team Croatia*

The results obtained at the Beginning stage were entered into the HFE (Home Team Factors Evaluation) Matrix and the VFE (Visitor Team Factors Evaluation) Matrix. The HFE matrix represents the strengths and weaknesses of the Danish national team, and the VFE Matrix represents the strengths (or threats) and weaknesses (or opportunities) of the Croatian national team. The results of the third stage, The Input Stage, are presented in Table 2.

Table 2. *IFE and EFE Matrix for team Denmark*

IFE Matrix team Denmark				EFE Matrix team Denmark			
Kay Internal Factors	**Weight**	**Ratio**	**Weighted Score**	**Kay External Factors**	**Weight**	**Ratio**	**Weighted Score**
Strengths Denmark				*Opportunity Denmark (Weaknesses Croatia)*			
s7D	0,097	4	0,388	o1D (w1C)	0,146	4	0,577
s6D	0,095	4	0,379	o5D (w5C)	0,070	4	0,279
s1D	0,083	3	0,248	o9D (w9C)	0,059	2	0,118
s3D	0,077	4	0,307	o3D (w3C)	0,058	3	0,175
s9D	0,068	4	0,274	o2D (w2C)	0,054	4	0,214
s10D	0,057	4	0,288	o8D (w8C)	0,048	2	0,096
s4D	0,049	3	0,147	o10D (w10C)	0,047	3	0,140
s8D	0,039	4	0,155	o4D (w4C)	0,043	4	0,172
s2D	0,039	3	0,118	o6D (w6C)	0,043	4	0,171
s5D	0,021	3	0,064	o7D (w7C)	0,040	4	0,159
Weaknesses Denmark				*Threats Denmark (Strengths Croatia)*			
w5D	0,084	2	0,168	t1D (s1C)	0,118	3	0,353
w1D	0,081	1	0,081	t4D (s4C)	0,074	2	0,149
w4D	0,069	1	0,069	t3D (s3C)	0,062	4	0,249
w6D	0,057	1	0,057	t2D (s2C)	0,049	3	0,147
w3D	0,044	2	0,088	t5D (s5C)	0,047	2	0,094
w2D	0,040	1	0,040	t6D (s6C)	0,046	1	0,046
	1,000		2,811		1,001		3,139

The results of the HFE (2,811) and VFE (3,139) evaluation are plotted in the Denmark-Croatia Matrix, which we have shown in Figure 3.

