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**APPLICATION OF PORTFOLIO MATRIX FOR
RESOURCE ALLOCATION PURPOSES IN SPORTS**

Theses of Doctoral Dissertation

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Introduction

In Hungary, sport has become a strategic sector since 2011, as a result of which the resources going to the area have increased significantly. In the past 10 years, the allocation of resources has been done by several methodologies and by several controllers, which methodologies have not been published. The sports portfolio matrix is a methodology for the distribution of resources available for two-dimensional sports, operating along transparent guidelines required by the EU and domestic sports and sports organizations.

The matrix provides assistance to sports leaders at the state, municipal and association level. The sports portfolio matrix shows the location of each sport in the framework adopted from the BCG matrix along two dimensions - effectiveness and importance/tradition. The methodology takes into account the popularity of the investigated sports, their active and passive consumers, the supply of human resources, their infrastructural situation, as well as the quantity and effectiveness of adult and youth athletes. Based on the examined data, the value of each sport is determined in the dimension of tradition/importance and effectiveness. The obtained values are represented in a BCG matrix adapted to the sport.

However, the sports portfolio matrix does not only enable visual representation, but also offers a resource distribution method based on the received values of the sports. The first level of distribution is the state, the second level is the municipality, while the third level is the associations. The sports portfolio matrix includes several research areas and several application dimensions.

The purpose of the research, hypotheses

Since the beginning of the 2010s, the government of our country treats sport as a priority sector. One of the additional conditions for the

continuity of the started developments is that behind the distribution of the resources available for sports there is a uniform model that can be calculated by everyone. As a result of research carried out at several stages and levels over the past three years, the sports portfolio matrix distribution methodology was developed, which aims to provide guidelines for the distribution of resources in both the domestic and international sports sector, from the level of state resource distribution to the association level. In my research, I am looking for answers to the following main questions:

- a) What are the main dimensions that enable a uniform comparison of different sports?
- b) How can the portfolio matrix be used as a sport distribution model?
- c) What differences should be applied at the state and association levels for a resource distribution model?

Regarding the questions formulated in the thesis, I formulated the following hypotheses in connection with the research:

- H1: I assume that the tradition of sports can be incorporated as indicators along the dimensions that enable a uniform comparison of sports?
- H2: I assume that the quantity and quality of adult and junior athletes can be included as indicators along the dimensions that enable a uniform comparison of sports?
- H3: My assumption is that the model developed in the thesis creates a quantitatively based model that makes the distribution of resources between sports more supportable?

The main research goal is to develop a methodology for both the highest sports management and the associations, in which all sports can be judged according to the same indicators. In addition to the

above research goals, we use an additional assumption during the thesis, according to which the preferences of the capital city and rural sports leaders involved in the research differ in the approach to sports in terms of effectiveness and tradition.

Material, method

The sports portfolio matrix formed as a result of the thesis was created in several phases, each of which is presented separately. The phases of the research and the simulations based on it were as follows:

Research:

1. Pilot research among sports organizations in Baranya county.
2. Research among prominent rural and metropolitan sports associations.

Simulations:

1. Examining the application of the sports portfolio matrix through the example of state resource distribution, focusing on the distribution between sports associations.
2. Examining the application of the sports portfolio matrix through the example of state resource distribution, focusing on the distribution between departments.

The large sports associations of Baranya county were involved in the pilot research. The condition for participating in the research is that you have at least 5 professional classes in which at least 250 people play sports. The following 6 Baranya sports associations met the conditions in the research conducted at the end of 2020 (PEAC, PVSK, PSN Zrt. Komlói Bányász, Mohácsi TE, Szentlőrinc SE). The list of prominent rural and capital associations is in 1809/2018 (XII.23.). s. and 1410/2021. (VI:30.) It was contained in government

decisions. 14 of the 24 priority clubs returned the completed questionnaire. More than 70% of the sports associations in the capital city included in the research filled out the questionnaire (four out of six associations), while in the case of the priority sports associations in the countryside, this ratio barely reached 50% (9 out of 17 priority associations filled it out). The following 40 sports were included in the pilot research. In the course of the research conducted for prominent sports associations in the capital and rural areas, the list of forty sports included in the pilot research was expanded by 10 sports.

An online questionnaire (Google Forms) was the basis of both the pilot research and the research conducted among prominent sports organizations, the difference between the two researches being the method of data recording. During the pilot research, the questions of the online questionnaire were recorded with the help of interviewers at the end of 2020, while for the prominent sports association, the questionnaire was opened online in the months of April and May 2022. For the latter target group, we did not send the online questionnaire directly from the researcher's side, but with the help of the National Association of Sports Associations. Due to the personal opinions and additions related to the sports, the questionnaire took an average of one and a half hours to complete during the personal data collection, while this time was 50 minutes in the case of online completion. In order to increase the willingness of the prominent sports associations to respond, a personal contact was also made, thanks to which we managed to ensure a completion rate exceeding 50%.

In addition to age data, the first third of the questionnaire was designed to collect sports management experience. In the first stage, in addition to the collection of experience and age data, the experience was also recorded, i.e. in which sports the given sports leader says that he has relevant experience in the given sport. The first part of the research prepared for prominent sports organizations was supplemented by specifying the association of the person completing it. In the pilot research part, the association of the respondents was not assigned to

the person completing the questionnaire. In the second and third stages of the research, we asked the responding sports leaders to consider the past 10 years for each question. The second stage of the research examined the importance and social embeddedness of sports. In the case of the pilot research, the interpretation framework was the NUTS III, i.e. county level. In the case of prominent sports associations, the interpretation level was the NUTS II level, i.e. the request for evaluation according to statistical regions in relation to rural associations, while those filling in the capital had to give their answers in relation to Budapest. The third stage of the research focused on the effectiveness of the investigated sports. In the case of the examined aspects, there was always a 4-part response option, in which the answer I don't know was evaluated with 0 points and was not included in the research, while the remaining three answers were given 1-2-3 points. In each case, we gave 3 points to the highest category and one to the lowest, and then these values were added and averaged for the respondents for each question. During the research, however, we did not only treat the obtained value of the sports as a simple average, but also assigned a weight to the investigated aspects. The weights were compiled based on expert opinion, with the involvement of 4 domestic sports leaders. The answers to the individual questions were given the following weights:

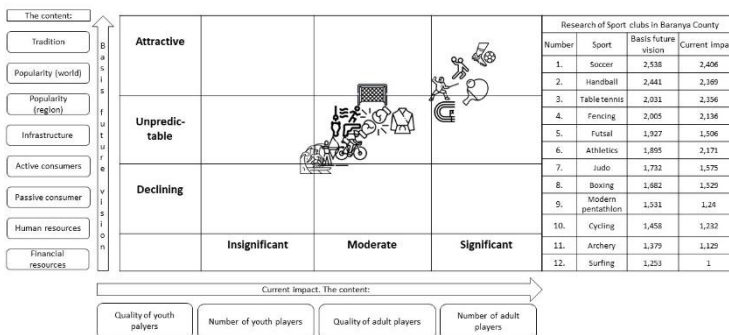
- Tradition, Sport recognition in the world, Sport recognition in Hungary/region, Infrastructural provision: 0.1
- Number of active and passive sports consumers, and availability of human and material resources: 0.15
- Quality replenishment, quantity at adult level: 0.2
- Quantity replenishment at level: 0.25
- Quality at adult level: 0.35

The value of the weights in both the tradition dimension of importance and the dimension of current effectiveness is given as one. For the sake of illustration, 12 of the 40 sports of the pilot research and the 50 sports of the priority sports association research were selected. The selections were supported by the following reasons: The selected sports were primarily included in the research because of their importance in Hungary. Among the sports presented in the sample, the three team sports with TAO support (soccer, handball, futsal) and seven individual sports that belong to the priority state category were selected. In order to cover the entire domestic sports segment, surfing and archery were also selected as elements categorized as catch-up sports in our country.

Results:

The selected 12 sports were placed in the already presented matrix, along the x-axis of which the current effectiveness (quantity and quality of junior athletes, quality and quantity of adult athletes) was plotted. The y-axis is used to show tradition and importance. The axis includes data on tradition, popularity, infrastructural provision, human resources, material resources, and the number of active and passive sports consumers given in relation to sports. Given that the created matrix was transformed from a portfolio matrix and focused on the examination of sports, we named it officially the sports portfolio matrix, which can also be referred to as the "sport portfolio" matrix as an abbreviated name. One of the possible applications of the matrix is the pictorial representation of the sports included in the research along the axes of importance/success. In the case of the sports portfolio matrix, after the pilot research for the Baranya county, a survey of a nationwide network followed, on which the distribution methodology was built, and the names of the categories, similar to the BCG matrix, were done.