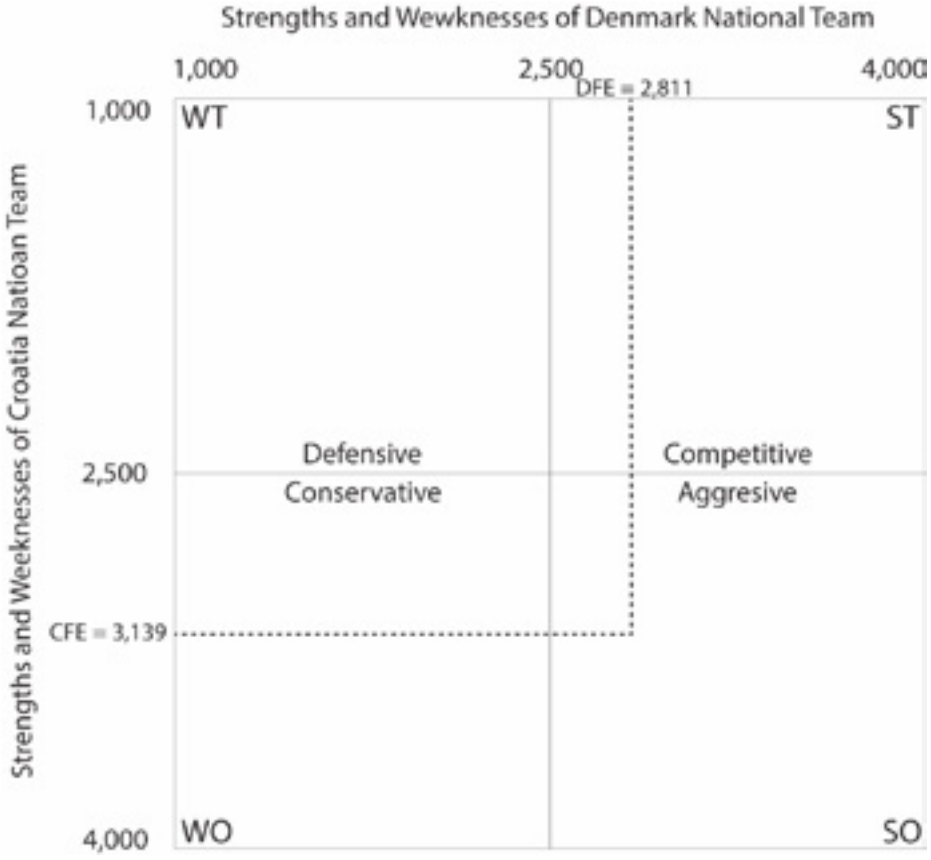

Figure 3. *SPACE Matrix Plot for team Denmark*

The diagram showed that the choice of Denmark's strategy for the match with Croatia should be an SO, i.e. an aggressive strategy. In other words, Denmark should use its strengths and opportunities, or play on Croatia's weaknesses, in order to win this match.

Based on the results obtained in the final stage of the research, the Game-Decision Stage, the TOWS Matrix was created and it outlined the specific goals setting pertaining to the upcoming game, as shown in Table 3.

Table 3. *TOWS Matrix – strategic goals*

		TEAM DENMARK (Strengthts and Weaknesses)	
		s1D (0,083) s2D (0,039) s3D (0,077) s4D (0,049) s5D (0,039) s6D (0,095) s7D (0,097) s8D (0,039) s9D (0,068)	w1D (0,081) w2D (0,040) w3D (0,044) w4D (0,069)
TEAM CROATIA (Weaknesses$_{Opportunities}$ and Strengthts$_{Thretas}$)	o1C (0,146) o3C (0,058) o4C (0,043) o5C (0,070) o6C (0,043) o7C (0,040) o8C (0,048) o9C (0,059) o10C (0,047)	SO strategy 1. disciplined and compact defense in line with all major defensive principles (s6D s7D s8D s9D vs o1C, o3C, o5C, o6C, o8C', o9C') = 0,926 2. transition with certain elements of positional attack (s1D, s2D, s3D, s4D, s5D, s6D, s8D vs o1C, o6C, o10C) = 0,639 5. peaking in form through continuity in competitive matches (s6D, s8D vs o1C, o4C, o6C, o7C) = 0,406	WO strategy
	t1C (0,118) t2C (0,049) t3C (0,062)	ST strategy 3. neutralize polyvalence of the defending team by delivering segmented attacks (s1D, s2D, s3D, s4D, s5D, s6D, s8D vs t1C, t2C, t3C) = 0,632	WT strategy 4. adjusting the offensive system formation to the opponent's defense (w1D, w2D, w3D, W4D vs t1C, t2C, t3C) = 0,463

According to the results shown in Table 3, we see that, should Denmark want to beat Croatia, it must set five specific goals in pre-game preparation stage. The goals have been ordered by priority, of which the first goal is crucial for Danish national team, i.e. if this goal fails to be met, it would be highly unlikely for Denmark to win the match.

Although our research plan envisioned a QSPM Matrix for this particular matter, it was later decided not to provide one since the point where the HEF and VEF intersect in the SPACE Matrix is far from both the x and y axes, so there was no need to evaluate the choice of strategy in this respect.