1. Figure 1: Sports portfolio matrix, Baranya



Source: edited by the author

Determining the value of different sports recorded in the figures showing the sports foil matrix is an important stage of the research, but not the end point. The field of use of the research offers many additional possibilities, of which the resource distribution option is now presented through detailed examples. The presented examples can be applied even at the governmental, municipal or regional level. In the 2*2 division matrix of the BCG matrix, each quarter was given a different name, and we proceeded similarly in the case of the sports portfolio matrix:

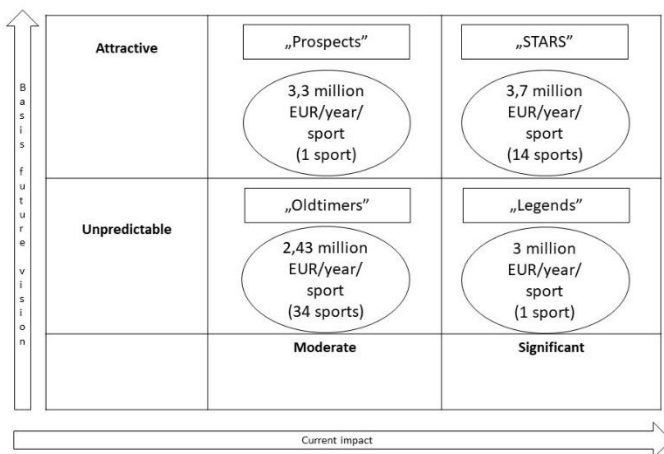
- Sports whose current effectiveness is moderate and whose importance is unpredictable are called "old-fashioned". The English name of the category is "oldtimer".
- Those sports whose current results are moderate and whose importance is unpredictable, we called them "probable", and in foreign language publications we used the term "Prospects".
- The third category was called legends, characterized by considerable success and an unpredictable future. In our

research, only gymnastics is included in this category, but several sports are very close to the dividing line of the category (table tennis, fencing, karate, fiddling). What these sports have in common is that they are individual sports, their ability to generate income is very low, their traditions go back a long time, and their results are relatively constant.

- In the event that the current performance is also high, and the importance and future vision are also high, the sports can be assigned to the highest category of the BCG matrix, called "stars".

To demonstrate the use of the sports portfolio matrix, we present an example of the Hungarian government's resource allocation. The Hungarian government spent about HUF 55 billion on competitive sports in 2022 (Act XC of 2021).

2. Figure 2: Sports portfolio matrix, categories



Source: edited by the author

Sports associations can use the sports portfolio matrix in several ways, the first option of which is to distribute the resources available to them using the data of the priority sports association research. That is, they collect the list of the departments that work for them from the list of sports, and the distribution of resources is done in a similar way to the state sample distribution. During the simulation, a large rural association with 1,300 certified athletes is included in the sample, with 16 professional divisions (existing club, with known internal resource distribution in 2023).

The divisions of the investigated association are as follows: table tennis, wrestling, futsal, archery, bicycle, handball, kick-boxing, basketball, football, parasport, volleyball, kite boat, dance sport, gymnastics (aerobic), fencing, water polo. The association's resource allocation based on basic research is thus a method that does not take into account the association's headcount data, the championship divisions of each discipline, effectiveness, etc.

In the case of associations, therefore, the sports portfolio matrix can primarily be used as a starting point, a base. In order to use the recorded research results as a base, it is necessary to adapt the association's characteristics and expectations, as well as the indicators that the club recorded in its strategies. In the case of the association examined during the simulation, the following new indicators were introduced as the dimensions of the association level: competition category, personnel data, TAO sport (yes, no), number of national teams, hall rental fees.

It is clear from the sample simulation that the basic values provided by the sports portfolio matrix contribute well to the presentation of the differences between the individual sports, however, it is also clear from the example that the matrix provides a kind of framework only for the association level, for its precise operation the club's own indicators.

Summary:

With regard to the assumptions, it is necessary to comprehensively state that the sports portfolio matrix is a model based on a very broad base in terms of input indicators. Due to the high number of inputs, the model can also build on a broad base and thereby ensure the comparison of different sports. Hypotheses recorded at the beginning of the thesis:

- H1: I assume that the tradition of sports can be included as indicators along the dimensions that enable a uniform comparison of sports?

- H2: I assume that the quantity and quality of adult and junior athletes can be included as indicators along the dimensions that enable a uniform comparison of sports?

- H3: I assume that the model developed in the thesis will create a quantitatively based model that makes the distribution of resources between sports more supportable?

In the matrix, tradition, tradition, importance, vision of the future recorded during the H1 assumption were placed in the matrix. During the development of the model, it was given a weight of 0.1. Regarding the assumption H1, the thesis was supported by literature, after which the tradition, as an actual input indicator, was given a role as one of the indicators of the sports portfolio matrix. Based on the above, hypothesis H1 was supported in the literature and, based on it, the sports portfolio was used as an indicator in the matrix model. The tradition indicator recorded in hypothesis H1 contributes to the broad base and operation of the model, i.e. the assumption can be recorded as supported.