Discussion

Making right decisions about the choice of tactics has proven to be a decisive factor in winning matches in team sports (Weigel, Raab, & Wollny, 2015). Handball is a team sport where game and offense time limitations, coupled with the tactical choices a team makes, have a very significant impact on the overall decision-making process on the players' part, and which, as a consequence, decide which team will eventually come victorius (Nicolosi, Quinto, Lipoma, & Sgro, 2023). The process of decision-making is heavily dependent on the appropriate set of information on one's own and the opposing team.

The use of modern technologies enables the process of data collecting to be ever more efficient (Torres-Ronda & Schelling, 2017). To analyze both teams has become an indispensable part of pre-game preparations at the professional level in handball (Trunić & Milovanović, 2022). At the same time, the amount of information that the coach receives creates the phenomenon of information overload, therefore it is necessary to filter them and extract the most relevant pieces of information (Bawden & Robinson, 2020).

While selecting the most appropriate strategy in pre-game preparation stage, we could consider utilizing certain approaches that have been applied in business management (*Peatling, 2005)*. SWOT analysis is one such strategy, which enables a certain group of individuals to perform 60% better than their opponents (*Kessler, 2013)*. However, one might argue that sports and business management do not have much in common - „as the outcome would be that 'oil and water mix' - sports on the field/court/ice are not the same as business in the workplace" (*Grant, McKechnie, & Chint, 2008)*. But if there are strategies people use to beat their competition in a business environment, why wouldn't we use the same or similar set of tools to gain a competitive advantage over an opponent in sports (Ibid). The Scout Method (SM) is used in various team sports like football (Jamil & Kerruish, 2020), ice hockey (*Lignell, Rago, & Mohr, 2020)*, volleyball (Ciuffarella, Luca Russo, Masedu, & Valenti, 2013), tenis (Martínez-Gallego, Vives, Guzmán, Ramón-Llin, & Crespo, 2021), rugby (Zahidi & Ismail, 2018), basketball (Esteves, Mikolajec, Schelling, & Sampaio, 2021), waterpolo (Verlin, Gullikson, Mayberry, & Cliburn, 2019) etc. Handball is no exception in this regard (Ferrari, Sarmento, & Simões Vaz, 2019; Kumar & Chandrasekaran, 2017) The process that allows coaches to collect data which provide feedback on players' and team's performance is known as Match Analysis (Carling, Williams, & Reilly, 2005). It provides information on strengths and weaknesses of both teams and individual players (Costa, Garganta, Santos, & Teoldo, 2014). Advances in technology have exponentially increased the availability of data, but at the same time we have been witnessing an ever growing complexity in decision-making (Torres-Ronda & Schelling, 2017). The question now is – what is the most optimal way to interpret the plethora of information gathered in this process?

As the final result of our matrix calculation, we extracted Score Vectors of Denmark and Score Vectors of Croatia, which enabled us to see to what extent the key factors within each team's strengths and weaknesses affect the overall performance quality (Figure 2). Specifically, the most significant factors as far as the team Denmark is concerned are the following strengths: s7D "*two goalkeepers*" (9.705% of the total impact on the final score) and s6D „*current form*" (9.471%), followed by strength s1D "*organized positional attack*" (8.258%), weakness w5D "*goalkeeper dependency*" (8.385%) and w1D " *attacking deep defensive zones"* (8.093%). As far as the team Croatia goes, the most significant weakness is w1C "*Covid-19 protocol*" (14,423%), whereas the most significant strength is s1C „*adjusting the defense to the opponent*" (11,764%), which was also recorded as one of the greatest threats to the team Denmark.

DFE Matrix and CFE Matrix (Table 2) matrices are nothing less than IFE (Internal Factors Evaluation) and EFE (External Factor Evaluation) Matrix commonly used in economics and strategic management research (David et al., 2023). DFE Matrix and CFE Matrix results were 2.811 and 3.139 respectively. This indicates that the team Denmark had more observed strengths than weaknesses, whereas the same cannot be said about the team Croatia.

These two obtained results shown on the SPACE Matrix Plot for Denmark National Team (Figure 3) show that Denmark's strategy for this match is to be found in the SO quadrant. Situations like these are considered the most favorable ones for teams with multiple strengths when facing the opponent's weaknesses (Sikavica, Bahtijarević-Šiber, & Pološki Vokić, 2008). These kind of situations call for growth-oriented strategies, that is, an aggressive strategy in which the team Denmark must first put focus on its own strengths and set up an „aggressive" game plan.

The final stage of the study focused on specific goal setting based on the selected strategy form SO quadrant and the hierarchy of the goals set in TOWS Matrix (Table 3). The were 5 goals in total, out of which the first one was

considered radical in terms of its impact on the final score and a possible victory of the team Denmark. This goal was labeled „*disciplined and compact defense in line with all major defensive principles*". No other key factors should be disregarded whatsoever, the most notable ones being „*transition offense with certain elements of positional attack*" and „*neutralize polyvalence of the defending team by delivering segmented attacks*", and also two minor factors such as: „*adjusting offensive game plan to the opponent's defense*" and *„peaking in form through continuity in competitive matches"*.

There is a vast set of evidence that the following game segments have also a major impact on the final score: goal scoring position and its efficiency, number of goals scored by back positions (outside the 9 meter line) and its efficiency, 7 meter line (penalty throw) efficiency, and overall scoring efficiency (Ferrari, dos Santos, & Simões Vaz, 2014), as well as the total number of assists made (Popovich, Bezukladnova, Bezukladnov, & Goncharova, 2020). The offensive strategizing is recommended to be based on an increased number of fast attacks against unset defense, attacking the opponent *wide and deep* and with multiple individual actions (Rogulj, Vuleta, Milanović, & Čavala, 2011), whereas deep defensive zones should be attacked by well-set and organized offense actions Popovich et al., 2020). The national teams excelling in these regards have been the ones winning the games (Ferrari, Dias, Sousa, Sarmento, & Vaz, 2020). Indeed, the SWOT matrix formation in our study was highlighted by those characteristics as the key ones. For the team Denmark the key factors included: „*transition attack*" (s4D), *attacking efficiency* (s1D, s2D and s5D) and „*attacking versatility achieved through all-round scoring positions*" (s3D) and offensive weakness „*attacking inefficiency resulting from poor tactical solutions against seep defensive zones*" (w1D and w2D). The team Croatia was found to have one major attacking weakness, i.e. „*poor attacking solutions heavily dependent on right and left back performance*" (w5C and w9C).

As far as the defense solutions in modern handball are concerned, research show that compact defense with collective response is the preferred option since that is a highly adaptable formation, particularly when it comes to high pace and intensity games (Barreira, Musa, Morato, & Menezes 2021). The classic type of zone defense 6:0 is highly recommended since it is simpler to be formed than deep zone formations particularly in games with plenty of transitional attacks. The research on game-related statistics indicate that highly significant are technical mistakes made by the opponent (Antonis, Dimitris, ZacharoulaP, Vasilis, & Ioannis, 2019), as well as the total number of fouls committed, 2 minute suspensions, penalty throws and blocked shots (Rogulj et al., 2011). Also, the goalkeeper's efficiency is a strong predictor of a team's success on the professional level (Pavlinović, Foretić, Veršić, Uljarević, & Modrić, 2021). The experts involved in our study have found out that the team Denmark has „*strong, stable and disciplined defensive formation*" (s9D and s10D) coupled with phenomenal „*two goalkeepers*" (s7D), whereas their weaknesses include „*dependency on goalkeepers' performance*" (w5D) and „*tenacious 6:0 defense formation*" (w6D). As for the defense of the team Croatia, the following strengths were recorded: „*deep and shallow formation zone switching*" (s1C), „*swift offense-to-defense repositioning"* (s2C) and high „*motivation and defensive aggression*" (s3C). The team Croatia weaknesses were „*individual and team turnovers"* (w10C) and „*two goalkeepers*" (w2C). Also, one of the perceived weaknesses in the team Croatia was common line-up changes heavily affected by Covid-19 protocol and the change of generation in their national team (w1C, w4C i w6C).