Those recorded during the H2 assumption were placed as four separate indicators in the sports portfolio matrix. The indicators quantity of youth athletes, quality of youth athletes, quantity of adult athletes, and quality of adult athletes together represent the current

effectiveness/impact dimension of the sports portfolio matrix. During their literature analysis, they were identified as essential indicators for building the model. During the mathematical development of the model, the following weights were applied: amount of replacement athletes 0.25; quality of youth athletes 0.2; amount of adult athletes 0.2; the quality of adult athletes is 0.35. Based on the above, the indicators recorded in the H2 hypothesis were supported in the literature and based on that, they were applied in the sports portfolio matrix model. The four indicators recorded in hypothesis H2 contribute to the broad basis and operation of the model, i.e. the assumption can be recorded as supported.

Regarding the assumption of hypothesis H3, the possibility of application of the sports portfolio matrix developed during the thesis at the state, regional and association level was also presented. The substantiation of the presented source distributions is represented by the indicators selected for the model, through which a unit measurement system was established, so the substantiation can be verified in terms of the hypothesis in terms of the thesis. However, the true support of the hypothesis can only be provided by use outside the scope of the thesis, which the author hopes will be done not only in the sports association he represents, but widely.

New findings:

Among the findings formulated in the summary of the thesis, we can mention as a new finding that a new area of the diverse application area of the BCG-Matrix has been identified.

Naturally, in addition, the complexity of the entire methodology can be considered a new approach, since there is a small amount of comparative literature in the subject area.

The multi-level distribution model presented in the thesis can be considered novel for two reasons. The first reason is basically the presentation of the topic, while the second reason is the presentation of at least three levels of applicability and at the same time its support. As a result of the research, completely different sports were compared, and a model was created through which the question posed at the very beginning of the thesis ("Why so much?") becomes answerable. The "Why so much?" it is possible to give the answer to the question based on the data of the matrix along a unified indicator system.

Vision:

The future vision of the methodology can move in several directions, the most significant of which is the comparison of large metropolitan and rural associations with several departments. In this case, in addition to summarizing the results obtained in relation to the specific sports in the period given by the matrix, it is necessary to define the external indicator system, similar to the framework used for the internal distribution model. In advance, for the association comparison, it is necessary to assign personnel data, league divisions, and training opportunities as external indicators. Looking to the future, one of the most significant research directions is therefore the comparison of prominent rural and metropolitan sports associations based on the results of the sports portfolio matrix.

The vision of the methodology can of course not only be expanded in terms of usage possibilities, but its design and sampling can also be further refined. In the sample presented in the thesis, only sports managers are included, who naturally can distort the results in the direction of their own preferred sports due to their subjectivity. In the future, during the research, it is also necessary to involve the "people on the street" in the answers regarding the evaluation of sports. Another possible direction for improvement is the review of the weights assigned to each dimension.

List of publications:

Hoffbauer, M., Ács, P., Paár, D., Stocker, M. (2023). Sportági portfólió mátrix és potenciális szerepe a sportszervezetek belső forráselosztási rendszerében. *MAGYAR SPORTTUDOMÁNYI SZEMLE* 24 : 102 p. 59.

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Hoffbauer, M., Ács, P., Stocker, M., Paár, D. (2022) APPLICATION OF PORTFOLIO MATRIX FOR RESOURCE ALLOCATION PURPOSES IN SPORTS: THE CASE OF HUNGARY. *HEALTH PROBLEMS OF CIVILIZATION* 16 : 4 pp. 351-359. , 9 p.

Hoffbauer, M., Ács, P., Paár, D., Stocker, M. (2021). Sportági portfólió mátrix és potenciális szerepe a hazai forráselosztási rendszerben. *MAGYAR SPORTTUDOMÁNYI SZEMLE* 22 : 91 (3) pp. 62-62. , 1 p.

Journal announcements, abstracts, presentations:

Paár, D., Kovács, A., Stocker, M., Hoffbauer, M., Fazekas, A., Betlehem, J., Bergier, Ács, P. (2021). Comparative analysis of sports consumption habits in Hungary, Poland and Germany. *BMC PUBLIC HEALTH* 21 : Suppl 1 pp. 1481-1489. , 9 p.

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Paár, D., Stocker, M., Oláh, A., Hoffbauer, M., Meszlényi, E.; Betlehem, J., Bergier, J., Ács, P.: Comparison of Sport Expenditures in Hungary, Poland and Germany (2019). F., *Salonna (szerk.) Abstract book for the ISBNPA 2019 Annual Meeting in Prague. Prága, Csehország : International Society of Behavioral Nutrition and Physical Activity 1,266 p. pp. 1160-1160.*, 1 p.

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Stocker, M., Ács, P., Paár, D., Betlehem, J., Oláh, A., **Hoffbauer, M.**, Szabó, P. (2019). A fizikai inaktivitás gazdasági terheinek alakulása 2005-2017 között Magyarországon. *MAGYAR SPORTTUDOMÁNYI SZEMLE* 20 : 2(79) p. 83 , 1 p.