It should mentioned of course that one of the main shortcomings of this research lies primarily in the fact that we did it only after this match had been completed. However, one of our main goals was to try to provide a theoretical framework for the Scout Method and decision-making about the proper strategy for the game (competition) by using qualitative and quantitative methods that have already been used in other scientific disciplines. We propose a similar study to be conducted before the actual game takes place, so that the further research provide an insight as to what extent such analyses may or may not be beneficial for coaching staff. Another problem is the applicability of this methodology in practice, primarily due to qualitative research relying brainstorming and the Delphi method, in which 12 of our research experts were involved. Scott Armstrong also emphasized the fact that it is necessary to involve 5-20 experts if we want to have a sound implementation of the Delphi method (Armstrong, 1985). Multiple research have proven the there is a high correlation between expert opinions in sports and results obtained by mathematical methods (Simović, Matković, Mijanović, & Vojvodić, 2019).

The match between Denmark and Croatia at the European Championship, played on January 22, 2022 in Budapest, ended with the final score of 27-25 in favor of Denmark. Shaping their game tactics around game-related statistics team Denmark gained an advantage at the very beginning of the game with their experienced players from

the starting line-up, many of which had already participated in numerous international level games of the highest caliber (s6D, s8D; w1C, w4C and w6C). Team Denmark managed to reach the „radical" goal, which was extracted in TOWS matrix and labeled as „*disciplined and compact defense in line with the basic defending principles and able to eliminate strengths of team Croatia and take advantage of the opponent's weaknesses",* which derives from SWOT analysis an the following items: s6D, s7D, s8D, s9D, o1C, o3C, o5C, o6C, o8C and o9C. Taking game-related statistic as the base of its tactics, the team Denmark managed to impose its standard defending formation, as highlighted in other research as well (Antonis et al, 2019), and force team Croatia to make more turnovers, whereas Danish players had three steals more than their opponents, higher goalkeeper's saves percentage particularly from left and right back positions. Team Denmark also managed to camouflage their potential weaknesses (w5D and w6D), by insisting on a disciplined approach in defense and thus reduce their „*goalkeeper dependency"* (w5D). By doing so they also managed to reduce the shortcomings of their „*tenacious 6:0 defense formation"* (w6D) despite the fact that the most efficient player from team Croatia was the pivot (center forward) position player. Team Denmark identified the offensive pattern in team Croatia's attacks, i.e. from center back (s5C) to other positions, and pressed these players with additional defending burden, which eventually resulted in team Croatia's reduced efficiency from center back position (only 30%). This tactical decision was a conscious effort to let team Croatia attack from right and left back positions. Some previous studies have highlighted team Denmark's tendency to let their opponent's center back take shots since their goalkeepers have had an increased efficiency while defending these shots (the numbers in that regard being 56% in 2019 and 67% in 2021) (Parthipan & Kalidasan, 2022). Team Denmark focused its attention on team Croatia's center back Luka Cindric and limited him only on two goals while allowing him to record 8 assists, which was in line with team Denmark's tactical decision to decrease his shot efficiency. Speaking of the team Denmark's 6:0 defense formation efficiency, let's just point out that the goalkeeper Niklas Landin Jacobsen had 45% efficiency (5/11 saved goal attempts). Furthermore, team Denmark's goal keepers had a high efficiency from back position shot attempts in the finals of the following World Championships: 2019 WC 67% (4/6) and 2021WC 78% (7/9) (Ibid). The TOWS matrix indicates that team Denmark should make advantage of "*transition offense with certain elements of positional attack"*, which derives from the the SWOT matrix and the following proposed items: s1D, s2D, s3D, s4D, s5D, s6D and s8D; o1C, o6C and o10C. They managed to use this particular strategy and neutralize team Croatia's strengths thus minimizing difficulties when attacking deep defensive zones – something team Denmark and other Scandinavian national teams have been known to have problems with. Game-related statistic points in the same direction since team Denmark was very efficient when it came to transition attacks – 82% (9/11). Goals scored in transitional attacks (counterattacks) have been known as one of the most impactful on the final score (*Hatzimanouil, Lola, Giatsis, & Skandalis, 2023)*. As far as the positional attacks are concerned, team Denmark excelled in that aspect as well. Here are percentages for team Denmark back position players' efficiency: Mikkel Hansen 5/8 (62.5%), Mathias Gidsel 5/6 (83%) and Rasmus Lauge Schmidt 4/7 (57%). Also, left and right wing position players had remarkable efficiency percentages 88% (7/8). Their penalty throw efficiency was at 100% while at the same time team Croatia's goalkeepers recorded only 23% efficiency. This is to confirm that the third tactical goal of team Denmark was reached, i.e. „*neutralize polyvalence of the defending team by delivering segmented attacks*", as can be seen in the SWOT matrix s1D, s2D, s3D, s4D, s5D, s6D and s8D; t1C, t2C and t3C. Furthermore, team Denmark fulfilled the fourth tactical goal (TOWS matrix), i.e. „*adjusting the defense to the opponent*" – that specific goal was achieved by performing a cover-up of its own weaknesses and eliminating team Croatia's strengths (SWOT matrix: w1D, w2D, w3D, w4D and t1C, t2C i t3C). The fifth goal was also achieved, i.e. *„peaking in form through continuity in competitive matches",* as can be concluded from the SWOT matrix: s6D, s8D; o1C, o4C, o6C and o7C. This might be related to the fact that team Denmark was one of the rare teams at this championship without serious issue with their line-up and Covid-19 protocol. Regardless of that fact, every team still needs to have a coaching staff able to select the right players to deliver their tactical and strategic plans on the court and, by doing so to build the team's form so as to peak at the right time (Panagiotis, Konstantinos, & Ioannis, 2020). All the above confirms that team Denmark is at the very top of European and world handball (Pavliuk, 2022), and provides ample evidence that the prediction model we used in our study was accurate.

Every sport is abundant in uncertainties of potential outcomes, most probably due to the stochasticity of various game elements that require proper analysis, evaluation, prediction, and forecasting. To achieve reliable results in that respect, one must use the most appropriate analytical and methodological procedures and tools. There are no tools

to predict the exact final score of a game, which is basically very fortunate and innate to sports as it leaves plenty of room for speculation, biases, miscalculations and strategical mistakes, all of which are the essential parts of any sport and keep the spectators coming to sporting events. Every analytical forecasting is surely more than welcome, but there should always be a margin left for the uncertainties which can heavily influence the final score (Simović & Komić 2021).

Conclusion

SWOT analysis is a method that has been used in sports for a long time in order to provide coaches with a framework to strategize and plan tactical solutions before the actual game. SWOT analysis can be used by handball coaches on a regular basis, and can impact the viability of the decision-making process. This paper has used the most recent SWOT tools and procedures, i.e. qualitative, quantitative and mathematical methods, in order to set the right strategic goals for the game we researched. The key strengths and weaknesses for both teams were extracted using qualitative methods. The comparison of both teams' strengths and weaknesses was made by means of AHP mathematical method, and then through matrix calculation we were able to determine the importance of each factor on the final score of the game. Weight Scores were also calculated for each factor and each team separately (2.811 for team Denmark and 3,139 for team Croatia). The SPACE Matrix Chart indicated that the strategy for this game was best defined as the focus on the quality of team Denmark's two goalkeepers, peaking in form at the right time, and positional attacking pattern against the opponent and exploiting team Croatia's weaknesses heavily affected by the Covid-19 protocol. The TOWS method pointed out 5 strategic goals, one of which was *disciplined and compact defense.* Should the players be able to meet that goal and materialize the proposed strategic solutions set by the coaching staff, team Denmark is to come out as the winning team against the opponent.

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